Le Albere district

Introduction

Once the clients Castello SGR and Itas Assicurazioni bought the former Michelin area, they committed the general district design to Renzo Piano Building Workshop Srl (2002). Several stakeholders (designers, technicians, consultants, manufacturers) were involved within the district development. FAR Systems Srl was mainly responsible for the BIPV systems design and installation, working with Iure Srl for the project management. The works were concluded in 2013.

Aesthetic integration

The new Le Albere district, built from restructuring a former industrial area in Trento, is primarily characterized by its innovative urban fabric. The district includes commercial, residential and office buildings. A large surface of photovoltaic modules is integrated into the buildings, representing one of the most important and unifying features of the entire project. With different buildings heights and inclinations, the district is harmoniously inserted within its surrounding mountain environment.

Energy integration

The residential and office structures are designed as ‘passive’ buildings and certified according to CasaClima standards. The building’s energy provision is guaranteed by systems which exploit different renewable energy sources. The BIPV plant is divided into 11 sub-plants, which are independently connected to the electricity grid. The PV production supplies part of the electrical energy demand of offices, common spaces, pump rooms and the basement areas lighting (e.g. staircases and the district park). A trigeneration plant and an autonomous geothermal system provide energy for heating and cooling of the whole district buildings.

Technology integration

The BIPV plants are made of different typologies of custom-made modules with a silver appearance. 4,160 glass-Tedlar modules are mounted on metal frames (a), which are made of two metal struts of rectangular section and three of hollow circular section. 985 glass-glass modules are anchored to the roofs metal sheets with special clamps and reinforced with a metal profile along the larger side (b). The mounting system consists of extremely lightweight extruded aluminium profiles. It is flexible thanks to the customized sliding mechanism that balances the component’s thermal expansions (FAR Systems Srl).

Decision making

The project started with a partnership among public institutions, private companies and asset management companies. The project was conceived from the beginning as an educative instrument aimed towards the energy saving and an environmentally responsible management.

Lessons learnt

The ‘aesthetic’ integration is one of the main issues in this case study. It shows how a well-known architect (Renzo Piano) decided to use the PV modules to shape the buildings aesthetic, clearly declaring their presence and making them highly visible instead than hiding or camouflaging. The architects used the PV modules to express their architectural language, as a key element in the whole building composition. Regarding the BIPV system design, one of the main challenges was to customize the PV modules in order to satisfy the aesthetic requirements of the architects in terms of colours, dimensions, semi-transparency and materials as well as keeping costs in an acceptable range (FAR Systems Srl).

PROJECT DATA

Project type	New construction
Building use	Multifunctional
Building address	Via San Severino, Trento (TN), Italy

BIPV systems

BIPV SYSTEM DATA

Architectural system	Shading device
Active material	Polycrystalline silicon
Module transparency	Semi-transparent
Module technology	Glass layers, recognizable PV, customized modules
System power [kWp]	279
System area [m²]	3,258
Module dimensions [mm]	1,600 x 400, 1,045 x 400
Modules orientation	South, West, East
Modules tilt [°]	5 , 7.5 , 15 , 12

BIPV SYSTEM COSTS

Total cost [€]	1800000
€/m²	552
€/kWp	6450

Stakeholders

Main building designer

Arch. Renzo Piano (RPBW Architects)

BIPV system designer

FAR Systems Srl (closed)

BIPV system installer

FAR Systems Srl (closed)
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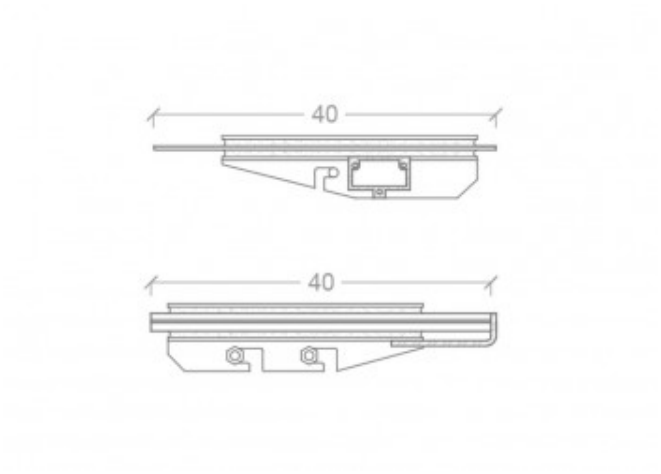
The modules are placed on the most of the district buildings as a unifying element © FAR System Srl

The buildings follow the surrounding mountain environment with different heights and inclinations © Eurac Research

Glass-Tedlar modules (a) mounted on metal frames fixed to the buildings' roof © FAR System Srl



Technical details of the two different typologies of modules structure and mounting system: glass-Tedlar modules (a) and glass-glass modules (b) re-drawing of Eurac © FAR System Srl

Glass-glass modules (b) anchored with special clamps to existing structures © FAR System Srl

The BIPV system is highly visible as a key element in the whole building composition © FAR System Srl

Case study author:

Eurac Research