

Rowhouse, Henz-Noirfalise in Eupen, Belgium

PROJECT SUMMARY

Transforming a 19th century row house into a state of the art passive house

SPECIAL FEATURES

Passive house standard

ARCHITECT

Fhw, architectes scprl
www.fhw.be

OWNER

Family Henz - Noirfalise



IEA – SHC Task 37

Advanced Housing Renovation with Solar & Conservation



Before

BACKGROUND

This 150 year old house needed a thorough renovation of the following elements:

- bad hygienic conditions demanded a mechanical ventilation system and insulation
- worn out roof structure needed replacement
- single paned glazing and small glazed surfaces had to be replaced by bigger, triple glazing
- enlarging the small historical house from 130m² to 180m²

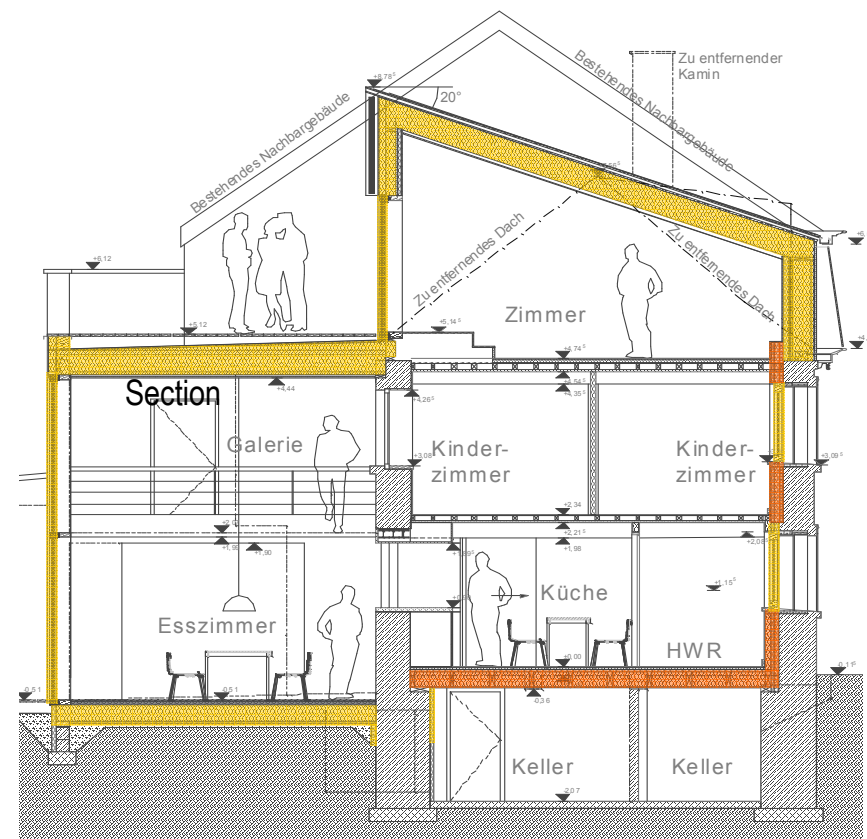
Renovation was preferred because of a substantially lower VAT, and reaching passive house standard only asked for some minor extra measures, so it was only a logical next step for the owner.

SUMMARY OF THE RENOVATION

- Insulation of the walls, floors and roofs with cellulose
- The single pane glazing is replaced by triple glazing with passive house frames
- New ventilation system (HRC 85-90%)
- Solar thermal panels
- Pellet heating



After



The inside insulation allows an almost continuous layer of insulation. The darker red layers represent the extra measures needed to reach passive house standard.



Problem of air tightness on old beam

CONSTRUCTION

Roof construction *U-value: 0,14 W/(m²·K)*

(top down)

Bituminised soft fibreboard	22 mm
Cellulose insulation + rafter	360 mm
Battens	48 mm
Interior plaster	9 mm
Total	439 mm

Wall construction *U-value: 0,135 W/(m²·K)*

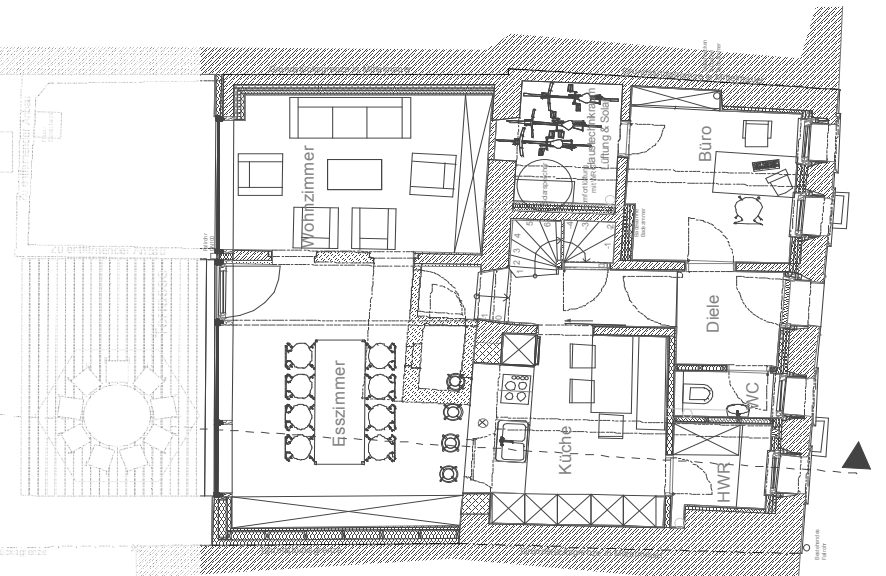
(interior to exterior)

