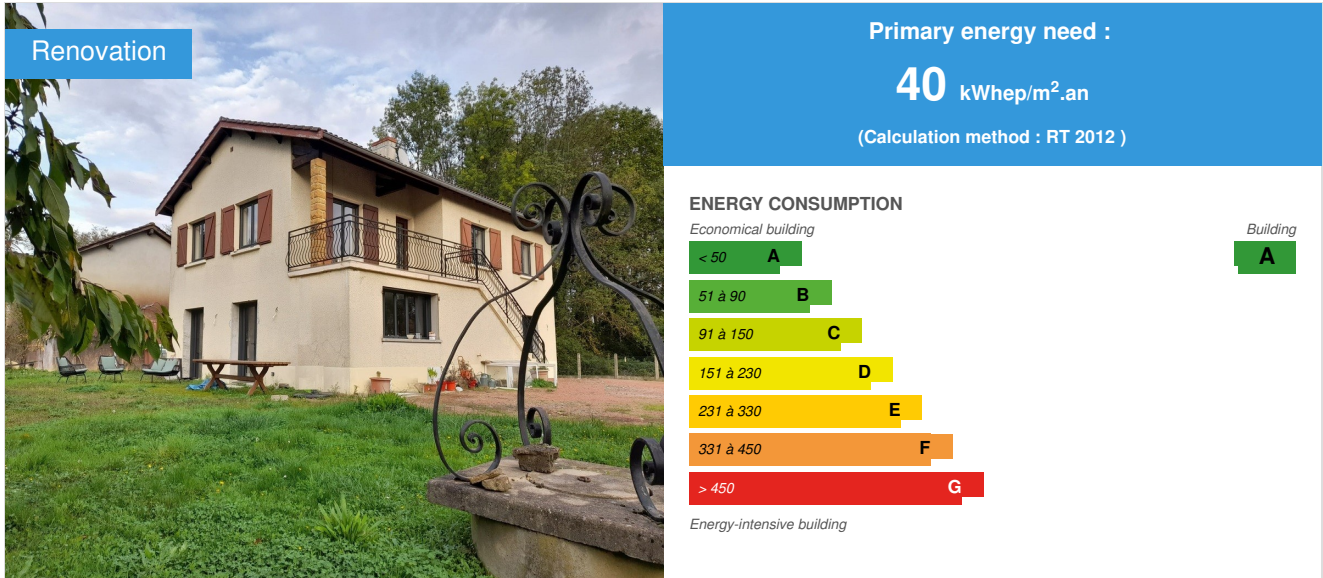


Circular House

by Naomi Scherer / 2022-05-17 00:00:00 / France / 4803 / FR



Building Type : Isolated or semi-detached house
Construction Year : 1978
Delivery year : 2022
Address 1 - street : 586 Route de Jarnioux 69640 PORTE DES PIERRES DORÉES, France
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 200 m²
Construction/refurbishment cost : 165 000 €
Cost/m² : 825 €/m²

General information

In a context of depletion of raw materials and increasing carbon emissions, each of us must take concrete action to save our planet. Actions in our professional life for MOEs, MOAs, BEs, but also concrete actions as individuals must be taken.

The linear economic model can no longer work.

The building sector generates 35% of waste in France. It is from this observation that our project was born.

We are 2 individuals (one who works in the fight against energy poverty, and the other in the circular building economy) who wanted to leave the city to settle in the countryside and remain consistent with our values.

Since the best energy remains that which we do not consume, we have opted for renovation rather than new construction. Our renovation will surely not have the budget of a professional, but the goal was to **show that even private individuals can carry out a complete renovation in a circular economy**. We worked outside our working hours, so as not to harm our respective work, we sourced the materials ourselves and made the craftsmen aware of following us in this ecological approach;

Our goals ?

- Improve the energy performance of the building by moving from level F to B
- Significantly reduce the carbon impact of our construction site (by using a maximum of products already present in the home or resulting from reuse)
- Show that even individuals can renovate in a circular economy
- Make beautiful and qualitative with materials from reuse
- Democratize reuse among individuals

Before renovation, the building was a 2-storey detached house for residential use built in 1978 for a family of winegrowers. She went on like this:

- Ground floor: garage, cellar, boiler area, room to accommodate pickers
- 1st floor: living apartment with 3 bedrooms, kitchen, living room, bathroom, WC.

