Low-energy housing

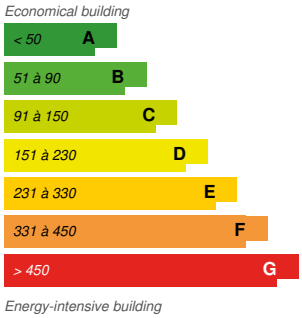
by ton fontdevila santamaria / 2017-06-13 11:09:06 / Espagne / 11979 / ES

Primary energy need :

15 kWhpe/m².year

(Calculation method :)

ENERGY CONSUMPTION



Building Type : Isolated or semi-detached house
Construction Year : 2013
Delivery year : 2016
Address 1 - street : Avinguda dels Paisos Catalans, 45 08680 GIRONELLA, España
Climate zone : [Csa] Interior Mediterranean - Mild with dry, hot summer.

Net Floor Area : 142 m²
Construction/refurbishment cost : 1 400 €
Number of Dwelling : 1 Dwelling
Cost/m2 : 9.86 €/m²

Certifications :

General information

During the project, 2 basic premises were pursued at all times. The first was to get a home in which most of the program was developed on the ground floor with a clear relationship with the garden and the environment. The second was to create an environmentally friendly house, designed under the Passivhaus standard, of very low energy demand and where construction processes based on dry construction are used. The implementation strategy was to generate an L-shaped building, closing with respect to neighboring buildings while opening towards the garden, taking advantage of the natural sunny and good visuals. The volumetric solution was simple, with two rectangular prisms in plan. The lower plant was generated in the form of L, and a third prism in first plant united the two previous volumes.

In order to be able to develop most of the program on the ground floor, it was decided to deplete to the maximum the occupation of the lot and to divide the program leaving all the zones of services in basement plant and to distribute the stays of the house in ground floor. In this way it was possible to simplify its use

and to minimize the circulations between the different spaces.

Thus, the volume located in the inner part contains the private program (rooms and service rooms) and the other the public part as are the living room and kitchen. The two volumes are linked through the vertical communications core and a third body in the first floor containing the study.

Finally a fourth element in the shape of a pergola is responsible for tying volumetrically the whole set.

Environmental and energy efficiency aspects were taken into account, such as the use of solar radiation to cover energy demand with a clean and free source, were considered in the conception process. The design, with large eaves to the south, allows us in winter to take advantage of the heat of the sun to warm the house, in summer, on the contrary, protects us to avoid overheating it.

The materialization of the project was gesture with the clear will to achieve a sustainable construction. The use of natural materials allows us 80% of employees can be recycled.

The structural part (forged and walls), are panels of contralled CLT wood. The numerical control technology used for the structural elements allows to have a much higher control of the finished product since they are realized in workshop and later they are transported to the work to be assembled.

A good thermal envelope and exhaustive control at work to minimize energy losses, added to a heat recovery system that allows us to transfer much of the heat that transports indoor air to outdoor renovation air, makes the extra heat input is very low, thus generating a very low energy demand.

See more details about this project

http://www.tonfontdevila.cat/?p=69

Data reliability

Assessor

Stakeholders

Stakeholders

Function : Designer

Fontdevila-Casajuana arquitectes

Ton Fontdevila, arquitecte. C/Santiago Rusiñol,14 08680 Gironella (Barcelona)

http://www.fontdevila-casajuana.cat/

Architects

Function : Construction Manager

MACUSA

MACUSA, Maderas Cunill, S.A. Pol. Ind Cantallops s/n Olvan (Barcelona)

http://www.macusa.es/ca/

Constructor

Function : Certification company

Energiehaus

Micheel Wassouf. C/ Ramón Turró, 100-104, 08005 Barcelona Tel. 931280955

http://www.energiehaus.es/

Passivhaus Certifier

Function : Manufacturer

ZEHNDER

info.es@zehndergroup.com

http://www.zehnder.es/

Air ventilation and after-treatment equipment

Function : Manufacturer

STORA ENSO

Stora Enso Wood Products Stora Enso Oyi Head Office (legal domicile) Kanavaranta 1 FI-00101 Helsinki Finland Tel.: +358 20 46 131

http://www.clt.info/es/

Contralled Wood, CLT

Function : Manufacturer

CARINBISA

Crtra. N.240 Km. 128 22535 Esplus, HuescaTelf: (+34) 974429955

http://www.carinbisa.com/
Wood carpentry

Function : Manufacturer

Contracting method

Lump-sum turnkey

Owner approach of sustainability

MACUSA, Maderas Cunill, S.A. Company specialized in the construction of wooden houses.