Clay	20 mm
Wood fibre insulation panel	60 mm
Variable internal air barrier	- mm
Cellulose insulation + wood construction	280 mm
Quarry (existing)	500 mm
Exterior stucco (existing)	15 mm
Total	875 mm

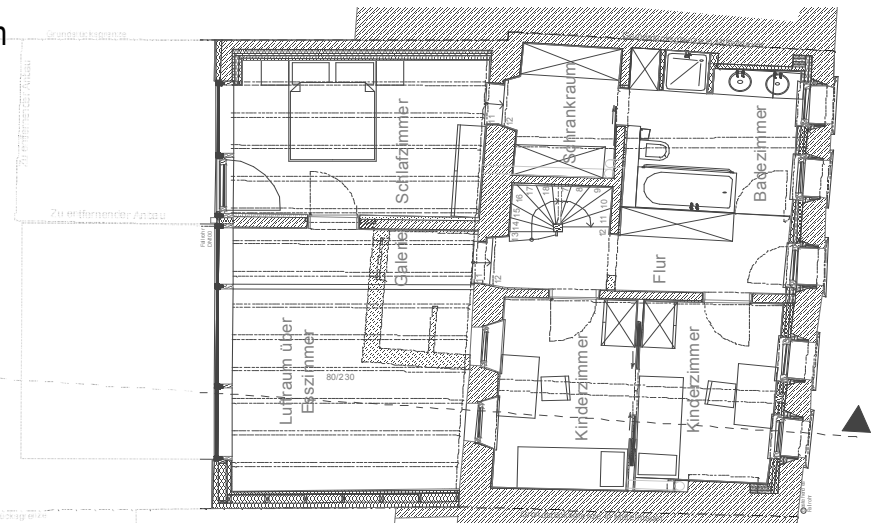
Basement ceiling *U-value: 0,165 W/(m²·K)*

(top down)

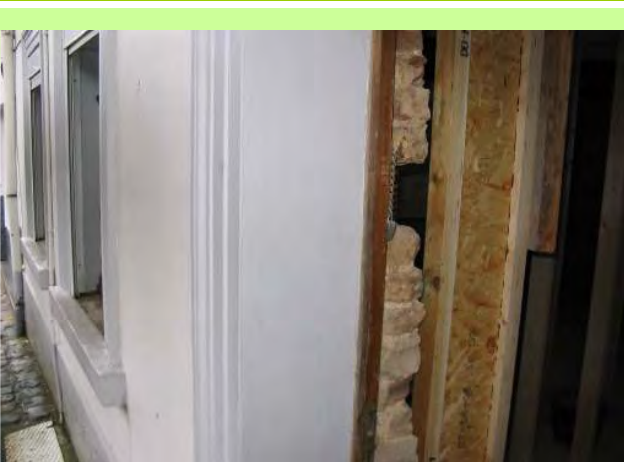
Floor	20 mm
Wood fibres insulation	40 mm
Wood boards	22 mm
Cellulose insulation + beams	260 mm
Wood fibre panel	18 mm
Total	360 mm



Ground floor



First floor



Old versus new: inside insulation



Old versus new: the annex

Summary of U-values $W/(m^2 \cdot K)$

	Before	After
Roof	-	0,14
Walls	3,14	0,135
Basement ceiling	2,2	0,165
Windows*	4,65	0,72

BUILDING SERVICES

Air ventilation with heat recovery and ground-air heat exchanger. Solar heating covers a portion of the hot water supply. A pellet stove covers the remaining heat demand (15%) and hot water demand (85%).

To guarantee a good summer comfort level, the thermal mass of the old building is used as well as external shading on the upper floor by the installation of the solar heating panels, and on the ground and first floor by natural vegetation.

RENEWABLE ENERGY USE

Pellets and solar thermal installation for space and water heating.

ENERGY PERFORMANCE

Space heating:

Before: 300 kWh/m²

After: 15 kWh/m²

Reduction: 95%

(PHPP 2004)

INFORMATION SOURCES

Plans, sections, calculations:

Fhw, architectes scprl (www.fhw.be)

Photos: Fhw, PHP

Brochure authors

Wouter Hilderson, Passiefhuis Platform vzw

Olivier Henz, Fhw, architectes scprl

Wouter.hilderson@passiefhuisplatform.be