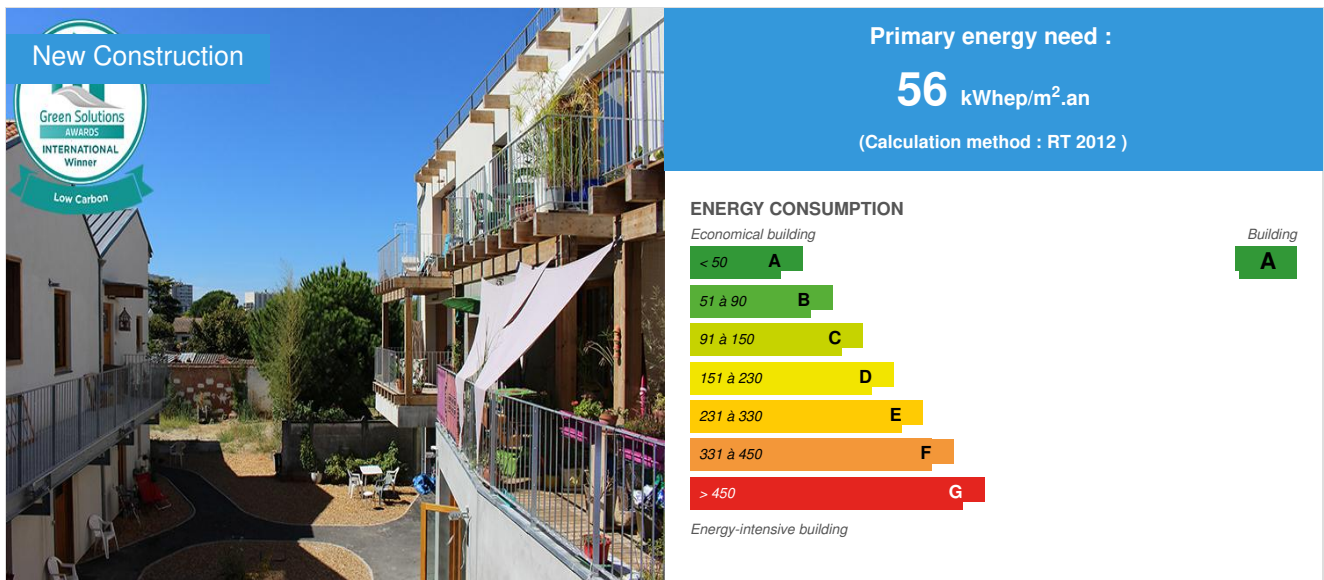


## The Beehive

by hugues joinau / 2018-04-27 17:05:15 / France / 21145 / FR



**Building Type :** Collective housing < 50m  
**Construction Year :** 2015  
**Delivery year :** 2016  
**Address 1 - street :** 102 avenue du professeur bergonié 33130 Bègles, France  
**Climate zone :** [Cfb] Marine Mild Winter, warm summer, no dry season.

**Net Floor Area :** 950 m²  
**Construction/refurbishment cost :** 1 450 000 €  
**Number of Dwelling :** 11 Dwelling  
**Cost/m² :** 1526.32 €/m²

**Certifications :**



### General information

The project is a social experiment that tackles the notion of "experimental" so that it can fit into a reality that is understandable and accessible to all the actors of the project, from conception to completion. realization and all his life.

It is a project of cooperative collective social housing, that is to say that it is about a group of reasoned people constituted by cooptation to pool their means in order to realize their habitat. Users benefit from the investment of a social lessor and assistance to the project owner. However, this distances us from the traditional process of mounting an operation. By the nature of the project, everyone (users / project management / project management) is invested and responsible offering the project a dimension "brings".

The structural system in framework and wood and straw infill, the passive ambition of the operation, the bio-sourced nature of the materials used and all the project attitudes stem from this human dynamic. This attitude is at the heart of energy saving issues, however simple it may be.

The innovation goes in the direction of the simplification of the systems used, a return to the essential valuing local resources, renewable, integrated in the natural cycle of manufacture and end of life and encouraging the development of local networks and a large economy human. Against the current or carrying a current respectful of life on earth, the project wishes to praise the highest human ingenuity, awareness of its potential for mutual help, listening and transmission.

The cooperative habitat of Bègles "La Ruche" is the bearer of this desire to transform the city, an urban village with a human face. Do together and otherwise tomorrow's housing. Thus the success of this project will have an immediate effect on the transformation of the city of Bègles in the sense that it engages on the voice of the cooperative and participative habitat, so on real changes in the ways of doing the city and its main constituent, housing.