Architectural description

During the project, 2 basic premises were pursued at all times. The first was to get a home in which most of the program was developed on the ground floor with a clear relationship with the garden and the environment. The second was to create an environmentally friendly house, designed under the Passivhaus standard, of very low energy demand and where construction processes based on dry construction are used. The implementation strategy was to generate an L-shaped building, closing with respect to neighboring buildings while opening towards the garden, taking advantage of the natural sunny and good visuals. The volumetric solution was simple, with two rectangular prisms in plan. The lower plant was generated in the form of L, and a third prism in first plant united the two previous volumes. In order to be able to develop most of the program on the ground floor, it was decided to deplete to the maximum the occupation of the lot and to divide the program leaving all the zones of services in basement plant and to distribute the stays of the house in ground floor. In this way it was possible to simplify its use and to minimize the circulations between the different spaces. Thus, the volume located in the inner part contains the private program (rooms and service rooms) and the other the public part as are the living room and kitchen. The two volumes are linked through the vertical communications core and a third body in the first floor containing the study. Finally a fourth element in the shape of a pergola is responsible for tying volumetrically the whole set. Environmental and energy efficiency aspects were taken into account, such as the use of solar radiation to cover energy demand with a clean and free source, were considered in the conception process. The design, with large eaves to the south, allows us in winter to take advantage of the heat of the sun to warm the house, in summer, on the contrary, protects us to avoid overheating it. The materialization of the project was gesture with the clear will to achieve a sustainable construction. The use of natural materials allows us 80% of employees can be recycled. The structural part (forged and walls), are panels of contralled CLT wood. The numerical control technology used for the structural elements allows to have a much higher control of the finished product since they are realized in workshop and later they are transported to the work to be assembled. A good thermal envelope and exhaustive control at work to minimize energy losses, added to a heat recovery system that allows us to transfer much of the heat that transports indoor air to outdoor renovation air, makes the extra heat input is very low, thus generating a very low energy demand.

Energy

Energy consumption

Primary energy need : 15,00 kWhpe/m^2.year

Primary energy need for standard building : 80,00 kWhpe/m^2.year

Calculation method :

CEEB : 0.0464

Final Energy : 120,00 kWhfe/m^2.year

Breakdown for energy consumption :
Dcal: 15 kWh/m2a
Qcal: 15 W/m2
Dref: 13 kWh/m2a
Qref: 9 W/m2

Envelope performance

Envelope U-Value : 0,17 $W.m^{-2}.K^{-1}$

More information :
Enclosure

• Facade: A = 0.17 (W / m2.k)
• Solera: Us = 0.18 (W / m2.k)
• Cover: Uc = 0.15 (W / m2.k)

90mm Pine Wood Cerraminets with triple joint and triple glazing with double chamber and gas Argon> 90%. (Average values)
• Uf = 1.1 (W / m2.k)

• Ug = 0.60 (W / m2.k)
• Uh = 0.85 (W / m2.k)

Building Compactness Coefficient : 1,58

Indicator :

Air Tightness Value : 0,57

Renewables & systems

Systems

Heating system :

- Heat pump
- VAV System

Hot water system :

- Heat pump

Cooling system :

- Reversible heat pump
- VAV Syst. (Variable Air Volume system)

Ventilation system :

- Double flow
- Double flow heat exchanger

Renewable systems :

- Wood boiler
- Heat pump

Other information on HVAC :

The air conditioning of the house is done by the ventilation system. Two regeneration air after-treatment batteries have been provided by an air-heat pump. Apart from that, there is a 10 kW firewood burning stove.

