Project 103

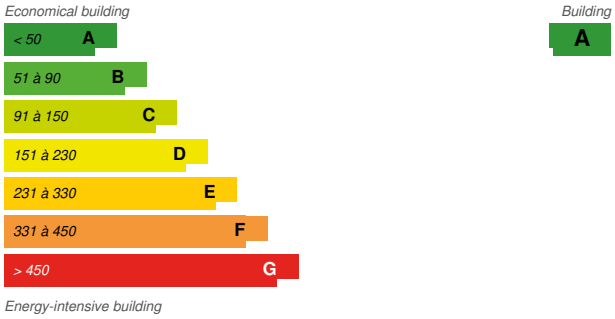
by Elie Delvigne / 2021-02-03 20:55:40 / Belgique / 2498 / FR

Primary energy need :

44 kWhep/m^2.an

(Calculation method :)

ENERGY CONSUMPTION



Building Type : Isolated or semi-detached house
Construction Year :
Delivery year : 2018
Address 1 - street : rue des Américains 103 7022 HYON, Belgique
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 293 m^2
Construction/refurbishment cost : 178 000 €
Number of Dwelling : 1 Dwelling
Cost/m2 : 607.51 €/m^2

General information

"Projet 103" consists of the renovation of an old and unhealthy house. The objective was to reach the "**Q-ZEN**" energy standard (2021 standard in the Walloon Region, Belgium) at the end of the renovation while doing without fossil fuels: only a wood stove provides heating for the house.

The programme includes insulation of the envelope (with, in particular, bio-sourced insulation for the roof: Gramitherm), careful airtightness, double flow ventilation and photovoltaic panels.

The label of the house is A+, which is better than what is required for a new house in 2021.

Data reliability

3rd part certified

Photo credit

Elie Delvigne
Cecile Hoyos
Denis vasilov

Stakeholders

Contractor

Name : Delvigne Elie
Contact : elie.delvigne@gmail.com

Construction Manager

Name : Homeco
Contact : Elie Delvigne
https://www.homeco.be/

Stakeholders

Function : Designer

Homeco architecture

Xavier Bachelart

https://www.homeco.be/
architect

Owner approach of sustainability

The aim was to carry out a renovation (environmental impact of a renovation vs. new construction) of a house in an urban context (proximity to services, public transport, etc.).

The objective of the renovation was to show that it is possible to achieve high energy performance (A+ label) without the use of fossil fuels (only a wood-burning stove heats the house) and by using bio-based materials (gramitherm insulation on the roof).

The consumption of the house is currently 0 € (wood recovered from neighbours, electricity compensated by photovoltaic panels).

In terms of biodiversity, a permaculture vegetable garden, a greenhouse and a henhouse have been installed.

Architectural description

Work on the building envelope:

- external insulation of walls ;

- insulation of the attic floor;

- triple glazed aluminium joinery;

- insulation of the floor slab and the cellar ceiling;

- work on the airtightness.

Systems:

- Heating by wood stove (independence from fossil fuels);

- Domestic hot water by electric boiler (simplicity of installation);

- double flow ventilation system with heat recovery;

- photovoltaic panels to compensate for electricity consumption.

Energy

Energy consumption

Primary energy need : 44,00 kWhep/m^2.an
Primary energy need for standard building : 510,00 kWhep/m^2.an
Calculation method :
CEEB : 0.0026

Final Energy : 40,00 kWhef/m^2.an

Breakdown for energy consumption :
According to the PEB certification method: 79% heating, 15% DHW, 6% auxiliaries

More information :
Consumption = 0. Wood recovered when cutting trees, electricity consumed offset by photovoltaics

Initial consumption : 658,00 kWhep/m^2.an

Envelope performance

Envelope U-Value : 0,33 $W.m^{-2}.K^{-1}$

More information :
Roof insulation with Gramitherm insulation, facades insulated from the outside with plaster on EPS insulation, floor slab insulated with icynene foam. Triple glazed aluminium joinery.

Building Compactness Coefficient : 0,62

Indicator : n50

Air Tightness Value : 5,00

Test blower door

Renewables & systems

Systems

Heating system :
- Wood boiler

Hot water system :
- Individual electric boiler

Cooling system :
- No cooling system

Ventilation system :
- Double flow heat exchanger

Renewable systems :
- Solar photovoltaic
- Wood boiler

Renewable energy production : 100,00 %

Solar photovoltaic system installation composed of 20 panels of 270 Wc

Environment

Urban environment

Existing house on the outskirts of an urban centre (city of Mons).

A bus line passes in front of the building (bus stop a few dozen metres away).

A cycle track is in front of the building (see photo).

A permaculture vegetable garden has been set up in the garden with a chicken coop and a greenhouse.