## Sustainable development approach of the project owner

Everything begins at the Town Hall of Bègles, who wants to see on its territory an exemplary participative project. Four years later, after an unforgettable human adventure, 11 homes enjoy an exceptional environment. The keys to this success? A team involved from genesis to delivery. Operation La Ruche is the winner of the call for projects at the Aquitaine Basse Energie Building 2014. It has been the subject of a detailed carbon assessment conducted by BCO2 Ingénierie. It is a participative habitat, the inhabitants are involved from the first phases from design to project. A meeting every two weeks on average nourishes the project and strengthens the group. Since the call for participation in this first "cooperative" housing in the region in March Building professionals (construction company wood, straw construction), our design offices and 180 degrees have shared in these public meetings, their work and answered the questions of future inhabitants on the performance and implementation of the chosen materials. They are all the more involved because a participative project and a "second project" will be organized. The participatory project allows not only a project economy but also and above all a real knowledge of the inhabitants who will participate in the constitution of their walls. This call for participation will also be an opportunity to transmit the technique of straw construction and associated coatings, accessible to the greatest number.

Is provided in the mission of the office of study 180 degrees, the drafting of a guide of "good use" of the building intended for the inhabitants. This is the subject of future public meetings, to understand the workings of this "living machine" so that it can live for a long time in a comfort and an optimal energy saving

## Architectural description

The two buildings face each other: a building of 7 collective dwellings and 4 contiguous houses. They were built on the plot of an old detached house. There were no parking in the basement, but surface outdoor parking, half sheltered. The structure of the building is concrete on the ground floor. It supports floors and attic insulated wood frame with 37 cm of straw between the uprights and 40 mm of wood fiber from the outside. The partitions were made of wood frame with mud filling (straw + raw earth). In order to limit thermal losses through the ceilings, the wooden deck is insulated with polyurethane and the crawlers have 45 cm of cellulose wadding between and under the wooden purlins.

## Building users opinion

"For the moment, it is especially the children who have appropriated the local, explains Noëlle, because we have taken our marks recently. It is also pure happiness to see them together, it's like a big family! Mutual support among the inhabitants is reflected in particular by the babysitters. Since then, the project has made small, which shows the interest of supporting this type of operation to show that it is possible.

## If you had to do it again?

Gladly ...

## See more details about this project

<http://www.dauphins-architecture.com/la-ruche/>

## Stakeholders

### Contractor

Name : Axanis  
Contact : a.canu[a]axanis.fr  
<http://www.axanis.fr>

### Construction Manager

Name : dauphins architecture  
Contact : h.joinau[a]dauphins-architecture.com  
<http://www.dauphins-architecture.com>

### Stakeholders

Function : Other consultancy agency  
180 degrés ingénierie  
j.coeurdevey[a]180ingenierie.com

<http://www.180ingenierie.com/>  
environmental engineering consultancy

Function : Other consultancy agency

eco étude

luc.floissac[a]gmail.com

<http://www.eco-etudes.com>

life cycle analysis of the building + straw construction support

## Contracting method

Other methods

## Energy

### Energy consumption

Primary energy need : 56,00 kWh/m<sup>2</sup>.an

Primary energy need for standard building : 67,80 kWh/m<sup>2</sup>.an

Calculation method : RT 2012

### Envelope performance

More information :

Building a

Ubat = 0.471 W / (m<sup>2</sup>.K) - Bbio = 29.7

Building B

Ubat = 0.357 W / (m<sup>2</sup>.K) - Bbio = 27.4

Walls from the inside to the outside (filling straw bales):

Plaster earth (3 / 4cm), straw bale (37cm), wooden frame (beam l or 20cm full), high density wood fiber (16mm), rain cover, battens (27mm finish coating (ie nergalto + coated, wood cladding)

roofing

Building 1 / accessible roof terrace Rigid insulation (2x80mm) + vegetal fiber panel (80mm) (option of greening roof parts not accessible); Building 2 / pitched roof Cellulose wadding (220mm) + vegetal fiber board (48mm)

Low floor

Rigid insulation type expanded polystyrene (100mm) + hedgehog

Double glazed joinery

Thermal bridges

In most of the project, corresponding to the wooden structure envelope, the thermal bridges will be treated unusually well. Indeed :

- No integrated thermal cladding deck cladding because cladding facades like those coated will be fixed via battens to wood panels outside the insulation.
- integrated thermal bridges of the wooden wall: very reduced by the choice of wooden carriers profiled in "I", with thin core, instead of sections in solid wood.
- thermal bridges connecting intermediate floors wood / wood walls: very small because the floor joists do not cross the insulation, they come to end against a wooden wall.

