



**Cable car station of Naturno**

## Introduction

The client, Seilbahn Naturns GmbH, publicly opened a call for tenders. Architect Götsch was assigned to the building design. Leitner Electro Srl was responsible for the photovoltaic plant. The engineering department of Leitner Electro Srl and Pichler Stahlbau Srl planned and calculated the building structure and the PV plant together. The PV production was estimated with UNI 10-349 and a price calculation was made with a payback simulation. After the price calculation and the technical consulting, the client confirmed the installation of the plant. Stahlbau Pichler Srl built the construction and installed the glass modules, involving Vitralux Srl with the installation of the glass of the first plant. Leitner Electro Srl installed the other components of the plants. The first plant was completed in 2007, the second one in 2013 (Leitner Electro Srl).

## Aesthetic integration

The glass envelopes that protect the valley (a) and the top (b) stations of the cable car in Naturno from the elements are made from semi-transparent BIPV modules. The structures are located on a steep wooded slope of the Val Venosta in South Tyrol. The modules are integrated into both the lateral façades and on the southern pitch of the roofs. They were custom made in order to adjust the transparency and the size to the needs of the structures (Leitner Electro Srl).

## Energy integration

With a nominal power of 19.4 kWp (a) and 30.4 kWp (b), the BIPV systems are estimated to produce 18,700 kWh/a and 24,800 kWh/a, respectively. The total annual energy production exceeds 50% of the demand (Leitner Electro Srl).

## Technology integration

The BIPV plants are made from polycrystalline glass–glass modules produced by Scheuten Optisol (P082136 K) (a) and EnergyGlass (EGP32ST/EGP48ST) (b). They are supported by a steel trusses system. The BIPV modules are fixed to aluminium horizontal and vertical beams that hide the wiring system. They are naturally ventilated, due to the wide openings of the glazed structures.

## Decision making

The client Seilbahn Naturns GmbH wanted to build a roof for the ropeway station, in order to protect the technical system from the weather conditions. Architect Götsch envisioned to install a photovoltaic plant to lower the energy consumption and contribute to a sustainable environment. Full integration of the PV system into the roof makes a dual use (energetic and weather protection) of the panels possible. The aesthetic point of view was of great importance to the client. BIPV with semi-transparent modules was a convenient way to still get sufficient natural light into the building (Leitner Electro Srl).

## Lessons learnt

The flexibility of BIPV can increase its implementation into special places characterized by specific constraints (e.g. historical, environmental) as well as into different building typologies. This case study is an example of that since it is placed in a mountain context, on a steep wooded slope and it is a kind of building not commonly used for BIPV installations. The main building design did not need architectural alterations. The building roofs were optimally tilted (30°) for the application of a photovoltaic system. Since it is an 'open configuration', no problems for internal comfort can occur, as it would have been in case of closed configuration.

## PROJECT DATA

<b>Project type</b>	New construction
<b>Building use</b>	Infrastructure
<b>Building address</b>	Frazione Monte Sole, Naturno (BZ), Italy

## BIPV systems

### BIPV SYSTEM DATA

<b>Architectural system</b>	Skylight, warm façade
<b>Active material</b>	Polycrystalline silicon
<b>Module transparency</b>	Semi-transparent
<b>Module technology</b>	Glass layers, recognizable PV, customized modules
<b>System power [kWp]</b>	19.3 (a), 30.4 (b)
<b>System area [m<sup>2</sup>]</b>	90 (a), 254 (b)
<b>Module dimensions [mm]</b>	Several
<b>Modules orientation</b>	South-East and North-West (skylight), South-West and North-East (façades)
<b>Modules tilt [°]</b>	30 (skylight), 90 (façades)
<b>Annual FV production [kWh]</b>	43500

### BIPV SYSTEM COSTS

<b>Total cost [€]</b>	316748
<b>€/m<sup>2</sup></b>	713
<b>€/kWp</b>	6373

## Stakeholders

### Main building designer

Arch. Götsch

### BIPV system designer

Leitner Electro Srl, Pichler Stahlbau Srl

### BIPV system installer

Leitner Electro Srl  
Via Ahraue 6, Brunico (BZ), Italy  
info@leitnerelectro.com +39 0474 571 100  
<https://www.leitnerelectro.com/index.php?lang=it>

### BIPV components producer

Scheuten Solar Technology GmbH (closed)

-  
-  
-

EnergyGlass Srl  
Via Domea 79, Cantù (CO), Italy  
contact@energyglass.eu  
[www.energyglass.eu](http://www.energyglass.eu)



View of the downstream unit semi-transparent glass roof © Eurac Research



View of the upstream unit semi-transparent glass façade © Leitner Electro Srl



Steel trusses system supporting the BIPV plant © Leitner Electro Srl



Detailed view of the glass modules mounting structure © Leitner Electro Srl



External view of the semi-transparent polycrystalline modules © Leitner Electro Srl



The ropeway station roofs were optimally tilted (30°) for the photovoltaic integration © Eurac Research

Case study author:

Eurac Research