As buyers, we decided to **renovate the building by giving it better energy performance and using as many recycled materials as possible, resulting in frugal architecture.**

The new distribution is:

- Ground floor: living room (kitchen, dining room, living room), guest bedroom 1 + shower room, laundry room, storage room, office 1 for teleworking, technical room
- 1st floor: sleeping area with 3 bedrooms, study 2/guest bedroom 2, 2 bathrooms, 1 dressing room

In a desire for efficiency, we have divided up the roles:

- 1 person was in charge of energy renovation and mobilizing CEE and Maprimerenov aid;
- 1 person was in charge of the circular economy lot (collection of needs, adaptability, sourcing, delivery, storage, renovation);

We are therefore probably the only individuals to participate in the "Green Solutions Awards" who have carried out a renovation project from A to Z bringing together the parameters of circular economy, energy and environmental performance!

Building users opinion

The house withstood the summer heat waves very well.

When outside it was 35°C/38°C, the indoor air temperature was controlled at 27°C maximum.

If you had to do it again?

We would add solar panels to the roof early in the project.

We would have made the French doors a standard width (120x220 instead of 143x220) in order to more easily find reused shutters to integrate into the project.

Photo credit

Naomi Scherer

Stakeholders

Contractor

Name : Naomi Scherer

<https://www.linkedin.com/in/naomi-scherer/>

Construction Manager

Name : Julie Teulé

Contact : teulejulie@gmail.com

<https://julieteule.com/>

Energy

Energy consumption

Primary energy need : 40,00 kWhp/m².an

Calculation method : RT 2012

Breakdown for energy consumption :

Initial consumption : 475,00 kWhp/m².an

Envelope performance

More information :

We have not yet had time to carry out a control audit, nor to have a year of consumption to assess the actual consumption of the building. Similarly, we have not yet done the air tightness test which is planned in the coming weeks.

As far as the envelope is concerned, the concrete walls have been insulated internally with 20 cm of cellulose wadding, the attic has been insulated with 40 cm of cellulose wadding and the lower floor with polyurethane foam. 6 cm. All of the windows have been replaced by PVC joinery in double glazing.

More information

This is a global renovation project aiming at a BBC renovation level. The initial thermal audit allowed us to define two work scenarios, one allowing a minimum reduction of 30% in energy consumption, the other allowing a reduction of about 400 kWh/m²/year. We opted for the more efficient scenario so that the house could significantly reduce its carbon impact. We also chose to switch to renewable energy for heating and domestic hot water, by installing a wood pellet boiler in place of the old original oil boiler.

Renewables & systems

Systems

Heating system :

- Water radiator
- Low temperature floor heating
- Wood boiler

Hot water system :

- Wood boiler

Cooling system :

- No cooling system

Ventilation system :

- Humidity sensitive Air Handling Unit (Hygro B)

Renewable systems :

- Biomass boiler

Renewable energy production : 60,00 %

We made the choice of the production of heat by wood in substitution of the old oil boiler.

This choice was dictated by several reasons:

- the regulations in force as well as our ecological commitment have prompted us to abandon the old oil-fired system.
- wood is a renewable energy that significantly reduces greenhouse gas emissions
- the price of wood energy was very competitive on the market and seemed able to guarantee us limited energy expenditure.
- the wood boiler allows us to supply both the old emission system by radiators upstairs that we wanted to keep in a process of reuse while allowing us to install a heated floor on the ground floor.

The boiler guarantees both the heating of the house as well as the production of domestic hot water.

Solutions enhancing nature free gains :

Ouverture de baie vitrée au sud.

Environment

Risks

Hazards to which the building is exposed :

- Geotechnical drought (Clay soil shrinkage and swelling)

Risks measures put in place :

No action yet.

Urban environment

Land plot area : 2 752,00 m²

Built-up area : 3,60 %

Green space : 2 652,00

The house is located on agricultural land between the villages of Pouilly-Le-Monial and Jarnioux, in the Commune of Porte des Pierres Dorées.

To the east, a wood (left abandoned) of 10,000m² runs along the width of the land.
To the north, an uncultivated meadow of 8,000m² borders the land.
To the south, passes the departmental road which connects the 2 villages.
To the west, there is a hamlet with around ten individual houses with private gardens.

Bus stop in front of the house.

Primary school at 800m.

Shops can be reached by car, except for a supermarket, bakery and hairdresser 600m away in the center of Pouilly le Monial.

