House for eco

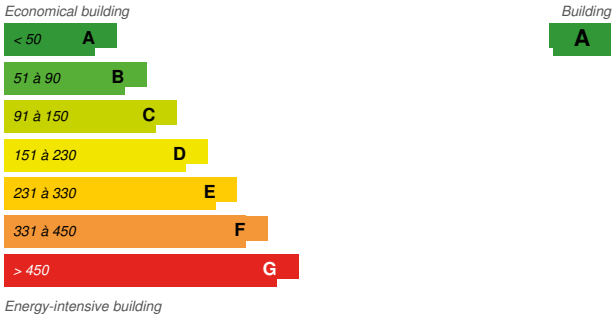
by zink arquitectura / 2021-03-25 17:31:17 / España / 4889 / ES

Primary energy need :

43 kWhpe/m².year

(Calculation method : Other)

ENERGY CONSUMPTION



Building Type : Isolated or semi-detached house
Construction Year : 2019
Delivery year : 2019
Address 1 - street : Jaime I, 3 30001 MURCIA, España
Climate zone : [BSk] Mid-latitude Dry Semiarid (Steppe)

Net Floor Area : 159 m² Superficie útil
Construction/refurbishment cost : 250 000 €
Cost/m2 : 1572.33 €/m²

Certifications :

General information

Shaped by the sun - “Casa para Eco”/ “House for Eco”

The first Passivhaus certified building in the Region of Murcia has been designed aiming at minimizing its overall energy footprint. It combines a concept that is open to the landscape and a contemporary style, with the use of natural materials, insulation thought out in detail and passive cooling techniques, among other things. Its owners will enjoy a lifetime of high thermal comfort, excellent indoor air quality, total noise insulation and all this while saving money compared to traditional construction.

The site is situated on a promontory with an impressive view to the north-northwest. The spaces are therefore organized around this condition. The entire house, from the very entrance to the plot is conceived as a path, a modest *promenade architecturale*, which allows to gradually enjoy partial views, framed by the architecture itself.

To this end, access is made through a deep lintel that frames the view and from there to a lateral passage that leads to the house entrance, on the side. Once inside, the ground floor is completely open, where only the staircase and the kitchen island articulate the circulations. Only once you walk through this space or ascend to the first floor can you enjoy the width and depth of the landscape.

However, the will to capture these generous views had necessarily to coexist with a very demanding energy behaviour in order to comply with the Passivhaus certification.

The sun, motor of the house

The outcome of the monitoring that has been carried out during the first year of its occupation, confirm the results of the calculations. Thanks to the free energy of the sun, the dwelling is always kept at a temperature of between 20 and 21º in winter without the need for a normal heating system, while summer temperatures rarely exceed 25º without a traditional cooling system.

Without a doubt, the fundamental strategy of the design of the house has been the control of the sun radiation. On the one hand, we have sought to capture the maximum solar radiation in winter and reduce it to a minimum during the hot months, by studying the shapes of the architecture itself (overhangs, setbacks, optimal orientation of openings). It can be said that the sun shaped the volume at its will.

On the other hand, passive cooling in summer has been maximized in order to take advantage of the dominant winds, cross ventilation of the whole house, or thermal inertia calculated in specific places to help dissipate the energy produced inside.

In addition to the passive techniques, the most efficient technologies on the market have been added: mechanical ventilation with heat recovery and free-cooling, air source heat pumps, solar photovoltaic, etc. The result of this combination is that with an expense of less than 100 euros per year, the house will manage to maintain a comfortable temperature throughout the year.

In addition to this data, the installation of 2.5 Kwp photovoltaic array contributes to further reducing its energy consumption and therefore its carbon footprint. The recovery of rainwater was included in the original project, but it was left to be installed in a future time that we hope nearby.

Carbon footprint

A starting premise of the project is the reduction to the maximum of the ecological footprint that will generate the house throughout its life, but also before and during its construction. To this end, priority has been given to building with 100% natural materials with a low or neutral ecological footprint and zero emissions of volatile organic compounds (VOCs).

The structure of the building is made entirely of wood, a biodegradable, natural, non-toxic material whose extraction is carried out under sustainability criteria. Wood is a material that consumes very little energy in its transformation, which is fundamentally linked to its transportation. Wood also plays a leading role in the ventilated facade of the first floor and in the exterior carpentry, with excellent thermal and acoustic performance.

Natural materials have also been chosen for the insulation. On the ground floor, the ETICS insulation system is resolved with recycled wood chip plates, which are finished with aerial lime mortar, highly breathable and with zero pollutant emissions. On the roof, natural cork sheets, free of binding glues and recycled from another site, are used as floating insulation. The rest of the house's insulation is provided by recycled natural mineral wool, which, in addition to being fireproof, completely insulates the house from outside noise.

The interior finishes also use ecological paints and waxes with low or no VOCs, further guaranteeing the quality of the air to be breathed.

Pure air and silence, what else could you ask for?

Parties involved

Architecture: Joaquin Ruiz Piñera - Zink Arquitectura

Passivhaus Designer: Joaquin Ruiz Piñera

Passivhaus Certifier: Energiehaus SLP

Project Manager: Asier Elorza Echebarría – Arkitae

Interiors: María José López Rodríguez

Contractor: 100x100 Madera

Data reliability

3rd part certified

Photo credit

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Stakeholders

Contractor

Name : 100x100 Madera
Contact : comercial[a]100x100madera.com
https://casas-madera-madrid.net/

Construction Manager

Name : Joaquin Ruiz Piñera - Zink Arquitectura
Contact : info[a]zinkarquitectura.com
http://zinkarquitectura.com

Stakeholders

Function : Certification company

Energiehaus SLP

info[a]energiehaus.es

https://www.energiehaus.es/

Function : Facility manager

Asier Elorza Echebarría – Arkitae

Function : Others

María José López Rodríguez

Interiors

Energy

Energy consumption

Primary energy need : 43,00 kWhpe/m^2.year
Primary energy need for standard building : 120,00 kWhpe/m^2.year
Calculation method : Other
CEEB : 0.0003
Final Energy : 39,00 kWhfe/m^2.year
Breakdown for energy consumption :
Air tightness n50 = 0.49/h
Annual heating demand 7 kWh /(m2a) calculated according to PHPP
Cooling and dehumidification demand 16 kWh /(m2a) calculated according to PHPP
PER demand 43,12 kWh /(m2a) on heating installation, domestic hot water, household electricity and auxiliary electricity calculated according to PHPP
Generation of renewable energy 20 kWh /(m2a) based on the projected area

Renewables & systems

Systems

Heating system :
- Heat pump

Hot water system :
- Heat pump

Cooling system :
- Reversible heat pump

Ventilation system :
- Double flow heat exchanger

Renewable systems :
- Solar photovoltaic

Urban environment

Isolated House

Contest

Reasons for participating in the competition(s)

PHPP values:

Air tightness n50 = 0.49/h

Annual heating demand 7 kWh /(m2a) calculated according to PHPP

Cooling and dehumidification demand 16 kWh /(m2a) calculated according to PHPP

PER demand 43,12 kWh /(m2a) on heating installation, domestic hot water, household electricity and auxiliary electricity calculated according to PHPP

Generation of renewable energy 20 kWh /(m2a) based on the projected area

Treated Floor Area according to PHPP 159.2 m2

Building candidate in the category

Energy & Hot Climates

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