



Multi-family house in Appiano

Introduzione

The PV system is integrated on four dormers, on the western roof slope of a residential building built in 1977 in the historical town centre of Appiano.

Integrazione estetica

It represents an interesting retrofit installation where the dark surfaces of the photovoltaic modules are installed next to the traditional roof tiles. This contrast is not visible from the surrounding building or from the street (building owner)

Integrazione energetica

With a nominal power of 1.92 kWp, the BIPV system covers almost the 70% of the top apartment's electricity demand thanks to an annual energy production of around 1,900 kWh. The photovoltaic output is especially used for the building conditioning system (building owner).

Integrazione tecnologica

The BIPV plant is composed of 32 thin-film amorphous silicon standard modules (Kaneka K60). The modules are installed on aluminium planks which are fixed on the dormers' metal sheets through special grab connectors. This mounting system does not require drilling the metal sheets, ensuring the roofs weather tightness. The natural ventilation of the PV plant is guaranteed thanks to an air gap between the modules and the roof.

Processo decisionale

The building owner decided to install a photovoltaic plant in order to balance the increase of the electricity demand following the installation of a new air-conditioning system. He designed the PV plant as a distinctive in-roofing system, using the existing dormers as support. The purpose was to hide the modules from view, covering the dormers with the same shape and size. In this way, the difference between the plant surfaces and the roof tiles is not noticeable (building owner).

Lessons learnt

The PV integration had good results concerning several aspects. Aesthetically, the designer met the objectives to keep the original homogeneous surface of the pitched roof by placing uniformly the modules on the dormers. A better aesthetic integration could have been performed by closing the air gaps, but the modules are hidden from view so it was not necessary to do so. Economically, the selected module technology (with low efficiency) allowed the photovoltaic plant to stay within the small plant's category of the Italian energy service management body (GSE). Technically, after the construction work

was finished, a minor intervention was required in order to avoid snow damage on the roof gutter (building owner). As a multifunctional technology, BIPV should be designed taking several targets into account (e.g. the ones mentioned above) which have to be balanced according to the main project purposes.

DATI EDIFICIO

Tipologia progetto	Riqualificazione
Destinazione d'uso	Residenziale
Indirizzo edificio	Appiano (BZ), Italy

Sistemi BIPV

DATI SISTEMA BIPV

Sistema architettonico	Opaque roof
Anno integrazione BIPV	2007
Active material	Amorphous silicon
Trasparenza modulo	Opaco
Tecnologia modulo	Vetro-backsheet, FV non riconoscibile, modulo standard
Potenza sistema [kWp]	1.92
Area sistema [m²]	30
Dimensioni modulo [mm]	960 x 990
Orientamento moduli	West
Inclinazione moduli [°]	8
Produzione FV annuale [kWh]	1900

COSTI SISTEMA BIPV

Costo totale [€]	10000
€/m²	333
€/kWp	5208

Stakeholders

Progettista principale

Building owner

Progettista sistema BIPV

Building owner

Installatore sistema BIPV

PVEnergy Srl

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Produttore componenti BIPV

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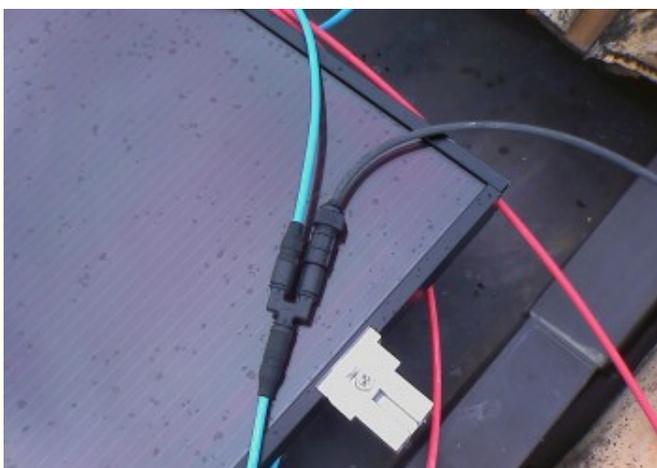
<https://www.kaneka.co.jp/en/>



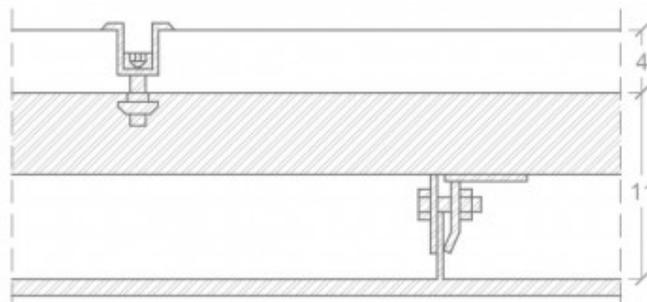
Aerial view of the building: the modules contrast with the traditional surrounding roofing systems © building owner



The building roof is higher than the other ones so that there is no evidence of the modules from the surrounding © building owner



Detailed view of the modules cables and the special fixing grab © building owner



Technical detail of the BIPV mounting system, re-drawn by Eurac © Phys. Francesco Nesi



The modules are distanced from the dormers metal sheets © PVEnergy



The BIPV plant is slightly tilted: this requires high care for snowfalls © building owner

Autore caso studio:

Eurac Research