Positive Social Housing - 4-room house

by isabelle Dorgeret / 2015-03-20 16:07:42 / Francia / 19083 / FR

Primary energy need :

35.6 kWhep/m².an

(Calculation method : RT 2012)

ENERGY CONSUMPTION

Economical building

Building

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

Energy-intensive building

Building Type : Isolated or semi-detached house
Construction Year : 2013
Delivery year : 2013
Address 1 - street : 36 rue Georges Clémenceau 11400 CASTELNAUDARY, France
Climate zone : [Csa] Interior Mediterranean - Mild with dry, hot summer.

Net Floor Area : 101 m²
Construction/refurbishment cost : 134 755 €
Number of Dwelling : 1 Dwelling
Cost/m2 : 1334.21 €/m²

Certifications :

Bepos 2013

General information

The Positive Social Housing project is primarily a sustainable development project on the scale of a territory. It brought together the city of Castelanaudary, the social landlord Habitat Audois, the students and the teachers of the building trades Andreossy Highschool of Castelnaudary and the TERREAL company, a constructive solutions manufacturer for the building envelope and leading economic player of the region.

The project is the brainchild of four partners:

- **Imagine** an exemplary territorial project around the Eco district Vallons de Griffoul by building **two positive energy houses** using local materials mainly from extracted locally clay. The cost of construction and maintenance of the houses had to be compatible with the financing of social housing and therefore controlled. Selected materials and systems are simple to operate and robust. It is also designing efficient housings in which the human factor remains at the center.
- **Build:** Positive Social housing is a concrete project. Two houses were built by local actors, introducing innovative techniques with the support of Terreal for their implementation. The construction was done in accordance with the principles of bioclimatic architecture and with particular focus on the summer

comfort of the future resident.

- **Understand:** The Positive Social housing project allowed each player to understand how we imagine and how to build buildings that can compensate all consumptions of the house and its occupants by producing renewable energy at an exemplary cost. This project was also an excellent teaching aid for students in high school who imagined the technical solutions for shaders.

The Positive Social Housing project is also the practical support for research conducted in 2015 by a PhD student at the University of CERTOP Toulouse. The research aimed to understanding the influence of occupant behavior on the performance of homes, in order to work on supporting change management. That way, these positive energy buildings stay positive even with their inhabitants, and without coercion, to really meet the challenge of energy sobriety.

This case study concerns the 4-room house.

Sustainable development approach of the project owner

The goal was to learn and understand how to make a positive energy house controlled cost with actors and local materials, and to understand how it is occupied by the inhabitants to subsequently propose technical solutions that will adapt to occupiers and not the reverse. Make houses really positive energy!

Architectural description

The project consists of two adjoining houses T3 and T4 using building materials made locally and respecting the principles of bioclimatic architecture

See more details about this project

http://www.habitatsocialpositif.com

Stakeholders

Stakeholders

Function : Manufacturer

TERREAL

Isabelle Dorgeret

http://www.habitatsocialpositif.com/

Contribution to the initiation and project success

Function : Investor

Habitat Audois

Monsieur Armand Cathala

http://www.habitat-audois.fr

Contribution to the initiation and success of the project, social landlord and owner of the house

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Function : Environmental consultancy

Ville de Castelnaudary

Monsieur le Maire

http://www.ville-castelnaudary.fr/fr/

Contribution to the initiation and project success

Function : Others

Lycée Andréossy de Castelnaudary

Monsieur le Proviseur

http://www.les-provinciales-castelnaudary.fr/

Builder

Function : Designer

AEAA

Cécile Escourrou

http://www.alvaro-escourrou.fr/pagedegarde.html

Architect

Function : Thermal consultancy agency

CITE Vergé

Alain Biard

Thermal calculations

Function : Certification company

CEQUAMI

Maxime Parent du Châtelet

http://www.cequami.fr/
Certification Bepos Effinergie 2013 and Effinergie +

Energy

Energy consumption

Primary energy need : 35,60 kWhep/m^2.an

Primary energy need for standard building : 59,70 kWhep/m^2.an

Calculation method : RT 2012

CEEB : 0.0002

Breakdown for energy consumption : Actual energy consumption 2014:
- Heating kWhfe = 19.8 / m² / year
- ECS: 2.9 kWhfe / m² / year
- Lighting + auxiliary ventilation: 2.3 kWhfe / m² / year
- Total RT2012: kWhfe 25 / m² / year
- specific consumption: 30.74 kWhfe / m² / year

Real final energy consumption

Final Energy : 55,74 kWhef/m^2.an

Real final energy consumption/m2 : 71,83 kWhef/m^2.an

Real final energy consumption/functional unit : 71,83 kWhef/m^2.an

Year of the real energy consumption : 2 014

Envelope performance

Envelope U-Value : 0,34 W.m^{-2}.K^{-1}

More information :
- External walls: Brick BMI isolated monolith Terreal + coating + ext plasterboard U = 0.268 W / m².K
- Internal walls: placbric partitions Terreal + int + coated insulation: U = 0.309 W / m².K
- Floor Screed insulation + compression slab + isoleader 23: U = 0.130 W / m².K
- Ceiling height lost: plasterboard + 36 cm of blown wool U = 0.154 W / m².K

