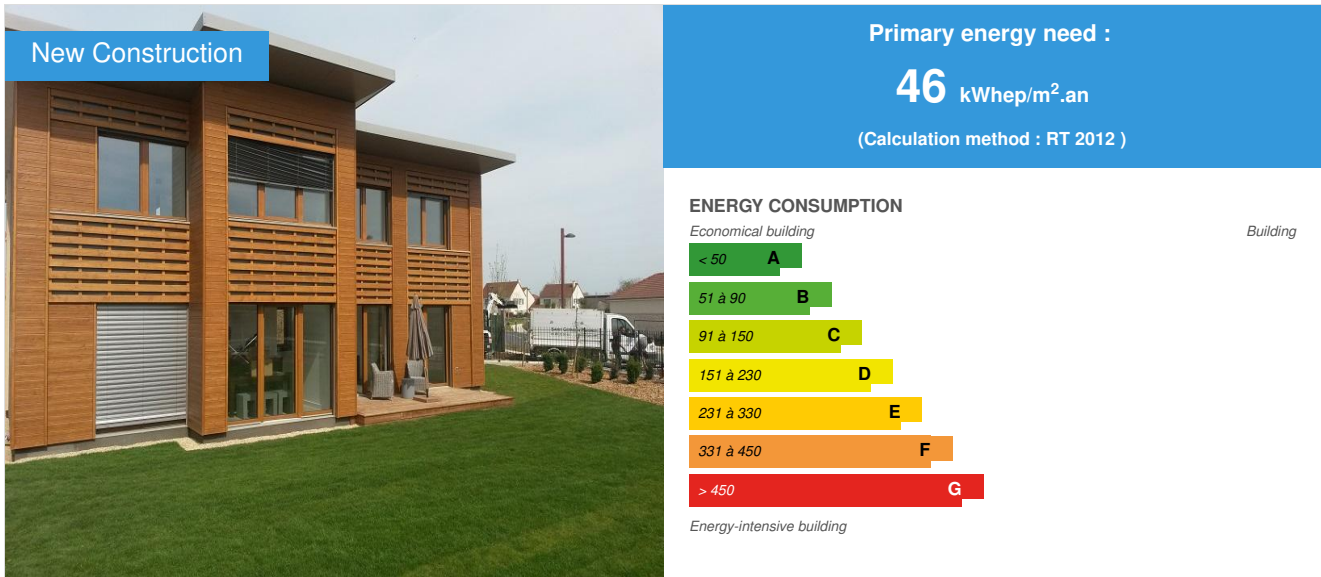


The Lodges - demonstrator building

by [Rodrigue LECLECH](#) / 2021-03-24 00:00:00 / France / 17340 / FR



Building Type : Isolated or semi-detached house
Construction Year : 2015
Delivery year : 2015
Address 1 - street : rue des Champs Robailles 77600 CHANTELOUP EN BRIE, France
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 136 m² SHON
Construction/refurbishment cost : 299 200 €
Cost/m2 : 2200 €/m²

General information

The original idea of the project comes from a strong architectural idea: a house that evolves with the family.

The first sketches are drawn around the idea of the wooden cabin. Piece by piece, we build the house around a central volume which connects the whole house. The staircase creates the double height which naturally becomes the living room. The structure organises itself: the masoned hard core hosts the wet rooms; wooden frames volumes cling all around it as the house evolves to adapt with the needs of the family: it is an evolutive house.

Sustainable development approach of the project owner

The house is called "Lodge" to echo the wooden frame set up in a natural area. This project does not just limit to only one innovation, but tries out different fields to meet (or even anticipate) in an original way the in an original way the expectations of our clients and public partners :

- Scalability housing (3 to 6 rooms): by adding prefabricated wooden boxes, we encourage the residential "journey" of our customers (from € 35,000 to € 65,000). It allows them to stay longer in their homes and to carry out several stages of their residential "journey" (welcoming newly arrived families, retention in the city, consistent with the evolution of the financial capacities of future residents);
- A passive house: triple glazing / reinforced insulation / heating through dual flow ventilation / orientation to the South / Solar hot water;
- The choice of bio-based materials (French wood / hemp), to help developing new economic sectors;
- Home automation and feedbacks (a home control including the monitoring of energy consumption to reduce the energy bill);
- A contemporary architecture that embraces the wooden construction and a quality landscaping;

Through this project, we also commit to an environmentally responsible approach by involving local industries and imposing social integration clauses in our

markets.

Architectural description

The originality of the project is the architectural design of these homes that allows them to be scalable. The houses can be enlarged with the addition of wooden prefabricated modules: a house with 3 rooms and can move to 4, 5 or 6 rooms without changing the land surface.