Products

Product

Gramitherm

Gramitherm

info@gramitherm.eu

https://gramitherm.ch/

Product category : Finishing work / Partitions, insulation

Grass-based insulation

Happy to test this bio-based, innovative and local solution

Double flow ventilation

Zehnder

https://www.zehnder.be/

Product category : HVAC, électricité / ventilation, cooling

Double flow ventilation

Improved air quality, night cooling in summer

Wood stove

STUV

https://www.stuv.com/fr

Product category : HVAC, électricité / heating, hot water

Wood stove

Wood stove "heat", independence from renewable energy

Photovoltaic installation

JA Solar

https://www.jasolar.com

Product category : Management / Others

20 solar panels of 270 Wp

Electricity bill at 0

Solvent-free paint

Peintagone

baptiste@peintagone.be

https://www.peintagone.be/

Product category : Finishing work / paints, mural, wallcoverings

Velvety matt acrylic paint, almost solvent-free and plasticizer-free, very washable.

Solvent-free paint used throughout the house to minimise the air quality impact of finishes

Costs

Construction and exploitation costs

Reference global cost : 1 500,00 €

Renewable energy systems cost : 6 900,00 €

Reference global cost/Dwelling : 1500

Total cost of the building : 190 000 €

Subsidies : 30 000 €

Additional information on costs :
The renovation cost 600 € / m² HVAC

Health and comfort

Water management

Consumption from water network : 30,00 m^3

Consumption of harvested rainwater : 40,00 m^3

Water Self Sufficiency Index : 0.57
Water Consumption/m2 : 0.1
Water Consumption/Dwelling : 30
10,000-litre rainwater tank which supplies the toilets, the washing machine and the outdoor taps used for the vegetable garden

Indoor Air quality

The double flow ventilation ensures a constant and continuous ventilation of the building.

Solvent-free paint was used to paint the walls (Belgian brand PEINTAGONE).

Carbon

GHG emissions

GHG in use : 1,00 $KgCO_2/m^2/an$

Methodology used :
Certification PEB

GHG before use : 120,00 $KgCO_2$ $/m^2$

Building lifetime : 50,00 an(s)

, ie xx in use years : 120

Contest

Reasons for participating in the competition(s)

L'objectif premier du projet est de montrer aux particuliers et professionnels qu'il est possible d'atteindre une haute performance énergétique en rénovation. Le bâtiment est labellisé A+ (meilleur que le niveau d'exigence des nouvelles constructions en 2021).

Le second objectif est de montrer que le premier est atteignable en utilisant des matériaux biosourcés produit localement (Gramitherm, isolant à base d'herbe de prairie, produit à Auvelais en Belgique).

Enfin, le troisième objectif visé et atteint est de se passer des énergies fossiles afin de réduire au maximum l'empreinte carbone du bâtiment.

Building candidate in the category

Energie & Climats Tempérés

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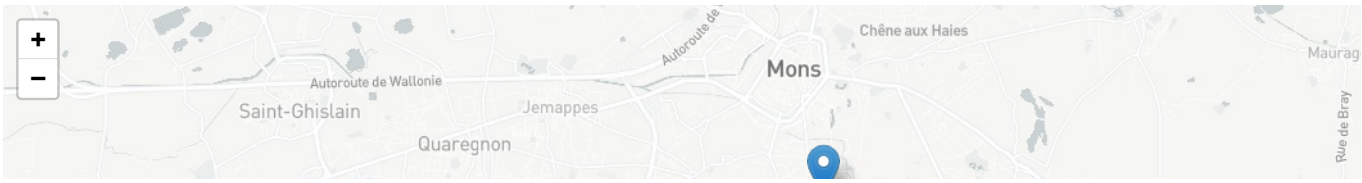

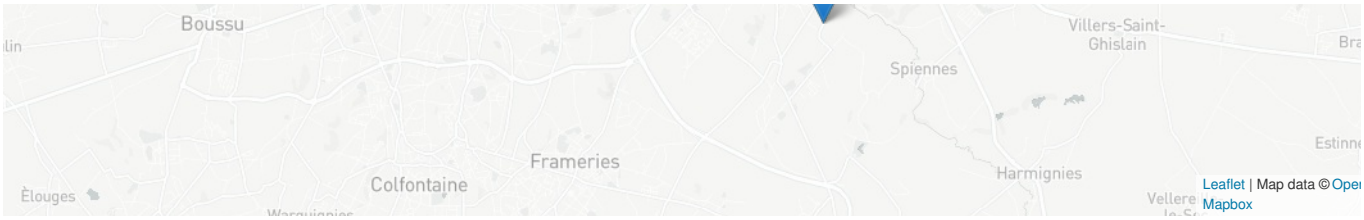

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