Products

Product

Circouleur recycled paint

Circouleur

contact@circouleur.fr

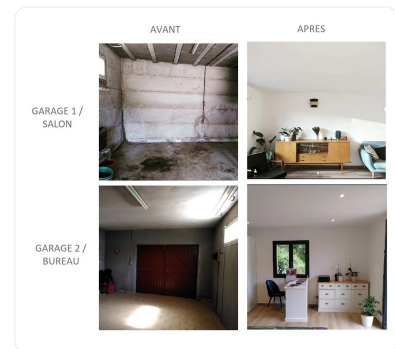
<https://circouleur.fr/>

Product category : Management / Facility management

The only and leading manufacturer of recycled paint in France, CIRCOULEUR recycles and transforms unused paint! By avoiding the incineration of acrylic paints and the extraction of new raw materials, he produces a high-performance ecological paint, with an environmental impact 12 times lower than a conventional paint. Circouleur also works with people in professional reintegration and with disabilities.

The whole house was painted with these unique paints in France!

The plasterer was surprised and reluctant at first. After seeing the result, he was happy to have discovered the innovation brought by Circouleur!



Permaculture

Product category :

A permaculture vegetable garden has been created in the land near the well to benefit from its water thanks to a pump.

Fruit trees have been planted to promote self-sufficiency of supply, zero km and the biodiversity of the land.

Costs

Construction and exploitation costs

Renewable energy systems cost : 40 000,00 €

Cost of studies : 2 000 €

Total cost of the building : 160 000 €

Subsidies : 22 500 €

Energy bill

Forecasted energy bill/year : 1 250,00 €

Real energy cost/m² : 6.25

Real energy cost/Dwelling : 1250

Circular Economy

Reuse : same function or different function

Batches concerned by reuse :

- Indoor joineries
- Outdoor joineries
- Floorings
- Isulation
- Heating ventilation air conditioning
- Plumbing

- Landscaping

For each batch : Reused Materials / Products / Equipments :

Landscaping :

- Terrace wood 50m²
- Stone for low wall 5m³

Plumbing:

- Taps (11 taps for: 1 kitchen, 2 showers, 3 sinks, 1 laundry room, 1 bidet, 1 bath, 2 washbasins)
- 1 bath
- 1 Laundry sink
- 1 kitchen sink
- 5 cast iron radiators

Floor covering:

- Earthenware Bathrooms: 15m² in total
- Floating parquet: 70m² (the entire parquet)
- Bathroom floor tiling: 25m² (all the floors of the bathrooms and WC + Cagibi)

Interior carpentry:

- Interior doors: 16 doors and cupboard doors (all)
- Solid wood door frames: 16
- Garage doors: 1 door

Exterior Carpentry:

- Windows: 2 windows
- Flaps: 1 pair of flaps

Insulation:

- Cellulose wadding interior insulation: 243m²
- Placard: 270m²

Other :

- Painting walls and ceilings: 10 pots of 15l
- Kitchen: 13 boxes + 13 cupboards
- Polyurethane cornices: 25 linear meters
- Metal placo rails: 28 linear meters

Field of use and material origin :

Landscaping :

1. Terrace wood: from a student accommodation that has never been inhabited, it was removed and reused for the same use in the new home.
2. Stone for low wall: from the various construction sites within a 5km radius of the region.

Plumbing:

1. All fittings (Nobili brand) are old "Show-room" exhibition products that could no longer be sold on the market
2. Bath: from a construction site for an Accord hotel. The MOA decided at the end to replace the bathtubs with showers, they were resold via a platform specialized in the reuse of building materials (Articonnex)
3. Laundry sink: sandstone sink from the old workshop on the ground floor relocated to the laundry room on the ground floor
4. Kitchen sink: sandstone sink recovered from a private individual
5. 5 cast iron radiators that were already in the house. We took them apart, cleaned them, repainted them and reinstalled them

Floor covering:

1. Bathroom tiles: one part from the end of construction sites, the other from the remaining batches from end of collections that could no longer be sold normally; some earthenware was purchased from Minéka, a platform specializing in the reuse of building materials
2. Parquet: end of collection from a German manufacturer intended for dumpsters, purchased via a platform specializing in the reuse of building materials (Articonnex)
3. Bathroom floor tiles: Remains of an end of construction, saved from the dumpster

Interior carpentry:

1. Interior doors: we have recycled all the doors in the house regardless of their condition.
2. The garage doors become sliding doors to access the laundry room
3. Door frames have been measured and adjusted to fit into the new openings

Exterior Carpentry:

1. The old windows have been transformed into a small greenhouse for the garden
2. Shutters: 1 pair of shutters on a new opening that has been created. Purchased from an individual.

