AIDA AFFIRMATIVE INTEGRATED ENERGY DESIGN ACTION

Co-funded by the Intelligent Energy Europe Programme of the European Union

EURAC research

Operational success story

Kererhof

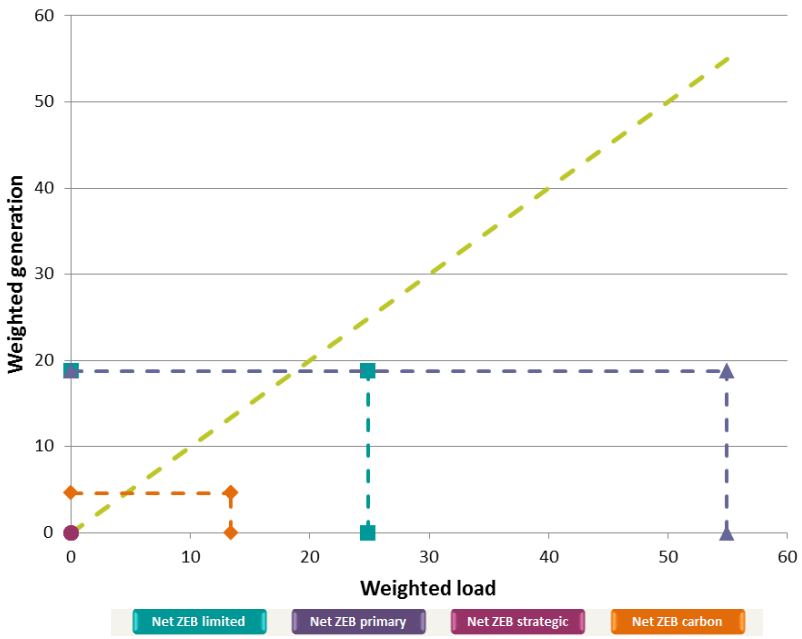
Year of construction (2012), Bolzano (IT)

GENERAL INFORMATIONS

Owner:	Province of Bolzano
Architect:	Michael Tribus
Design office:	Michael Tribus
Use:	Residential building
Heated surface:	472,51 m²
Gross volume:	1796,89 m³
Built in:	2012
Cost	2.120 €/m²

ENERGY PERFORMANCE

Primary energy demand:	68 kWh/m²a
Type of certification:	*CasaClima certification (mandatory certification for Energy Demand for Heating):* 8 kWh/m²y standard 'Casa Clima Gold'.
Total CO2 Emissions:	17,1 kg CO2/m²a
Total saving :	17,2 kWh/m²a (due to PV system)
Total CO2 saving :	3,7 kg CO2/m²a

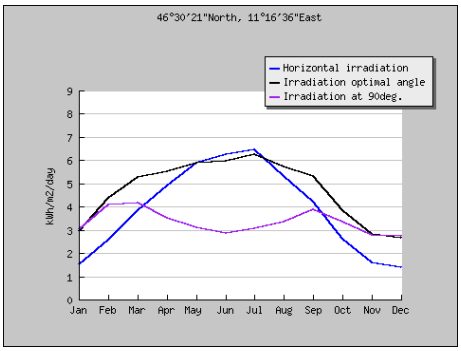


Graphic1: Monitored Import/Export calculated by Net ZEB Evaluation Tool.* Elaboration made by calculation data (extracted from PHPP tool).

*Developed within the IEA - SHC Task 40/ECBCS Annex 52 - "Towards Net Zero Energy solar Buildings". Created by: Eurac Research within STA. Draft: V4.3

DESCRIPTION OF THE CLIMATE:

Address:	Mondsheinweg 18C, Terlan, Italy.
GPS:	Latitude = 46.503034 Longitude = 11.277047
Altitude:	237 m
Yearly solar radiation: (graphic)	3,89 kWh/m²*day (Average sum of horizontal global irradiation per square meter received) 1420 kWh/m² (Average sum of horizontal global irradiation per square meter received) (http://re.jrc.ec.europa.eu/pvgis/apps4/pvest.php)
HDD20 (http://www.degreedays.net/):	HDD_{20}= 2501 Bolzano, IT (11.33E,46.46N)
CDD26 (http://www.degreedays.net/):	CDD_{26}= 34 Bolzano, IT (11.33E,46.46N)
HDD20, Italian Classification: (italian law: n. 412 26/august/1993)	HDD20= 2791 Bolzano, IT (11.33E,46.46N)



SPECIFICATIONS OF THE BUILDING

1) Building Envelope

The building achieves the Passive House energy requirements and is certified as 'CasaClima Gold'. The thermal energy demand and air tightness are two important characteristics, which were controlled during all stages, from the early design to the construction phase, with on-site testing (e.g. the blower door test). Moreover, in order to achieve high internal comfort levels, a ventilation system with heat recovery (efficiency of 90%) has been installed.
The structure consists of two buildings connected by a common entrance. The two V-shaped residential buildings form a closed courtyard where the farm, a private parking and the plant room are located. The two different dwellings are designed for couples and families. In the upper floor there is an apartment, which can be rented out.

Data collected

U-value of the opaque surface

• Walls:	0.142 W/m²K 0.15 W/m²K
• Roof:	0.109 W/m²K
• Basement:	0.13 W/m²K

Windows

• G-value	0.62-0.58
• Ug	0.64-0.69 W/(m²K)
• Uf	1.09-1.31 W/(m²K)

Blower Door — 0.40 [h-1] air tightness demonstrated

2) Building systems

Renewable energy production

Photovoltaic systems	• 96 solar panels (P_{nom} 236 W) • Estimated production about 3100kWh/year
Solar thermal plant	• SST large collector with a surface of 12,14m²

Source of heat production

Heat pumps	• LZW270 Stebel Eltron • η 85.1%

CONTEXT AND HISTORY OF THE BUILDING

2010.10

Phase of the project assignment

In October 2010 the building process of the private building Kererhof has started.

The energy requirement desired by the owner was the minimum requirement fixed by law - CasaClima B, with a heating demand for the winter season of less than 50 kWh/m²year. On the other hand the architect had the objective to built a Passive house since the very beginning.

2010.11 – 2011.12

Preliminary project.

The most important work done by the architect was to inform the owner about the significant difference between the two solutions (CasaClimaB and Passive House), in particular for the quality of the internal comfort, the reduced operating costs and a higher initial investment.

It was decided to benefit from a local law that allowed to increase the volume of 10% if the new building would achieve the CasaClima A standard (heating demand lower than 30kWh/m² year).

The building volume increased from 1250m³ to 1375m³.

2011.01 – 2011.02

Definitive project.

During this phase the project achieved the CasaClima Gold requirement (heating demand lower than 10 kWh/m² year).

Other technical solutions:
- thermal bridge free construction
- high energy efficiency of the building
- low thermal transmittance for opaque and transparent elements
- wood pellets boiler

2011.03 – 2011.04

Detailed project

Finally the building achieved the Passive House energy requirement with:
- thermal bridge free construction
- high energy efficiency of the building
- low thermal transmittance for opaque and transparent elements