Stakeholders

Stakeholders

Function : Contractor

Bouygues Immobilier

<http://www.bouygues-immobilier.com>

Function : Construction Manager

Aw²

Stéphanie Ledoux

<http://www.aw2.com>

Function : Thermal consultancy agency

Pouget Consultants

contact[a]pouget-consultants.fr

<http://www.pouget-consultants.fr>

Function : Other consultancy agency

TRIBU

C. Morvan - cmorvan[a]tribu-concevoirdurable.fr

<http://www.tribu-concevoirdurable.fr>

Function : Others

EPAMARNE

<http://www.epamarne.fr>

Developer and pilot innovative project

Contracting method

Off-plan

Energy

Energy consumption

Primary energy need : 46,00 kWhep/m².an

Primary energy need for standard building : 72,00 kWhep/m².an

Calculation method : RT 2012

CEEB : 0.0001

Breakdown for energy consumption : Heating: 9.4 kWhep/ m²ShonRT.year

ECS: 12.1

Lighting 3.7

Auxiliary: 21

Envelope performance

Envelope U-Value : 0,16 W.m⁻².K⁻¹

More information :

The thermal survey was conducted by Pouget Consultants with the PHPP software and using RT2012 (French thermal regulation)

The exterior woodwork are of type 95 mm triple glazing with a $U_f 0,80 \text{ W / m}^2\text{K}$ and triple glazing achieves U_g of $0,60 \text{ W / m}^2\text{K}$.
For exterior walls, bottom floor and the roof, significant insulating thicknesses are required depending on the heat loss, which is related to the nature of the wall.

- Walls with timber frame

main timber frame wall with 120 mm outer glass wool + 145 mm of glass wool between wood studs (7% wood) + 100 mm hemp wool inside; Total thickness = 365mm; $U = 0,10 \text{ W / m}^2\text{K}$

Wall insulated with 22 cm wooden frame with 100 mm and 120 mm polystyrene exterior glass wool + 145 mm of glass wool between wood studs (7% wood) + 100 mm inside hemp wool; Total thickness = 505mm; $U = 0,08 \text{ W / m}^2\text{K}$

Masonry walls

External insulation wall of insulating bricks (200 mm) with 24 cm under plaster 240 mm polystyrene; Total thickness = 440mm; $U = 0,11 \text{ W / m}^2\text{K}$

External insulation wall of insulating bricks (200 mm) with 26 cm under plaster 260 mm polystyrene; Total thickness = 460mm; $U = 0,10 \text{ W / m}^2\text{K}$

External insulation wall of insulating bricks (200 mm) with 24 cm under cladding: 240 mm polystyrene; Total thickness = 440mm; $U = 0,12 \text{ W / m}^2\text{K}$

External insulation wall of insulating bricks (200 mm) with 16 cm under cladding: 120 mm polystyrene; Total thickness = 320mm; $U = 0,15 \text{ W / m}^2\text{K}$

Low floors and roof

Groundfloor or unventilated building void: concrete screed (50 mm) + 120 mm + polyurethane insulation slabs (370 mm) Total thickness = 490mm; $U = 0,07 \text{ W / m}^2\text{K}$

On porch floors: concrete screed (50 mm) + 120 mm polyurethane; Total thickness = 120mm; $U = 0,18 \text{ W / m}^2\text{K}$

Roof: 100 mm hemp fiber + 300 mm glass wool; Total thickness = 400mm; $U = 0,09 \text{ W / m}^2\text{K}$

Indicator : I4

Air Tightness Value : 0,17

Renewables & systems

Systems

Heating system :

- Condensing gas boiler
- Others

Hot water system :

- Solar Thermal

Cooling system :

- No cooling system

Ventilation system :

- Double flow heat exchanger

Renewable systems :

- Solar Thermal

Renewable energy production : 30,00 %

Other information on HVAC :

- Choice of heating system: dual flow ventilation coupled with a gas boiler
- Ventilation: Double flow type Zehnder ComfoAir ($n > 90\%$)

Environment

Urban environment

Land plot area : 700,00 m²

The land on which settles the project is an ecological relay to the village center in the vast chain of ecological corridors that frame the large territory, from the Marne valley and forests in the north to the forest of Ferrières South. The main idea of the block plan is to create a smooth transition between the village center "mineral" in the south and the north woods of Chigny, main biodiversity reservoir nearby. Vegetable intake that characterizes the project is the "orchard inhabited" a real link between these wooded poles. Soft paths (pedestrian and bicycle) are preferred for all daily trips nearby (school, town center) within 500 m of the site. The main access to the site is located north of the plot, on Avenue du Chêne Saint Fiacre. The houses are serviced individually via the main street one-way running through the site in a north-south axis, then emerges rue des Champs Robailles. The routes of interior roads allow direct access to each plot. A pedestrian-bicycle traffic through the site on an east-west axis, highlighting the Avenue du Bois de Chigny relationship and the Promenade du Lac. The operation ground plane is designed to give each house an optimal situation in terms of orientation

Products

Product

Biofib'Chanvre

Biofib'Isolation

Le Fief Chapitre - 85400 Sainte Gemme la Plaine - Tél. 02 51 30 98 38 - Fax 02 51 30 98 37

<http://www.biofib-isolation.com/>

Product category : Second œuvre / Cloisons, isolation

Special insulation for wood frame houses Biofib'Chanvre is a natural and environmentally friendly insulation, manufactured by topping hemp fiber. Available in rolls or semi-rigid panels, it is primarily intended for thermal insulation of residential buildings (walls, roofs and floors) in new buildings and renovation.

