Milland Church

Introduction

Milland Churcgh represents an interesting example of retrofit of a church built in 1984– 1985. The PV system is a pitched roofing solution integrated into the metal sheets roof.

Aesthetic integration

The original building shape, composition and main colours are respected. The roofing system is divided into six triangular parts. The PV plant, installed on the south-west facing part, is made of dark modules with black rear side base in order to keep homogeneity in surface and colours.

Energy integration

The BIPV system annually produces an electrical output of around 22,000 kWh (as monitored in 2011 by Eurac Research). It supplies most of electrical energy need of the church, the parish centre and the rectory (Don Vijo Luigi Alois Pitscheider).

Technology integration

87 PV modules (SunPower SPR-220 BLK) are integrated 14.5 cm far from the outside roof layer with a gap of 2.5 cm among the module arrays. The air gap allows natural ventilation of the PV modules and thus slightly reduces the power losses caused by the increased operative temperature. The chosen module typology eliminates standard metal gridlines, since metal contacts are placed on the back of the solar cell, out of sight. The fixing system is made of metal rails and clips.

Decision making

The main reason that leads the priest Don Vijo Luigi Alois Pitscheider to strongly want the integration of the photovoltaic system into the Milland Church roof was making a practical contribution to promote the use of renewable energy, serving an example for the community. Using one of the most sun-exposed roof parts to produce electric energy was also an opportunity to enhance the modern church features. The first step was to obtain the religious institution’s permission to install such an innovative technology on a holy building. Once the feasibility and cost effectiveness of the intervention were assessed, the priest succeeded in overcoming an initial disagreement with the local government (Don Vijo Luigi Alois Pitscheider).

Lessons learnt

The selected PV technology, based on back contact technology, combines an esthetical appeal (homogeneous black appearance) with the energy performance (the PV cells are entirely exposed to solar radiation without any covering due to standard front contacts). Fake modules play an important role in the finishing of the BIPV system. In order to respect the roof geometry, several fake modules have

been installed around the perimeter of the PV system. First fake modules which have been installed resulted to be too reflective and did not match very well with the active PV modules in the considered operative conditions. They have thus been removed and replaced with less reflective ones in order to provide a more homogeneous and coherent aspect. This experience underlines the importance of finishing details, which can make the difference to reach high quality in BIPV systems.

PROJECT DATA

Project type	renovation
Building use	religious
Heritage constraint	listed building
Building address	Via Campill, Bressanone (BZ), Italy

BIPV systems

BIPV SYSTEM DATA

Architectural system	Opaque roof
Integration year	2008
Active material	Monocrystalline silicon
Module transparency	opaque
Module technology	glass-backsheet, hidden PV, standard modules
System power [kWp]	19
System area [m²]	107
Module dimensions [mm]	1,559 x 798
Modules orientation	South-West
Modules tilt [°]	35
Annual FV production [kWh]	22000

BIPV SYSTEM COSTS

Total cost [€]	140000
€/m²	1308
€/kWp	7315

Stakeholders

BIPV system designer

Von lutz, Arch. Claudio Paternoster, Elettropiemme Srl

BIPV system installer

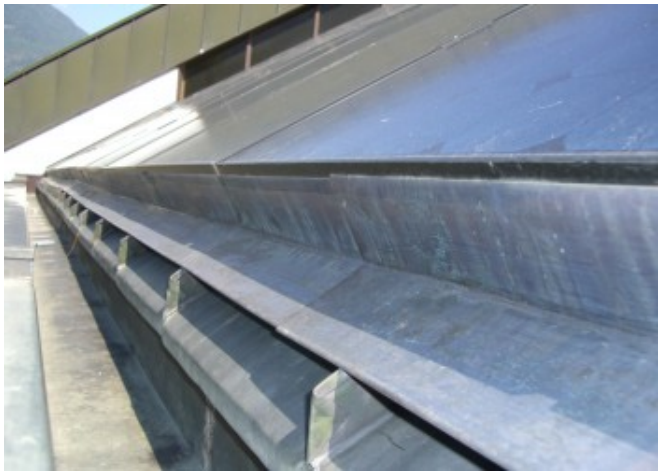
Elettropiemme Srl
Via Linz 137, Trento (TN), Italy
info@elettropiemme.it +39 0461 991935
https://www.elettropiemme.it/en/#toggle-id-2

BIPV components producer

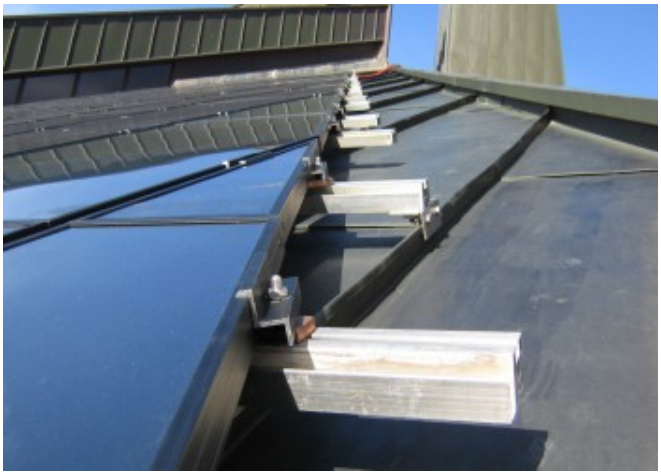
SunPower
51 Rio Robles San Jose, California, USA
1-408-240-5500
https://us.sunpower.com/

View of the original metal roofing surface, not so different from the PV modules © Eurac Research

Construction phase, the church metal roof and the BIPV mounting system are still visible © Eurac Research



The modules are naturally back ventilated © Eurac Research



Detailed view of the BIPV fixing structure © Eurac Research

First fake modules installed, too reflective © Eurac Research

Final fake modules installed, matching the BIPV plant surface © Eurac Research

Case study author:

Eurac Research