Products

Product

Zehnder ComfoAir 350 Luxe Heat Recoverer

Zehnder

Zehnder Iberica

http://www.zehnder.es/

Product category :

Comfort ventilation up to 370 m³ / h
Recovery of heat with a performance of more than 90%
Minimum power consumption due to DC motors
100% automatic summer switching
Frost protection function: also effective at low temperatures
Integrated preheater and humidity regulation (optional)
Radiocontrol and indication of filter clogging
Regulation of the floor heat exchanger
Minimum volumes of air, especially for the construction of houses to single-family houses

Quick and safe mounting

Carpentry V92

CARINBISA

Crtra. N.240 Km. 128 22535 Esplus, HuescaTelf: (+34) 974429955Fax: (+34) 974429482Web: www.carinbisa.comE-mail: carinbisa@carinbisa.com

http://www.carinbisa.com/

Product category :

Wood enclosure, European system V92

PH B certified Component

CLT

STORA ENSO

Stora Enso Wood Products Stora Enso Oyi Head Office (legal domicile) Kanavaranta 1 FI-00101 Helsinki Finland Tel.: +358 20 46 131

http://www.clt.info/es/

Product category :

Structural Panels of Contralled Wood, CLT

Fast execution on site

EURONIT, EQUITONE system

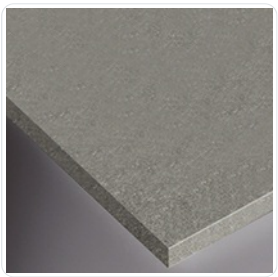
EURONIT

E-mail: consulta@euronit.es

http://www.euronit.es/

Product category :

Paneles de cemento reforzado para fachadas ventiladas y decoración de interiores, doblemente prensados, curados al aire y coloreados en masa o en superficie



Costs

Urban environment

Residential area

Land plot area

Land plot area : 594,00 m^2

Built-up area

Built-up area : 324,00 %

Green space

Green space : 250,00

Parking spaces

Parking in basement, with capacity for 3 vehicles

Building Environnemental Quality

Building Environmental Quality

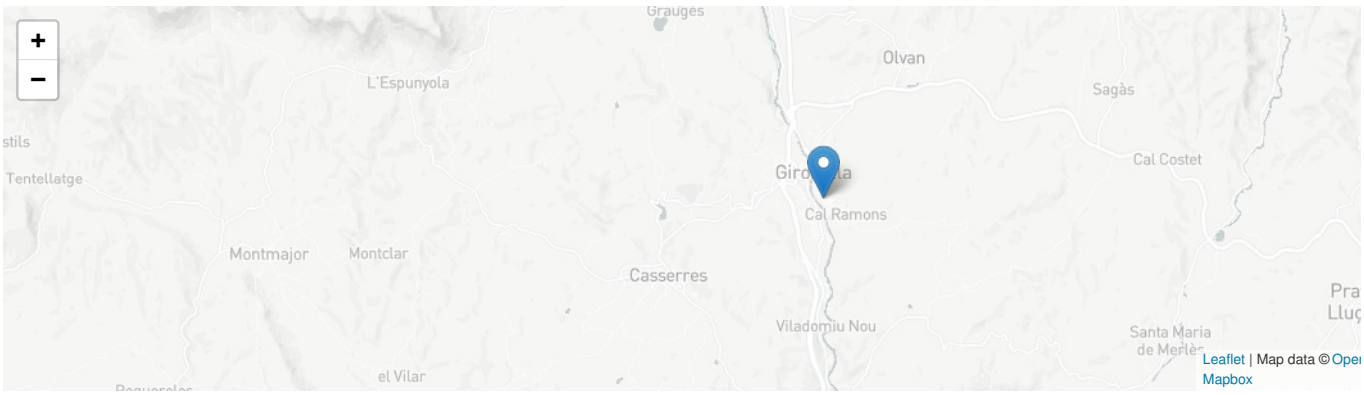
- indoor air quality and health
- acoustics
- comfort (visual, olfactive, thermal)
- energy efficiency

- renewable energies
- building process
- products and materials

Contest

Building candidate in the category

Energía & Climas Templerados



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