Building Compactness Coefficient : 0,52

Indicator : n50

Air Tightness Value : 0,25

More information

Actual consumption :
- Heating: kWhfe 37.86 / m² / year
- ECS: 3.17 kWhfe / m² / year
- Lighting + auxiliary ventilation: 1.78 kWhfe / m² / year
- Total RT2012: kWhfe 42.41 / m² / year
- specific consumption: 29.02 kWhfe / m² / year

Renewables & systems

Systems

Heating system :
- Electric heater
- Wood boiler

Hot water system :

- Solar Thermal

Cooling system :

- No cooling system

Ventilation system :

- Humidity sensitive Air Handling Unit (Hygro B

Renewable systems :

- Solar photovoltaic

Renewable energy production : 340,00 %

Environment

Urban environment

Land plot area : 500,00 m^2

The house is located in the eco-district of Vallons du Griffoul in Castelnaudary. The eco-district completes the existing urban fabric, in line with the sustainable development objectives of the municipality:
- Urban form and integration: limitation of heights, reduced car use, presence of bike paths, pedestrian paths, the proximity of public transport.
- Gender equality: homes will be individual, individual grouped and collective. A quarter of them will be in social housing.
- Water: recovery of rainwater, consumption control equipment, welcome booklets for future occupants.
- Biodiversity : conservation of woodlands.
- Bioclimatic orientation : living rooms south.
- Energy: low consumption buildings and solar thermal hot water.
- Waste: sorting and composting areas.
- Materials: local, natural, certified.
- Reasonable costs.
- Concertation.

Products

Product

BMI 30 TERREAL

TERREAL

isabelle.dorgeret@terreal.com

http://www.terrealstructure.com/Documentations/Documentation-commerciale

Product category : Table 'c21_italy.innov_category' doesn't exist SELECT one.innov_category AS current,two.innov_category AS parentFROM innov_category AS oneINNER JOIN innov_category AS two ON one.parent_id = two.idWHERE one.state=1AND one.id = '6'

System of isolated monolithic bricks the height of one storey (30 cm insulated). The façade is asymmetrical so as to concentrate most of his side mass inside the house, thus giving a better inertia therefore a better summer comfort. The system also allows an excellent result to the air impermeability test.

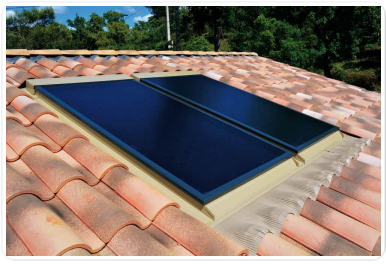
View the videos shot during the construction with the interview of the building company which explains how the product is arises and what are its benefits : http://www.habitatsocialpositif.com/construire-hsp/en-images/videos/

Soterre TH2

TERREAL

isabelle.dorgeret@terreal.com

http://solaire.terreal.com/



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Solar thermal hot water, usable in low sloping roof integration, it remains tight in slopes of 20%

Very well accepted by the roofing company, Terreal's integration kit was developed with traditional hedging techniques and a companion of duty.

Costs

Construction and exploitation costs

Total cost of the building : 134 750 €

Carbon

GHG emissions

GHG in use : 1,00 $KgCO_2/m^2/an$

Contest

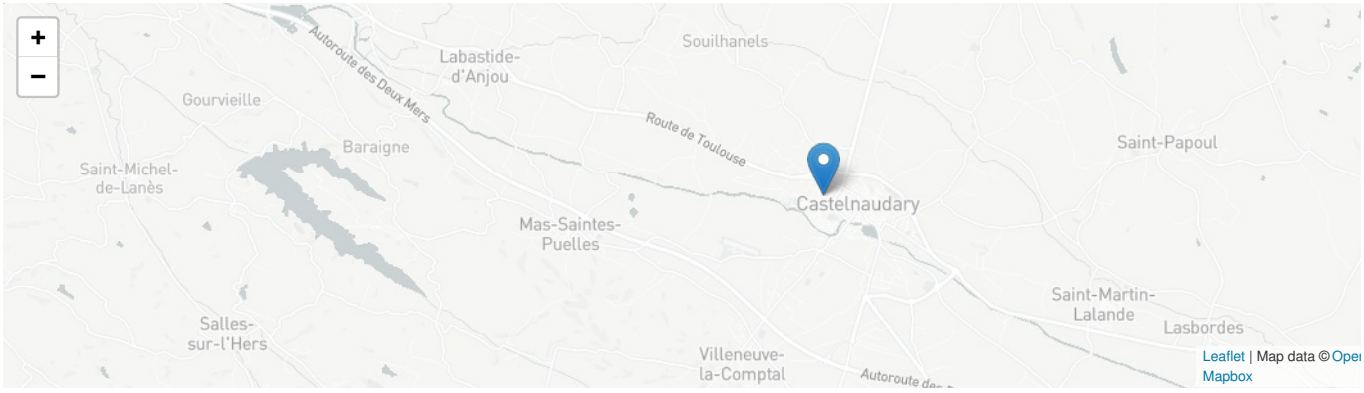
Reasons for participating in the competition(s)

The houses of the Positive Energy Social Housing project prove the reality of positive energy.
After 18 months of occupancy, all consumptions are optimised: the 5 usages of the French thermal regulation and the consumptions specific to th the tenants.
Theses consumptions are entirely compensated by renewable energies. That's why this house competes in the Net Zero Energy Building category.

Building candidate in the category

Bâtiment zéro énergie

Green Building Solutions Awards 2015
powered by Construction21



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