

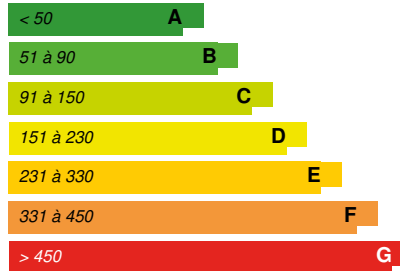
Passivescape Country House 2 in Ibero

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New Construction

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Building Type : Hotel, boarding house
Construction Year : 2015
Delivery year : 2016
Address 1 - street : C/ Larreberri 16 31173 ÍBERO, NAVARRA, España
Climate zone : [Dfa] Humid Continental Hot Summer, Wet All Year

Net Floor Area : 203 m²
Construction/refurbishment cost : 244 417 €
Number of Bedroom : 6 Bedroom
Cost/m2 : 1204.02 €/m²

General information

A cottage, which can be rented for short stays, can be a good choice to publicize the still unknown Passivhaus standard in Spain. Rehabilitation was an interesting option to test the feasibility of the standard in the restoration of buildings.

The starting point was a building in Íbero, a small town near Pamplona, Navarra. The existing building had an irregular plant, with a stone east facade to the Larreberri street, and west facade to the inner courtyard. The construction of this house is traditional, with stone load-bearing walls, wooden beams and ceramic brick cover. It was decided to keep the outer shell, so that the demolition of the other elements was a complex process.

Because we have tried to follow the Passivhaus standard, we have been taken into special consideration issues such as the tightness of the building, to prevent leaks, and the thermal envelope, to achieve a constant and pleasant indoor temperature. Therefore, the sheets have been placed in order to seal all elements of the structure, and a wood fiber insulation has been used through the inside, to isolate evenly all elements and avoid thermal bridges. In the hearth, however, isolation was performed from the outside.

The housing is designed with a constructive system of laminated wood structure, built against the façade preserved and existing party walls, with blown insulation and interiors finished with plate plasterboard. Ceramic tiles cover and wooden beams have been preserved, using the wood fiber insulation blown by the interior and finish plasterboard. The forged against ground is designed as a hearth with EPS insulation on the outside, and finished with ceramic tiles.

A triple woodwork was chosen with glass and air and argon chambers; the position of the windows and their encounter with the enclosure changes from one facade to another: in the stone facades and old brick were placed with sub-frame, to the inner face; in the half-timbered facades they were placed inside rebateless.

The renovation of the indoor air is performed by a ventilation system with dual-flow heat exchanger of high efficiency, which allows us to heat fresh air driven by the heat extracted from stale air. With a continuous flow of filtered and renovated air, levels of CO2 and volatile organic compounds (VOC or VOC) are kept to a minimum. It has been installed in the ventilation system, a battery aftertreatment air, before pushing to acclimate the housing.

Production of domestic hot water (DHW) has been fixed with a heat aerothermal pump, to extract energy from the outside air, even at low temperatures. In turn, the heat pump is connected to the radiating panels installed on the walls of the rooms.

All facilities are domotized, which will control the ventilation system, heating and air conditioning, through the Loxone system, connected to a web server which can be accessed from mobile, tablet or PC.

Once the work was finished, the Blower Door seal test was performed, obtaining a result of 0.6 renovations, thus meeting the Passivhaus standard.

See more details about this project

<http://www.passivescape.com/>

<http://www.sugeahome.com/>

Data reliability

Assessor

Stakeholders

Stakeholders

Function : Designer

BOA arquitectos

correo@boa-arquitectos.com

<http://www.boa-arquitectos.com>

Design and construction management

Function : Developer

Sugea Home S.L.

informacion@sugeahome.com

<http://www.sugeahome.com>

Promotion of the work

Function : Construction company

Progetic

progetic@progetic.com

<http://www.progetic.com>

Design facilities Ventilation, hot water, heating, home automation

Function : Thermal consultancy agency

Energiehaus Arquitectos S.L.

info@energiehaus.es

<http://www.energiehaus.es>

advisory

Function : Manufacturer

Zehnder Group Ibérica Indoor Climate, S.A.

