

Frugal rehabilitation of a Trièvoise farmhouse

by Silo architectes Yann Damiani / 2022-06-13 00:00:00 / France / 1484 / FR

Heritage renovation



Primary energy need :
kWhep/m².an
(Calculation method :)

ENERGY CONSUMPTION

Consumption Range (kWhep/m ² .an)	Energy Class
< 50	A
51 à 90	B
91 à 150	C
151 à 230	D
231 à 330	E
331 à 450	F
> 450	G

Economic building (A-D) / Energy-intensive building (E-G)

Building Type : Isolated or semi-detached house
Construction Year : 1820
Delivery year : 2021
Address 1 - street : Saint Beauvais 38710 SAINT BAUDILLE ET PIPET, France
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 236 m² Autre type de surface nette
Construction/refurbishment cost : 350 000 €
Number of Dwelling : 1 Dwelling
Cost/m2 : 1483.05 €/m²

Certifications :



General information

The traditional farmhouse of Trièves is transformed into a home and workshop, in the heart of a rural landscape, to house the daily lives of two contemporary artists. The contracting authority has decided to bring together its living and working place to limit its journeys, which are vectors of high energy consumption.

The **rehabilitation project** concerns the longest of the three buildings, which becomes housing, a workshop for woodworking, a music studio and a consulting room.

The project is **insulated from the inside** with hemp lime concrete and cellulose wadding on the roof. The heating and hot water system is a wood pellet boiler. Ventilation is natural. The non-collective sanitation system is carried out by phyto-purification.

Located in an **area with a low landslide hazard** , rainwater is discharged into an infiltration trench finely studied by a geotechnical engineer.

Building users opinion

The occupants are very satisfied with the thermal behavior of the building. The heating requirements are very low and the perception of the perceived temperature is good, given the favorable effusivity of lime-hemp concrete.

See more details about this project

<http://www.siloarchitectes.fr/rehabilitation-dune-ferme-dans-le-trieves/>

Photo credit

Silo architects and Sandrine Rivière

Stakeholders

Contractor

Name : Privé

Construction Manager

Name : Silo architectes

Contact : yann[at]siloarchitectes.fr

<http://www.siloarchitectes.fr>

Stakeholders

Function : Company

Ets Mordenti

Cyril Mordenti

Stone masonry, concrete masonry, sanitation and VRD

Function : Company

Les toits du Trièves

Lionel Cassaro

Framework, roofing, zinc work and roof insulation

Function : Company

ALEC

Alexis Rey-Galiay

Strong and weak current

Function : Company

Lehmann & fils

Peter Lehmann

Plumber heating

Function : Others

AQUATIRIS

Aurélie Daumergues

<https://www.aquatiris.fr/>

pre-studies, materials supplier and support for self-construction for the phyto-purification sanitation system

Type of market

Global performance contract

Energy consumption

Breakdown for energy consumption : - The heating and domestic hot water consumption comes from the same pellet boiler without an independent calorie counter. Last year's annual consumption was 2600 kg of pellets. This corresponds to approximately 11,800 kWh for a 236 m² building, knowing that 1 kWh = 0.22 kg of pellets. We therefore obtain a consumption of around 50 kWh/m².year. - Power consumption supports lighting and household appliances, but we don't have data on it. - No ventilation consumption because it is natural. - No cooling in the project.

Envelope performance

More information :

As expressed above, no calculation has been made, we have just largely exceeded the requirements of RT 2005.

- The concrete slabs are insulated on the underside with a side thermal bridge breaker with 100mm thick polyurethane with an R = 4.65.
- The roof is insulated with 340mm of cellulose wadding, density 60 kg/m³, i.e. an R = 8.1.
- The facades are insulated in ITI with hemp lime concrete with a thickness of 200mm for an R = 2.6. This value is only a numerical value which does not reveal all the qualities of this product which is an insulator with inertia (theoretically impossible for thermal software).

Building Compactness Coefficient : 0,60

More information

The consumptions that we have sent to you concern the actual consumption of the 1st year elapsed. There was no prior thermal simulation because, for economic reasons for the customer and for regulatory reasons, we were not obliged to make this calculation. Nevertheless, we are well above the performance required by the RT 2005.

Renewables & systems

Systems

Heating system :

- Wood boiler

Hot water system :

- Wood boiler

Cooling system :

- No cooling system

Ventilation system :

- Natural ventilation

Renewable systems :

- Wood boiler

Renewable energy production : 100,00 %

Solutions enhancing nature free gains :

La ventilation est naturelle et ne produit donc pas de consommation.

Environment

Risks

Hazards to which the building is exposed :

- Flooding/Fast Recession

Risks measures put in place :

The plot is located in low landslide hazard. In order not to aggravate the risk and to respect infiltration on the plot, we worked with the KAENA geotechnical study office, which helped us to size an infiltration structure using a MATSUO method. This resulted in the creation of a drainage trench with a storage volume of 21.6 m³ capable of coping with ten-year occurrences of rain with a leakage rate set at 0.05 liters / second.

Urban environment

Land plot area : 2 288,00 m²

Built-up area : 300,00 %

The building is located in a rural agricultural setting. It is located 10 minutes by car from the nearest town center. A small communal road gives access to the house as well as to 5 other neighbours. The plot is bordered by forest and exploited agricultural field.

Products

Product

Hemp lime concrete

Saint Astier

<https://www.saint-astier.com/>

Product category : Second œuvre / Cloisons, isolation



Costs

Construction and exploitation costs

Renewable energy systems cost : 11 963,00 €

Cost of studies : 35 000 €

Total cost of the building : 350 000 €

Circular Economy

Reuse : same function or different function

Batches concerned by reuse :

- Structural works

For each batch : Reused Materials / Products / Equipments :

The project is the subject of a strong deconstruction of the original stone masonry. These walls were reassembled by the mason associated with concrete chaining. The reused volume of stone is around 50 m³.

Health and comfort

Indoor Air quality

Natural ventilation installed.

The occupants ventilate their accommodation by opening the windows with ease.

Comfort

Health & comfort :

The living space benefits from 2 large bay windows overlooking the ground level. The ground floor is therefore accessible and in continuity with the access to the land.

The hemp lime concrete used in interior insulation is a powerful regulator of wall temperature and interior humidity. Thus, in winter, it stores humidity, and in summer, it restores it, functioning as a passive cooler. In addition, this insulating material having inertia, the heat produced in winter is stored in the walls, and even when opening the windows to ventilate the building naturally, a large part of the calories do not escape. .

Acoustic comfort :

Through the roughness of the hemp-lime concrete, the exposed joists and the non-orthogonal geometry of the volumetry of the building, the acoustic comfort is exceptional.

GHG emissions

Methodology used :

Project too small to be able to pay for this kind of study

Building lifetime : 50,00 année(s)

Life Cycle Analysis

Eco-design material :

We used wood for the frame, wadding for roof insulation, hemp lime concrete in ITI, wood exterior joinery.

Contest

Reasons for participating in the competition(s)

The **rehabilitation project** for this Trièvoise farmhouse was carried out with a **strong ecological commitment** on the part of the contracting authority and the project manager. Both in terms of the current use of the building and in the construction techniques that have been used, every precaution has been taken to produce a **frugal building**. The insulation complex based on 20 cm of sprayed lime-hemp and 35 cm of cellulose wadding on the roof allow the building to **consume very little energy in winter and to remain very cool in summer** without means of cooling. Effluents (rainwater and wastewater) are treated on the plot by gravity and in particular by phyto-purification for wastewater. The inhabitants live and work on the spot to deeply limit their daily movements.

Building candidate in the category



Prix du public