Insulation:

1. Interior insulation in cellulose wadding. For the walls: Cellulose wadding from recycled cotton; For the attic: Puffed cellulose wadding from old newspapers.
2. Recycled and recyclable placo certified "Cradle to Cradle"

Others :

1. Painting: 95% recycled paint from the Circouleur brand to paint 320m² of Walls and Ceilings
2. Kitchen: 2nd hand kitchen + appliances purchased from a private individual and recomposed according to the configuration of the new kitchen
3. Polyurethane cornices: 25 linear meters present in the house. They were deposited, stored and put back after the installation of the partition.

Environmental assessment

Impacts avoided : water, waste, CO₂ :

Categories	CO2 avoided (kg)	Water consumption avoided (m3)	Waste avoided (kg)
Outdoor Facilities	2086.346154	13.38353846	2054.600629
Cover	645.1745425	1.913230757	609.3780794
facades	59.5	0.97	2125.31598
Sanitation facilities	268,417	2.24407	180.0069652
Insulation	-205.9715136	3.463606136	
Exterior carpentry	197.3096667	1.718243333	81.66293947
Interior joinery	647.5808587	7.835108971	337.2679365
Furniture	685.1044883	635.1306112	623.1136354
Paint	251.1255369	6.694445018	237.8081933
Plumbing	249.5	3.3935	666.554546
floor coverings	1452.058288	247.4464487	2505.983198
Locksmithing - metalwork	0.159556202	50.02834833	
VRD	0	0	0

	CO2 avoided (kg)	Water consumption avoided (m3)	Waste avoided (kg)
TOTAL	6364.326846	924.3523588	10173.36853

	km by small car	Number of rectangular bathtubs	number of years of household waste of a French person
50915	6162	20	

Equivalent trip Paris-Nice	58.0
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The results of the impact calculation do not include the reuse of the following furnishing materials:

- Wooden door frames
- Polyurethane cornices
- All the furniture in the house including: Sofas, armchairs, tables, beds, cupboards, shelves, appliances (oven, toaster, washing machine, hotplates, freezer, hood), furniture for the summer garden ...
- Decoration: Crockery, vases, frames, mirrors, lighting (lamps, sconces, etc.), all garden tools (lawn mower, wheelbarrow, watering can, garden hose, shovel, rake, garden stone sink. ...)
- Metal placo rails

Our objective is not limited to reusing materials from the second work, but also not to use the raw material in the decorative aspect: we buy (or recover) only second-hand items, or in the case of household appliances, products refurbished.

Economic assessment

Total cost of reuse : 8 000 €

Cost of reuse in percentage of the operation : 5 %

Saving realised thanks to the implementation of reused materials compared to new materials : 25 000 €

Social economy

Social economy and professional integration :

The paint used for the walls and ceilings, Circouleur, is an SSE structure because it works with people in professional reintegration for the sorting of paints to be recycled, and with an Esat with people with disabilities for the labeling of pots of paint.

Comfort

Temperature level :

The 20cm thick insulation guarantees a high level of thermal comfort.

We have seen this this summer during the heat waves, as well as at the end of October / beginning of November, despite the outside temperatures which have dropped, we have not yet needed to turn on the heating, the inside temperature remains at 19 °C.

Carbon

GHG emissions

GHG in use : 1,00 KgCO₂/m²/an

Methodology used :

Heating, cooling and DHW

Building lifetime : 46,00 année(s)

Contest

Reasons for participating in the competition(s)

Travaillant dans l'économie circulaire dans le secteur du bâtiment et dans la précarité énergétique, il nous a paru évident, quand nous avons du commencer la réflexion sur la rénovation de l'habitation dont nous étions devenus propriétaires, d'améliorer le plus possible la performance énergétique de celle ci, avec des matériaux écologiques et en faisant un maximum de réemploi de matériaux pour réduire l'extraction de la matière première. Tous les citoyens doivent apprendre agir à tous les niveaux. C'est ce que nous avons voulu accomplir.

Grâce à nos engagements forts envers le développement durable et un monde plus sobre nous avons rénové le logement :

- en améliorant drastiquement la performance énergétique du bâtiment
- en innovant sur les matériaux à réemployer

Aucun particulier (sans compétences d'architecture) avait auparavant mené un projet avec le but ultime d'éviter la quasi-totalité de l'extraction de matières premières dans une rénovation !

Building candidate in the category



Prix du public