info.es@zehndergroup.com

<http://www.zehnder.es>

Manufacturer and distributor of ventilation systems

Function : Certification company

Instituto Passivhaus

mail@passiv.de

<http://www.passiv.de>

company certification

Function : Others

Biohaus Goierri

biohaus@biohaus.es

<http://www.biohaus.es>

Distributor natural wood fiber insulation

Function : Others

Zulziri

zulziri@zulziri.es

<http://www.zulziri.es>

Running the sealing and wooden facades

Function : Others

Onhaus

info@onhaus.es

<http://www.onhaus.es>

Distributor of building materials under the Passivhaus standard

Function : Others

Altertechnica

info@altertech.es

<http://www.altertech.es>

Installation company for ventilation and air conditioning

Contracting method

Other methods

Owner approach of sustainability

Passivescape: Country House 2 in Íbero, has been designed and built to the Passivhaus standard, and is currently undergoing certification. The standard gives priority to thermal comfort and to the drastic reduction of energy demands, thanks to thermal insulation, reduction of thermal bridges and ensuring the sealing, which means that cold spots and currents are minimized. As far as possible, they have chosen materials with a low environmental impact, such as the isolation of natural fibers blown wooden structure laminated wood, wood flooring, and the use of cotton and natural latex mattresses and bedding.

Architectural description

The house has a floor space of 203.3 m² distributed over 3 floors. The building is characterized by its conventional construction system of reinforced concrete structure, to prove that it is possible to get a Passivhaus building with traditional construction systems. In terms of design, the building strategy is based on a concrete structure and facades of perforated brick, isolating the inside with natural wood fibers and finished with plaster, and a SATE insulation exterior and a Pinewood coating. The insulation inside ensures the continuity of the thermal envelope, thereby avoiding thermal bridges.

Energy

Energy consumption

Primary energy need : 93,00 kWhpe/m².year

Primary energy need for standard building : 284,00 kWhpe/m².year

Calculation method : Primary energy needs

CEEB : 0.0008

Final Energy : 35,80 kWhfe/m².year

Breakdown for energy consumption :

Heating demand: 14.64 kWh / m² / a hot water demand: 29.8 kWh / m² / a

Envelope performance

Envelope U-Value : 0,20 W.m⁻².K⁻¹

More information :

The South facade ventilated, with a value of U = 0.185 W / m² K, described below:

Interior>Exterior

-15 mm plasterboard panel

-80 mm Thermoflex insulation

-15 mm plaster

-110 mm perforated brick

-15 mm mortar layer

-140 mm Thermoflex insulation

-20 mm air chamber

-20 mm pine board

The northern facade, with a value of $U = 0.199 \text{ W / m}^2 \text{ K}$, described below:

- Interior>Exterior
- 15 mm cardboard-plaster panel
 - 80 mm Thermoflex insulation
 - 15 mm plaster
 - 110 mm perforated brick
 - 15 mm mortar layer
 - 140 mm wood fiber insulation
 - 20 mm white plastering mortar

The Mediatrix, with a value of $U = 0.16 \text{ W / m}^2 \text{ K}$, described below:

- Interior>Exterior
- 15 mm plasterboard panel
 - 80 mm fiberboard panel
 - 140 mm wood fiberboard panel
 - 15 mm plaster
 - 300 mm drywall

The dividing wall between the two rural houses, with a value of $U = 0.16 \text{ W / m}^2 \text{ K}$, described below:

- Interior>Exterior
- 15 mm plasterboard panel
 - 80 mm Rockwool insulation
 - 15 mm plaster
 - 110 mm perforated brick
 - 140 mm natural wood insulation fibers
 - 80 mm natural wood fibers insulation
 - 15 mm plasterboard panel

The cover, with a value of $U = 0.11 \text{ W / m}^2 \text{ K}$, described below:

- Interior>Exterior
- 15 mm plasterboard panel
 - 40 mm air chamber
 - 160 mm Rockwool insulation
 - 350 mm reinforced concrete slab
 - 160 mm XPS insulation
 - 40 mm air chamber
 - 20 mm ceramic tiles

The floor on the ground, with a value of $U = 0.146 \text{ W / m}^2 \text{ K}$, described below:

