



Smart Lab

Introduction

In 2009, the municipality of Rovereto commissioned to Arch. Gianluca Perottoni (ViTre Studio) the Smart Lab project. The company Costruzioni Debiasi started the construction works. Later, Arch. Perottoni changed the project with the integration of the photovoltaic plant on the south-facing façade. He led the monitoring, accounting as well as the safety coordination during the construction phase. Schüco International Italia Srl was the main technical responsible for the design and the installation of the BIPV plant. In 2013, the building achieved the Silver level for the LEED sustainability rating system, according to the 'Leed Italia 2009 Nuove Costruzioni e Ristrutturazioni' protocol.

Aesthetic integration

The BIPV plant consists of thin-film modules that cover almost a whole facade of Smart Lab, the youth centre of Rovereto. The modules comprise a homogeneous surface. They have a significant visual impact, increasing the architectural value of a building placed at the city gates. The building is designed for high visitor numbers. The building is a sociocultural meeting place for young people run by the local youth association.

Energy integration

The photovoltaic façade is a semi-transparent layer, able to control the solar gain (Arch. Gianluca Perottoni). It was calculated to produce around 9,072 kWh per year (PVGIS photovoltaic software), providing more than the 30% of the estimated building electricity demand (Schüco International Italia Srl). The BIPV system is one of the measures adopted in Smart Lab with the prospect of green building and energy efficiency (e.g. high quality of the technical-constructive strategies, recycled materials, etc.).

Technology integration

90 photovoltaic modules ProSol TF+ are integrated according to Schüco ventilated façade system. The modules are made of microamorphous silicon cells (20% transparency), which combine amorphous and microcrystalline silicon. The bearing structure is composed of metal uprights and crosspieces hiding the junction boxes and the cabling system.

Decision making

Obtaining the LEED certification was one of the main reasons that lead the municipality to include a photovoltaic system, together with other project adjustments regarding the building construction features as well as the electric and hydraulic plants. The photovoltaic plant was integrated on the building South façade, facing a large urban park and a busy street, highly visible to the community. It represents the municipality's commitment towards a sustainable environment (Arch. Gianluca Perottoni).

Lessons learnt

The use of the microamorphous silicon technology creates a homogeneous aesthetically appealing surface, hiding the facade behind, which is made of glazed and opaque parts. The microamorphous silicon modules are used together with an innovative mounting system that guarantees an effective thermal insulation effect and a high-quality architectural result (the joints outside visible are 60 mm wide). This consideration underlines how a continuous innovation of technologies can be essential to the increased diffusion of the BIPV systems. It should motivate the designers to research the best available products.

PROJECT DATA

| | |
|-------------------------|---------------------------------------|
| Project type | new construction |
| Building use | cultural |
| Building address | Viale Trento 46, Rovereto (TN), Italy |

BIPV systems

BIPV SYSTEM DATA

| | |
|------------------------------------|--|
| Architectural system | rainscreen |
| Active material | microamorphous silicon |
| Module transparency | semi-transparent |
| Module technology | glass-glass, hidden PV, standard modules |
| System power [kWp] | 10.8 |
| System area [m²] | 130 |
| Module dimensions [mm] | 1,100 x 1,300 |
| Modules orientation | South |
| Modules tilt [°] | 90 |
| Annual FV production [kWh] | 9072 |

BIPV SYSTEM COSTS

| | |
|------------------------|-------|
| Total cost [€] | 85000 |
| €/m² | 654 |
| €/kWp | 7870 |

Stakeholders

Main building designer

Arch. Gianluca Perottoni (ViTre Studio)

BIPV system designer

Schüco International Italia Srl



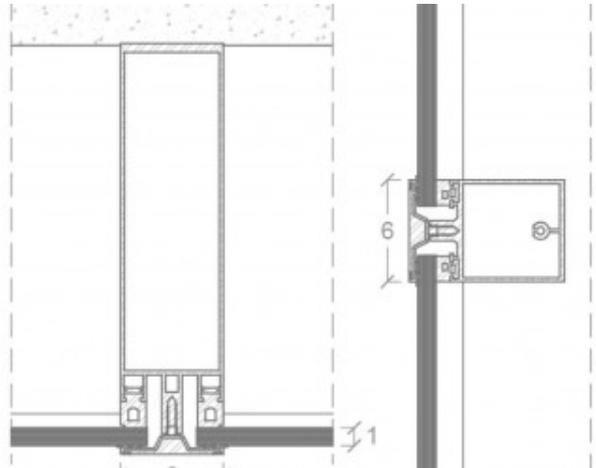
The BIPV façade is visibly exposed to the community © Arch. Gianluca Perottoni



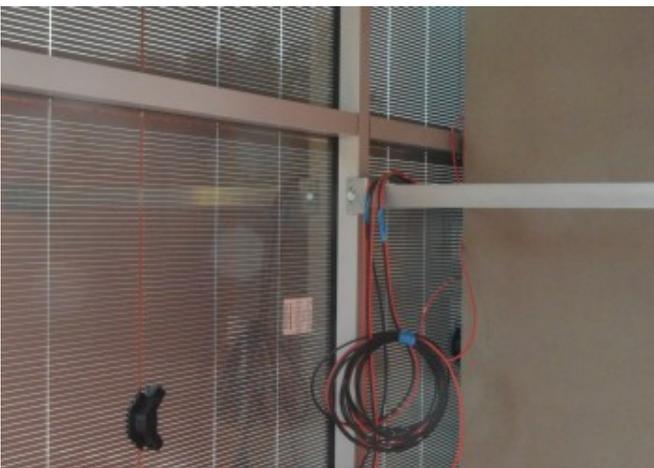
Construction phase: the South building front behind the BIPV plant is still visible © Schüco International Italia Srl



Detailed view of the modules mounting structure © Schüco International Italia Srl



Technical detail of Schüco ventilated façade system, re-drawn by Eurac © Schüco International Italia Srl



View from behind the semi-transparent modules © Schüco International Italia Srl



The thin-film modules create a high aesthetic quality building façade with a homogenized surface © Eurac Research

Case study author:

Eurac Research