European technical opinion ETA-11 / Etiquette 005 Emissions into indoor air: A +



ISO-CONNECT Vario Fix

ISOchemie

<https://www.iso-chemie.eu/fr/home/>

Product category : Gros œuvre / Charpente, couverture, étanchéité

ISO-CONNECT Vario Fix is a special foil which can be plastered over for the permanent airtight sealing of connection joints in window and door connections in various construction types. The foil can be fixed to both the window frame and the reveal in one single working step. The foil features a wide self-adhesive strip and a fine mesh for plaster. It guarantees a perfect hold and improved plaster adhesion even on difficult surfaces such as concrete, wood or brick and limestone masonry.

In addition, the foil reacts to the different seasonal temperature gradients by adapting its sd-value, thus achieving a high drying effect in the joint all year round.



Product advantages

- Increase in plaster adhesion thanks to the practical mesh fixing and two self-adhesive strips and a powerful adhesive surface on the fleece side
- No additional construction adhesive required
- Easy installation even on difficult surfaces such as concrete, wood, brick, or limestone masonry
- Optimum adhesive strength which is fully achieved after only 60 minutes
- Special fleece surface, easy to plaster and glue over
- Only one product for inside and outside
- High drying effect of the joint thanks to humidity-regulating functional mechanism
- Complies with the requirements of "EnEV" and the RAL "Installation guide" published by the RAL quality assurance association for windows and doors

Lamisol Shades

Griesser

info[a]griesser.fr

<http://www.griesser.fr/fr/home>

Product category : Gros œuvre / Système passif

- Self-supporting blinds system, recessed or surface mounting.
- Yellow Kevlar fibers have high strength and closing of the blades remains optimal for many years.
- Seal for a good darkening and mitigation of wind noise.
- The shape of the blade tips studied reduced wind noise in the closed position.
- Stainless steel connection hooks.
- Low wear raffle ribbons lined by the recesses



Triple Glazing Joinery

Menuiseries Blanc

<http://www.menuiseries-blanc.com>

Product category : Second œuvre / Menuiseries extérieures

Joinery 92mm triple glazing with $U_f = 0.8$ Carrelet 4 mixed folds épécéa / insulating glass $U_g = 0.6 / 0.63$ solar factor

Costs

Construction and exploitation costs

Total cost of the building : 299 200 €

Carbon

GHG emissions

GHG in use : 24,00 KgCO₂/m²/an

GHG before use : 577,00 KgCO₂/m²

,ie xx in use years : 24.04

Life Cycle Analysis

Eco-design material : All wood used for the building is from sustainably managed forests (PEFC label) The insulation (walls and roofing) was provided with 32 cm of hemp wool from a local business in Seine et Marne. With such reductions in energy needs, the share of energy consumption for the production of materials (embodied energy) and their greenhouse gas emissions takes on a different meaning.

The bio-based materials used for the construction of the Lodges are hemp wool insulation coming directly from the local agricultural sector, and wood for frames and wooden floors structure and for joinery. For both materials, throughout the growth of the plant (or tree), carbon dioxide is stored. It is fixed in the implemented components. If the forest or farm are sustainably managed, these raw materials are entirely renewable and thus avoid tapping into increasingly exhaustible resources . The development of the agricultural and industrial sector of hemp wool is an economic objective set across the Seine and Marne, including the eco-Valley of the Marne. The cultivation of hemp in bio-based materials is most interesting as this hardy plant grows very fast and is drought resistant. It requires little fertilizer, does not get attacked by insects and does not require any phytosanitary treatment. Also, its use as a raw material does not substitute for food use because the wool is made from the fibers and allows food use for the seed. It allows development of agricultural, transformation and eco-construction sectors.

Contest

Reasons for participating in the competition(s)

Before looking for zero energy, one must start by limiting and reducing consumptions, especially heating consumptions. This advanced "passive" approach was used for the Lodges in Chanteloup-en-Brie through very efficient insulation and air tightness, and heat recovery on air on ventilation. Each house of this project is to be certified with the PassivHaus Label. Photovoltaic panels cover 50% of hot water energy needs. Part of the materials used in the structure, the insulation and the joinery are bio-based.

The Lodges, through the demonstrating house, are not Zero Energy Buildings but perfectly illustrate the passive approach to reduce consumptions, a prerequisite to reach positive energy.

Building candidate in the category



Energie & Climats Tempérés

