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.
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-Galay

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

#### Contracting method

Separate batches

#### Type of market

Global performance contract
**Energy**

**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.

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### Products

**Product**

Hemp lime concrete  
Saint Astier  
[https://www.saint-astier.com/](https://www.saint-astier.com/)  
**Product category** : Finishing work / Partitions, insulation

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### Costs

**Construction and exploitation costs**

- **Renewable energy systems cost** : 11 963,00 €  
- **Cost of studies** : 35 000 €  
- **Total cost of the building** : 350 000 €

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### 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.

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### 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.

**Carbon**

**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)**

Le projet de réhabilitation de cette longère trièvoise a été porté avec un fort engagement écologique de la part de la maîtrise d’ouvrage et de la maîtrise d’œuvre. Aussi bien au niveau de l’usage actuel du bâtiment que dans les techniques constructives qui ont été employées, toutes les précautions ont été rassemblées pour produire un bâtiment frugal. Le complexe d’isolation basé sur 20 cm de chaux-chanvre projeté et 35 cm de ouate de cellulose en toiture permettent au bâtiment de consommer très peu d’énergie en hiver et de rester très frais l’été sans moyen de refroidissement. Les éffluents (eaux pluviales et eaux usées) sont traitées à la parcelle de manière graviétaire et notamment en phyto-épuration pour les eaux usées. Les habitants vivent et travaillent sur place pour limiter profondément leurs déplacements du quotidien.

**Building candidate in the category**

Prix du public