- Interior>Exterior
- 15 mm ceramic floor
 - 60 mm screed
 - 60 mm EPS insulation
 - 150 mm triple hollow brick
 - 350 mm reinforced concrete floor
 - 140 mm XPS insulation

The continuity of the thermal envelope is ensured by isolating the interior with insufflated natural wood fibers. The joinery are wood with a thermal transmittance $U_f = 0.93 \text{ W / m}^2 \text{ K}$. The windows are triple-layer, 4-18-4-18-4, 10% air - 90% argon, with a thermal transmittance of $U_g = 0.5 \text{ W / m}^2 \text{ K}$. The thermal transmittance of the installed woodwork is $U_w = 0.95 \text{ W / m}^2 \text{ K}$.

Building Compactness Coefficient : 0,39

Indicator : n50

Air Tightness Value : 0,60

Renewables & systems

Systems

Heating system :

- Heat pump

Hot water system :

- Heat pump

Cooling system :

- Reversible heat pump
- Radiant ceiling

Ventilation system :

- Natural ventilation
- Nocturnal ventilation
- Free-cooling
- Double flow heat exchanger

Renewable systems :

- Heat pump

Environment

GHG emissions

GHG in use :24,30 KgCO₂/m²/year

Methodology used :

8.5 PHPP with CO2 emissions data GEMIS

Building lifetime : 50,00 year(s)

Indoor Air quality

Indoor air quality is ensured by using non-toxic, natural and renewable materials along with a mechanical ventilation system with dual-flow heat recovery that provides fresh outdoor air preheated to 100% by stale exhaust air.

Comfort

Health & comfort : Thermal comfort is achieved thanks to the thickness and proper installation of the thermal insulation, reducing thermal bridges and ensuring the sealing, which means that the cold spots and currents are minimized.

Products

Product

Pump heat Rotex HPSU compact 8 kW

Daikin

marketing@daikin.es

<http://www.daikin.es>

Product category : HVAC / Riscaldamento, Acqua calda sanitaria

Integrated compact unit that produces domestic hot water by using the energy stored in ambient air.

Operating in line with expectations



Zehnder ComfoAir 550

Zehnder Group Ibérica Indoor Climate, S.A.

info@zehnder.es

<http://www.zehnder.es>

Product category : HVAC / Ventilazione, Raffrescamento

Unit-certified Passivhaus Institute. Comfort ventilation up to 550 m³ / h with automatic bypass in summer. Heat recovery with a yield of up to 95%. efficient electronically commutated motors DC.

Operating in line with expectations



Zehnder ComfoPost CW10

Zehnder Group Ibérica Indoor Climate, S.A.

info@zehnder.es

<http://www.zehnder.es>

Product category : HVAC / Ventilazione, Raffrescamento

Component installed in the ventilation system Heated fresh air driven into the housing.

Operating in line with expectations



ComfoWell

Zehnder Group Ibérica Indoor Climate, S.A.

info@zehnder.es

<http://www.zehnder.es>

Product category : HVAC / Ventilazione, Raffrescamento

Component installed in the ventilation system that reduces noise generated by the passage of air flowing through the housing.



Operating in line with expectations

Loxone Smart Home

Loxone

info@loxone.es

<http://www.loxone.com>

Product category : Opere di finitura / Servizi interni

Home automation system. The Loxone miniserver is a component which receives data on all installed systems of the House (ventilation, air conditioning, hot water, heating), and you can control, modify and / or monitor from different buttons, smartphone, tablet or PC.



Operating in line with expectations

Costs

Construction and exploitation costs

Cost of studies : 8 031 €

Total cost of the building : 244 417 €

Urban environment

Ibero is a town 5.66 km long and 203 inhabitants, in the municipality Cendea de Olza in Pamplona (Navarra, Spain). Located 393 meters above sea level, in the vicinity one can find the Araquil and Arga rivers, the Rocks of Etxauri or the Valley of Ollo.

Parking spaces

3 parking lots inside the building, 4 outside in an open field on urban land.

Building Environmental Quality

Building Environmental Quality

- indoor air quality and health
- acoustics
- comfort (visual, olfactive, thermal)
- energy efficiency
- integration in the land
- building process
- products and materials

Contest

Building candidate in the category



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