- thermal bridges connecting low floors to solid ground / wood walls: the slab is not worn by the foundations, these bridges are treated by the installation of insulation throughout its perimeter.

- Thermal bridges for hanging the balconies and intermediate slabs of the "hollow tooth" north of Building A: very reduced by the choice of self-supporting structures (independent external structure secured to the facade by specific metal hooks).

On the other hand, in the small part of the project in concrete structure insulated by the interior (ground floor) building A) the thermal bridges encountered are classic, the only ones being attenuated being those of the junction / facades because the slats are not in concrete but in wood with insulation for some and for others

### More information

see attachment

## Renewables & systems

### Systems

Heating system :

- Wood boiler

#### Hot water system :

- Individual electric boiler
- Solar Thermal

#### Cooling system :

- No cooling system

#### Ventilation system :

- Natural ventilation
- Free-cooling
- Single flow

#### Renewable systems :

- Wood boiler

#### Other information on HVAC :

The two buildings have a significant amount of solar hot water production: 28.5m<sup>2</sup> for building A and 17.1m<sup>2</sup> for building B. However, this does not allow for surplus energy production and therefore to become a producer. energy...

In order to reduce electricity consumption and limit the impact of the building on the environment, we chose to equip the project with:

- glazing distributed so as to favor a good homogeneous irrigation of the premises in natural light: in order to reduce the use of artificial lighting;
- low consumption lamps;
- low consumption ventilation boxes;
- through housing typologies to maximize the efficiency of natural ventilation: in order to achieve passive summer comfort;
- common all external traffic: to suppress their consumption of ventilation and heating, and to limit their consumption of lighting at night time;
- meters of consumption movable with posting in the lodgings in order to allow the occupants to follow them and to react in case of drift.

## Environment

### Urban environment

Land plot area : 1 150,00 m<sup>2</sup>

On an urban site on the outskirts of the metropolis of Bordeaux, between large complex and suburban fabric, directly related to the realization of the Tramway, the project occupies a plot of 1150 m<sup>2</sup>, mainly oriented, north and south, on a horizontal ground. "The hive" is a semi-collective program in participative and collaborative housing with shared and shared spaces, made of wood frame, straw filling, earth and lime rendering. Two buildings are developing on the parcel: the first contains seven units in street alignment. Its volume on four levels is animated by alternating volumes and materials, such as wood cladding and white lime renders on a concrete base. This building also contains the common room for the inhabitants of 80 m<sup>2</sup>, open on the heart of islet. At the top is a common terrace overlooking the gable on street. The design is characterized by the multiplicity of possible routes, through many stairs and corridors that make traffic spaces a major and inhabited component of the project. The second building contains four dwellings at the bottom of the plot, the facades alternate between wooden cladding and lime plaster. Joineries are also in wood, some set with metal frames, others with wooden frames. The sloped roofs are insulated in cellulose wadding and have various coverings: wood cladding, steel tray, tiles. As for the walls, they follow for each dwelling the interior use, elaborated with the inhabitants: all the openings are particular and included in the custom wood frame.

## Products

### Product

Individual pellet stove 6kW

Palazetti

800 018186

<http://www.palazzetti.fr/fr/>

Product category : HVAC, électricité / heating, hot water



## Costs

## Health and comfort

## Comfort

### Health & comfort :

The software used for natural lighting calculations is ArchiWizard, which calculates the Day Light Factors achieved in the different buildings of the building. The type of sky considered is the Moon and Spencer covered sky normalized by the CIE. Thus, one can act on the openings of the bays, their position, their dimensions, or the factors of luminous reflection of the coatings to increase the visual comfort. In the housing the requirement is not as strong as in premises working but considering the diversity of activities that can spontaneously take place there we recommend aiming at least achieving a minimum FLJ of 1% in all points, except in humid rooms. Our optimization work has been done in this direction. In the end the optimized project includes a maximum of spaces irrigated in natural light homogeneously and with a day light factor greater than 1%.

