



## Historisches Haus



Operazione co-finanziata dall'Unione Europea, Fondo Europeo di Sviluppo Regionale, dallo Stato Italiano, dalla Confederazione elvetica e dai Cantoni nell'ambito del Programma di Cooperazione Interreg V-A Italia-Svizzera. (Codice progetto 603882)

## Einführung

The valuable residential building, due to the passage of time and lack of maintenance, has come to the present day in conditions of advanced state of degradation from which resulted the conservative renovation project carried out in the two-year period 2021 to 2022. The building is under protection as it is within the perimeter of the ancient cores of specific historical and architectural interest. In the conservative intervention, technological systems have been included to meet the renewable share of consumption. Specifically, among the renovation of the whole roof, the portion on the south and east slopes, not visible from the public road, has been covered with a 6.5 kWp photovoltaic system made of photovoltaic module produced by GruppoSTG, while on the other pitches the traditional local stone covering was laid.

## Designansatz

In line with the Superintendence's prescription, the photovoltaic system has been camouflaged thanks to the use of 'dark' photovoltaic tiles, completed with passive ceramic elements shaped on site and dark in color. From the optical cones with which the south façade has been analyzed, the inserted technological system does not alter the perception of the south façade.

## Ästhetische Integration

The single photovoltaic tile is a frameless sandwich consisting of a 4 mm sunlight-transparent front glass and a 4 mm 'black' rear glass whose coloring is obtained by virtue of the use of a vitrifiable paint applied just before the tempering process. The insertion of high-efficiency monocrystalline cells between the two glasses leads to the obtaining of an overall dark color of the element.

## Energietechnische Integration

The energy produced by the photovoltaic system is used primarily to meet the building's electricity needs; Thanks to the presence of a storage system, about 70% of the building's needs are covered (heat pump for heating and cooling the building, heat pump water heaters for domestic hot water, all household appliances, home automation and lighting).

## Technologische Integration

Moreover, thanks to the special assembly system, the wiring between elements is concealed in the space below, which acquires the connotation of a technical passage space as well as being functional for ventilation under the tile. In this space are located the power optimizers that in this project have been combined with photovoltaic tiles to improve their performance and for monitoring needs.

## Entscheidungsfindung

Operating in an environment subject to landscape protection, the aesthetic aspect has been crucial in order to preserve the morphological, chromatic and cultural character of the architectural heritage. We therefore opted for a technological solution that would lead to visual as well as spatial compatibility.

## Lessons learnt

Since this is a BIPV system currently installed in other constrained contexts, no procedural problems were found; the high inclination of the pitches required the use of the smaller version of the photovoltaic tile that was better maneuverable at that altitude.

## PROJEKTDATEN

<b>Projektart</b>	Nachrüstung
<b>Gebäudefunktion</b>	Wohnen
<b>Einschränkung</b>	denkmalgeschütztes Gebäude
<b>Bautechnik</b>	Vorindustrielle
<b>Gebäudeadresse</b>	Frazione Vignamaggiore 20, Montecrestese (VB), Italien

## BIPV-Systems

### BIPV-SYSTEMDATEN

<b>Architektonisches System</b>	opakes Dach
<b>BIPV-Integrationsjahr</b>	2022
<b>Active material</b>	monokristallines Silizium
<b>Modultransparenz</b>	undurchsichtig
<b>Modultechnik</b>	Glas-Glas, verstecktes PV, Standardmodule
<b>Systemleistung [kWp]</b>	6,5
<b>Systembereich [m<sup>2</sup>]</b>	37,5
<b>Modulabmessungen [mm]</b>	1000 x 750 x 9
<b>Modulorientierung</b>	Süden, Osten
<b>Module kippen [°]</b>	38
<b>Jährliche PV-Produktion [kWh]</b>	7950

### BIPV-SYSTEMKOSTEN

<b>Gesamtkosten [€]</b>	33000
<b>€/m<sup>2</sup></b>	880
<b>€/kWp</b>	5077

## Stakeholder

### Hauptgebäudeplaner

Arch. Simone Giovanna

### BIPV-Systemdesigner

GruppoSTG Srl

### Installateur des BIPV-Systems

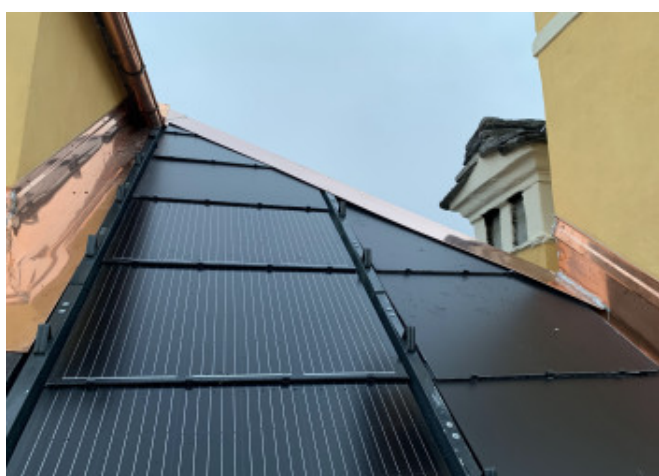
GruppoSTG Srl  
Via P. Paleocapa 19, Bergamo (BG), Italien  
+39 035-0510171  
<https://www.gruppostg.com/it/>

### Hersteller von BIPV-Komponenten

GruppoSTG Srl  
Via P. Paleocapa 19, Bergamo (BG), Italien  
+39 035-0510171  
<https://www.gruppostg.com/it/>

### Betriebsleiter

Ing. Andrea Bonacci



Autor der Fallstudie:

GruppoSTG Srl