



Chamber of Commerce of Bolzano

Introduction

In 2004, the Chamber of Commerce design process started. The Province of Bolzano commissioned to Arch. Wolfgang Simmerle with the general design of the building. Several specialists were involved. Energytech Srl and Industrie Team were responsible for the building's thermal and electric plants, respectively. Frener & Reifer GmbH was chosen as technical responsible for the facade development, including BIPV system design and installation, together with Obrist GmbH team.

Aesthetic integration

The Chamber of Commerce building is facing a central thoroughfare in the city of Bolzano. The PV system creates a dark vertical band integrated on a highly visible front, which is characterized by a variation of different facade materials. Components like blasted stainless steel panels, parapets, structural glazing, coupled windows and daylighting elements (Frener & Reifer GmbH) form a single surface, creating a dynamic appearance marked by stringcourses. The same combination of different materials and colours is reproduced inside the building.

Energy integration

The BIPV system installed in the facade is a small plant added to a bigger PV plant applied on the building's flat roof. Its electric output is fully self-consumed (Obrist GmbH). The produced energy is also used in the efficient thermal energy systems. The heating and cooling demand is supplied through a water-to-water heat pump, a free cooling system and natural gas-fueled condensing boilers (Energytech Srl). The building is CasaClima A+ certificated.

Technology integration

The 13 integrated photovoltaic modules Solarwatt (M234-108 GEG LK) are standard black glass-glass panels made of 108 monocrystalline cells. The 'glass-glass' technology, where solar cells are between two glass panes rather than of standard glass and plastic back-sheet setup, is considered as an extremely durable and resistant solution, with an optimal cells protection. The PV plant is the top layer of an insulation element consisting of a metal sheet, an insulating layer and a concrete structure. An air gap (8 cm) is left between the panels and the metal sheet in order to allow natural ventilation. The modules are mounted as common curtain wall component. They are fixed to an aluminium frame made of cross and vertical beams, hiding the wiring system.

Decision making

The integration of some photovoltaic modules on the highly visible building facade represents a symbol of the Province of Bolzano to the community, highlighting the local energy policy, which aims at sustainability through the exploitation of renewable energy (Frener & Reifer GmbH).

Lessons learnt

The PV modules are used as opaque facade panels. However, according to the designer (Frener & Reifer GmbH), the integration of semi-transparent modules in the large glazed surfaces of the building could have been an opportunity, assuming the function of a shading system. The close by building casts a partial shadow on the BIPV system. Partial shadow of a PV system might cause severe power losses, since all cells and modules in an array are connected in series. The presence of bypass diodes in the PV modules can partially mitigate this problem, which anyway has to be carefully considered during the design phase.

PROJECT DATA

Project type	New construction
Building use	Office
Building address	Via Alto Adige 60, Bolzano, Italy

BIPV systems

BIPV SYSTEM DATA

Architectural system	Rainscreen
Integration year	2007
Active material	Monocrystalline silicon
Module transparency	Opaque
Module technology	Glass layers, recognizable PV, standard modules
System power [kWp]	3.3
System area [m²]	30
Module dimensions [mm]	1,290 x 1,775
Modules orientation	South-West
Modules tilt [°]	90

BIPV SYSTEM COSTS

Total cost [€]	26800
€/m²	890
€/kWp	8120

Stakeholders

Main building designer

Arch. Wolfgang Simmerle

BIPV system designer

Frener & Reifer GmbH, Obrist GmbH

BIPV system installer

Frener & Reifer GmbH

Via Alfred Ammon 31, Bressanone (BZ), Italy

info@frener-reifer.com +39 0472 270 111

<https://www.frener-reifer.com/home-en/>

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

SOLARWATT GmbH

Maria-Reiche-Straße 2a, Dresden, Germany

info@solarwatt.com +49-351-8895-0

<https://www.solarwatt.com/>

Collaborators

Energytech Ingenieure Srl, Industrie Team



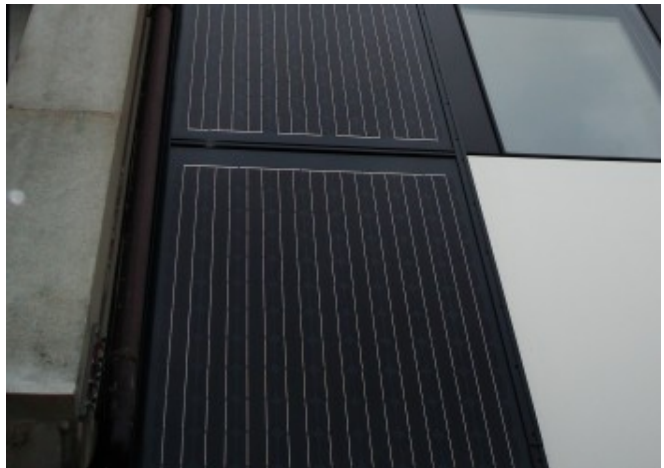
Internal view: combination of different materials and colours, the same as the building external façade © Frener & Reifer GmbH



The modules are exposed on a heavily busy city path © Arch. Wolfgang Simmerle



The photovoltaic energy output is visible on the façade surface © Eurac Research



Detailed view of the monocrystalline modules © Eurac Research



The photovoltaic dark band splits the modern Chamber of Commerce from the close traditional building © Eurac Research



View of the south-facing glazed surfaces © Arch. Wolfgang Simmerle

Case study author:

Eurac Research