Castaneum Center

Introduction

In 2008 the municipality of Velturno launched a call for a tender for the building design. Arch. Albert Colz won the competition, with a first project proposal that did not consider the photovoltaic implementation. Later, the PV was integrated into the plan. Elektrostudio was mainly responsible for the technical design and the installation of the PV system. Obrist GmbH was chosen as modules and system supplier. The building was completed in 2015.

Aesthetic integration

Castaneum center is a mixed-use building in Velturno, a little village located on a sunlit hill of South Tyrol. The building's facades are characterized by a modern appearance. On the roof, a photovoltaic plant is integrated replacing the traditional roofing materials. It is inserted in the context of historical houses with their traditional gabled roofs. The building preserves the tradition with a dark-pitched roof, with a decreased tilt angle, so that the BIPV modules, covering most of the available surface, are not visible from the street.

Energy integration

The BIPV plant was sized to produce about 60,000 kWh, yearly. It was estimated to cover most of the building electricity demand as well as feeding a large amount of energy into the grid (Arch. Albert Colz). The solar power is not the only kind of renewable energy used in the building. The district heating plants of Velturno supplies the building's thermal demand. This wide use of renewable energy contributes to the CasaClima A certification of the building.

Technology integration

193 PV modules (WINAICO WSP-M6 PERC Series) are integrated on the roof. This module typology is particularly suitable to be placed on high sunlit surfaces. It is characterized by the anti-PID (Potential Induced Degradation) technology, aimed to avoid a phenomenon that, enforced by high temperature and high level of humidity, can provoke permanent degradation of the p–n junctions. The modules are installed on the concrete roof surface and follow the gable shape. They are fixed with aluminium crosswise clamps that create a gap between the PV panels and the concrete, allowing natural ventilation of the plant.

Decision making

The municipality of Velturno decided to apply photovoltaic technology in order to directly produce renewable energy on-site. Arch. Colz proposed to integrate the PV plant on the roof, so that it doesn't compromise the building aesthetic value and it is an energetically effective solution, not subject to shading between panels (Arch. Albert Colz).

Lessons learnt

From the start of BIPV plant design phase, the aesthetic viewpoint played an important role. The photovoltaic surface was completed with optically matching black powder-coated panels, exactly aligned with the modules. Further, gangways— that partly correspond to the roof ridge—were installed for maintenance operations of the PV plant. Technically, an adjustment of the initial plan was needed. The PV panels were initially meant to be fixed to the building's steel structure directly, causing probable heat bridges through the concrete roof. The problem was solved with a design modification (Arch. Albert Colz). This highlighted the importance of performing detailed evaluations in designing complex components as a BIPV system.

PROJECT DATA

Project type	new construction
Building use	institutional
Building address	Piazza Silvius Magnago 1, Velturno (BZ), Italy

BIPV systems

BIPV SYSTEM DATA

Architectural system	Opaque roof
Integration year	2015
Active material	Monocrystalline silicon
Module transparency	opaque
Module technology	glass-backsheet, recognizable PV, standard modules
System power [kWp]	50.2
System area [m²]	316
Module dimensions [mm]	1,665 x 999
Modules orientation	North-West, South-East
Modules tilt [°]	7 to 4
Annual FV production [kWh]	60000

BIPV SYSTEM COSTS

Total cost [€]	130000
€/m²	411
€/kWp	2590

Stakeholders

Main building designer

Arch. Albert Colz

BIPV system designer

Elektrostudio, Obrist GmbH

BIPV system installer

Elektrostudio
Anello Nord Stegona 25, Brunico (BZ), Italy
0474 530924
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Obrist GmbH
Via Pillhof 7, Appiano (BZ), Italy
info@obrist.bz.it +39 0471 971 800
https://www.obrist.bz.it/en

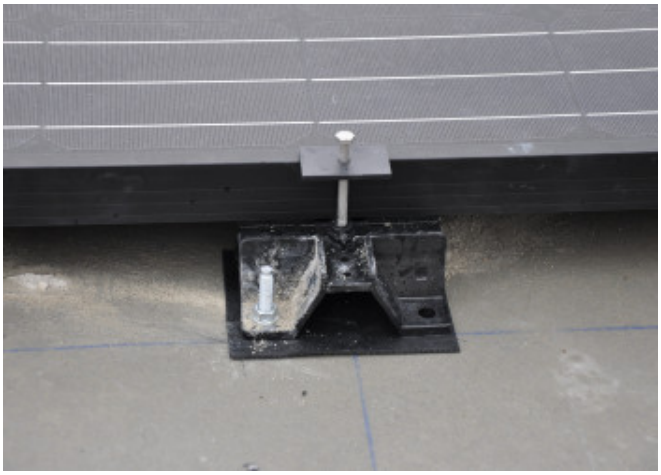
BIPV components producer

Win Win Precision Technology Co., Ltd
Gongdao 5th Rd., East Dist., Hsinchu City 300, Taiwan
info@winaico.com +886 3 568 8699
https://www.wwpt.com.tw/index.php?lang=en-us

Modern building appearance © Arch. Albert Colz

The innovative BIPV technology is used within a traditional urban context © Elektrostudio

Detailed view of the modules © Elektrostudio



BIPV fixing system: the special crosswise clamps anchored to the concrete building roof are visible © Elektrostudio

Space between the modules is left in order to permit through passage for the maintenance operations © Elektrostudio

Fake modules are installed, finishing the BIPV plant surface © Arch. Albert Colz

Case study author:

Eurac Research