


EntreEncinas Passivhaus

by alicia zamora / 2013-01-07 18:54:31 / España / 29395 / ES

New Construction



Primary energy need :
72 kWhpe/m².year
(Calculation method : RD: 47/2007)

ENERGY CONSUMPTION

Economical building

< 50	A	Building	A
51 à 90	B		
91 à 150	C		
151 à 230	D		
231 à 330	E		
331 à 450	F		
> 450	G		

Energy-intensive building

Building Type : Isolated or semi-detached house
Construction Year : 2012
Delivery year : 2012
Address 1 - street : el bosque 3 33591 LLANES - ASTURIAS, España
Climate zone : [Cfc] Marine Cool Winter & summer- Mild with no dry season.

Net Floor Area : 158 m² Superficie útil
Construction/refurbishment cost : 226 800 €
Cost/m2 : 1435.44 €/m²

Certifications :



General information

This is a passive house built according to bioconstruction criteria, as a result of the search for a self-sufficient housing in whose design is integrated, on one hand, the concepts of energy efficiency of the Passivhaus standard and bioclimatic architecture that guarantee a building energy consumption almost zero, and on the other hand, the principles of bioconstruction that require the use of materials and construction systems with low environmental impact.

[See more details about this project](#)

<http://www.passivhausprojekte.de/projekte.php?detail=2413>

Data reliability

3rd part certified

Stakeholders

Stakeholders

Function : Designer

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Function : Other consultancy agency

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Function : Developer

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Function : Certification company

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Owner approach of sustainability

Since its inception the objective was to conduct a housing as self-sufficient as possible, the use of renewable energy by prioritizing the solar energy both active and passive, and the use of sustainable materials, natural free of toxic compounds. Also, the effort to do so with a budget similar to a conventional home.

Architectural description

We started studying the climate and topography, so as to be able to fulfill the fundamental premises of the proposal: to respect the scale of the environment and integrate housing in the landscape, and search for the maximum utilization of the natural resources of the climate and thus a lower energy consumption. The results, necessarily very summarized and general, were the following: The plot has a rugged topography and dotted with white limestone rock, very common in this area, and it is located in a natural environment surrounded by native vegetation. The climate is relatively temperate, with heavy rainfall and high humidity throughout the year. The solution adopted is to look for a high compactness, thus minimizing the thermal envelope and with this the demand for energy, but that does not entail in any circumstances renounce to the principles of integration in the landscape and respect to the scale of the environment. After this consideration arises the idea of that part of the dwelling should "hide" and thus taking advantage of the strong pending existing, designing a low volume of plant barely perceptible; the rest will be a single compact volume 2 heights and open to the south as a solar sensor, which sits on the flat area of the plot and whose height does not exceed that of the treetops on the environment. The slope and the many rocky outcrops act as background for the rooms open to the south, while maintaining your privacy thanks to its position in the plot. The first floor, whose dimension corresponds to the top of the slope so that the view is not interrupted and the light fall with greater intensity and duration, is conceived as an open space associated with the field through the landscaped roof of the buried volume. It is situated in the so-called "zone of day", which includes the living room, kitchen and dining room; on the contrary, the "zone of night" is located on the ground floor. The location of the rest areas were decided on the basis of healthy house judgements; therefore, was preceded by a geobiological study and the analysis of the natural radioactivity of the environment, which was too low to be on ground limestone. Taking as a model the popular asturian architecture is a gallery in the entire southern front of the first floor; with what can be improved the thermic behavior of the housing to act as a greenhouse which builds up the heat in the material with thermic inertia, as the pavement of limestone; in addition, thanks to the current systems of carpentry, we can get this space works all the year: during the spring and autumn the sheet inside can be collected on a fixed part, thus expanding the area of the hall; in summer it will be sufficient to open its outer sheet for the gallery function as a porch. With regard to the east-west orientation, to be protected by the abundant vegetation, we have allowed open up large holes to improve the view.

If you had to do it again?

We are carrying out another passive housing in Asturias, and in this case we opted for the half-timbered, we have continued to opt for the prefabrication. In this case, to be a first residence housing the main heat will be composed of a pellet heater, as it allows us schedule and meet the needs of users.

Building users opinion

We are very happy with the interior comfort that we have within the home. We are passing the first winter, and it is being very rewarding. Only heated the house with a wood-burning heater and the support of the mechanical ventilation with heat recovery. The gallery is a very nice place, during the day builds up heat and by the night entered the heat toward the living room.

Energy

Energy consumption

Primary energy need : 72,00 kWhpe/m².year

Primary energy need for standard building : 220,00 kWhpe/m².year

Calculation method : RD: 47/2007

Breakdown for energy consumption :

Annual heating demand: 12 kW/m²a

Heating load: 11 W/m²

Annual cooling demand: 0 kW/m²a

More information :

Envelope performance

Envelope U-Value : 0,21 W.m⁻².K⁻¹

More information :

Exterior insulation underground U=0,244W/m²K

Exterior insulation to ambient air U=0,213W/m²K

Roof U=0,172

Windows U_{medium}=1,28W/m²K

External doors U=0,6W/m²K

Indicator : n50

Air Tightness Value : 0,39

Renewables & systems

Systems

Heating system :

- Individual electric boiler
- Water radiator
- Solar thermal

Hot water system :

- Individual electric boiler
- Solar Thermal

Cooling system :

- No cooling system

Ventilation system :

- Nocturnal ventilation
- Double flow heat exchanger

Renewable systems :

- Solar Thermal
- Wood boiler

Renewable energy production : 80,00 %

Environment

GHG emissions

Building lifetime : 75,00 year(s)

Life Cycle Analysis

Eco-design material : cork insulation, wooden structure, cellular glass insulation, pipes, electrical wiring and material of polypropylene; plastering mortar facade of silicate of lime; landscaped roof; without curtains and PVC blinds; and pavements with natural limestone flooring and solid bamboo lamas.

Water management

-Collection of rain water from the cover, which is stored in an underground tank of 1,500 l, and is reused for the tap for cleaning the house and irrigation of the plot, the washing machine and the tanks of the toilets.

-Treatment and sanitation of the black waters for their subsequent use in the irrigation of the plot, which is achieved using a reservoir of total oxidation.

Indoor Air quality

Mechanical ventilation with heat recovery. Their basic characteristics are: -The ventilation is continuous and at very low speed, which ensures an optimal quality of the air at all times without therefore create discomfort. -With the collector you get to tap a 85 per cent of the energy of the heated air inside, before being expelled. -Its consumption is very low maintenance and its only requires replacement of the filters located at the entrance and exit of the air.

Products

Product

ComforAir 350, Zehnder

<http://www.zehnder.es/>

Product category : Climatización / Ventilación, refrigeración



Wolf-TopSon f3-1

<http://www.wolf-heiztechnik.de/es/pkp/home.html>

Product category : Climatización / Calefacción, agua caliente



Urban environment

the house is located in a rural environment, surrounded by native vegetation: holm oaks, oaks, birches.. and with many rocky outcrops of limestone which are typical in this area.

Land plot area

Land plot area : 1 050,00 m²

Built-up area

Built-up area : 11,00 %

Green space

Green space : 300,00

Parking spaces

Parking area on the surface, pavement of pavicesped.

Contest



Date Export : 20230412144457