## Carbon

### GHG emissions

GHG in use : 34,74 KgCO<sub>2</sub>/m<sup>2</sup>/an

#### Methodology used :

Bilan Carbone (see attachment)

GHG before use : 252,43 KgCO<sub>2</sub> /m<sup>2</sup>

Building lifetime : 50,00 année(s)

, ie xx in use years : 7.27

GHG Cradle to Grave : 1 989,43 KgCO<sub>2</sub> /m<sup>2</sup>

### Life Cycle Analysis

#### Eco-design material :

**Carbone** : ADEME Nouvelle Aquitaine commissioned Laurent Castaignède from BCO2 to evaluate whether the participatory aspect of the project had an impact on its carbon footprint. "The impact study shows that La Ruche emits a total of 240 t CO<sub>2</sub> of construction then 33 t CO<sub>2</sub> / year of use, which reduces to housing gives respectively 22 and 3 t CO<sub>2</sub> / log t. Thus, compared to average housing RT 2012, emissions are halved when considering those of construction (carbon sinks effect of wood) and those of perimeter RT (pellet heating). The most emitting stations are travel (in reality less than the Bèglois average considered here) and domestic electricity, then equal construction depreciation and consumption RT. In the end, according to the Carbone® scale, La Ruche obtains a silver medal, (score of 13.6 out of 20) **Detail of the emissions of the construction** Although little concrete was used on the project, this one impacts a lot the balance sheet, but is partially offset by carbon storage in the timber being used (this takes into account the movement and exploitation of wood, some of which comes from the North). **Lot Carpentry and Wood** Structures Exterior Wood Frame Walls, Intermediate Floors, Carpentry Waterproofing Frames, Traditional Carpentry, Wood Exterior Cladding, Wood Plywood Floor Structure, Patio Load Resumption, Wood Console, Carrying Elements, Wood Wall slitting, Interior partitions, Depergola fittings .....

- Wood mass: 26890 kg
- Mass bio-based materials excluding wood: 14964 kg
- Mass all materials: 303972 kg

Biobased products (including wood) represent 14% of the mass of the batch Carpentry and woodworking **Lot Straw, plastered with earth / lime** Straw walls, lime plaster, interior plaster

- Wood mass: 16835 kg
- Mass bio-based materials excluding wood: 31861 kg
- Mass all materials: 120563 kg / m<sup>2</sup>

Biobased products (including wood) account for 40% of the mass of this lot. Lot Wood interior and exterior joinery

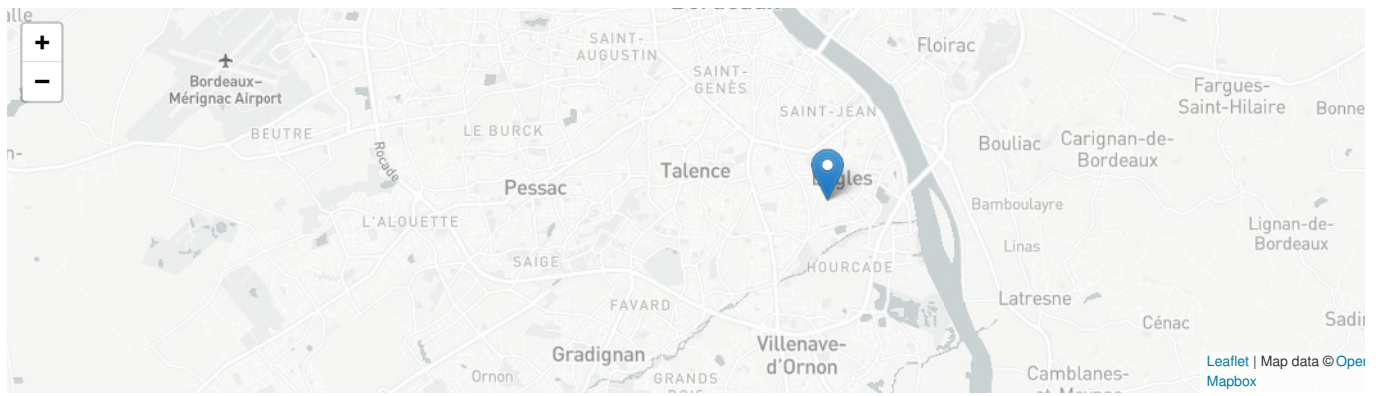
- Wood mass: 476 kg
- Mass bio-based materials outside wood: 0 kg / m<sup>2</sup>
- Mass all materials: 4706 kg

Bio-based products (including wood) represent 10% of the mass of this lot. The wood used for this project is eco-certified PEFC or FSC for a quantity of 80 dm<sup>3</sup> / m<sup>2</sup> SHON. Origin: local resources for solid wood and European for derivatives.

## Contest

### Reasons for participating in the competition(s)

Cet habitat participatif est construit en ossature bois remplissage botte de paille enduit terre face intérieur. Les planchers des logements sont en ossature bois. Les cloisons séparatives dans les logements sont elles aussi en ossature bois remplissage torchis, finition enduit terre. Bâtiment niveau de performance effinergie+. Le bâtiment est de catégorie 3° niveau : niveau de le plus élevé du label « Bâtiment biosourcé » du 19 déc.2011.



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