

2000 Antwerp, terraced house

1. INTRODUCTION

PROJECT SUMMARY

- *First phase energy renovation: 1999*
- *Second phase energy renovation: 2007*

SPECIAL FEATURES

- *Two phased energy renovation*
- *The owners stayed in the building during the renovation*

ARCHITECT

Gert Camerlinck

OWNER

Van Loocke, Vanhoutte

Brochure

Passiefhuis-Platform vzw
Gitschotellei 138, B-2600 Berchem
T: +32 (0)3 235 02 81
www.passiefhuisplatform.be



IEA – SHC Task 47

Renovation Residential Buildings towards Sustainable Standards

2. ENERGY PERFORMANCES

Energy performance – before and after, space/water

USE	kWh/m ² year	kWh/year
Energy demand before renovation (heating and DHW)	171	26703
Energy demand after renovation (heating and DHW)	110	17257

Renewable energy use

12 Pv panels, in total 22m², has been installed. 8 were installed on the main roof, 4 on the roof of the extension. In total the panels will deliver 2700 Wp. This will not be enough to cover the total electricity demand, but it will cover their electrical day use.

Thermal and electric consumption and costs (before and after)

The owners have taken measures to reduce their energy use during the use of the dwelling. For instance, the old refrigerator has been replaced by a fridge with an A label and the ground floor is illuminated with CFL's. The owners were a bit worried about the cold light that this bulbs emits, but with the right choice of armatures and CFL's it was possible to get a warm light.

The covered terrace on the first floor is used to dry clothes. This makes it possible to use the dryer less often.



Step 1: thermal insulation of the roof and adaptation of the roof to accommodate façade thermal insulation



Step 2: new windows and façade insulation

3. CONTEXT AND BACKGROUND

BACKGROUND

- *Neighborhood of detached houses*
- *Single family house*

OBJECTIVES OF THE RENOVATION

*First renovation in 1995-1996, where the energy aspect was not taken in consideration.
2 important renovations in 1999 and 2007, to be able to reach a good energy performance.*

SUMMARY OF THE RENOVATION

*1999: Central area and flat roof were insulated.
Preparation for the future connection with the insulation of the back façade.*

2007-2008: Insulation of the side and back façade, Change of the single glazing windows to windows with double or triple glazing,

On the facades where solar protection was necessary, an innovative system where the protection is integrated in the windows, was placed.

The owners were happy with the indoor air quality, therefore they did not installed a ventilation system. An extraction fan with humidity detector was placed in the bathroom.

Before retrofit



After retrofit



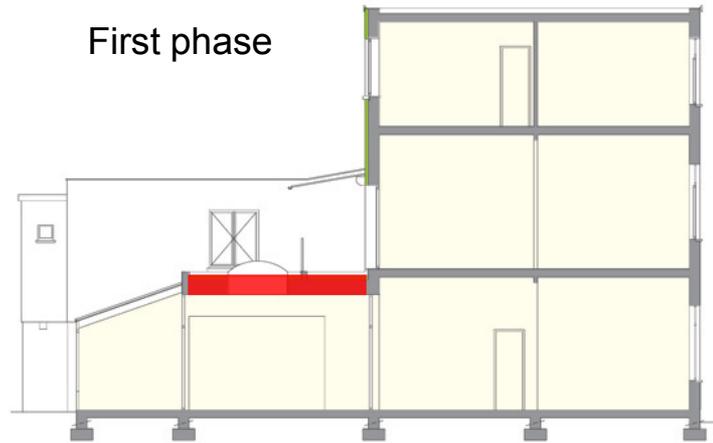
3. DECISION MAKING PROCESSES

The owners decided to renovate the house to increase the comfort and reduce the energy consumption. In the first renovation the energy aspect was not considerate. Afterwards they decided to do an energetic renovation in two phases according to the priorities.

In this project the primary motivation for a second renovation was not to reduce the energy consumption, but rather to improve the comfort of the house. Because of budgetary reasons the renovation was done in phases. Important to note is that one always has to think a few steps ahead. For instance, in this renovation it was important to adjust the eaves of the flat roof in the first phase, to be able to let the facade insulation properly align during the second phase.

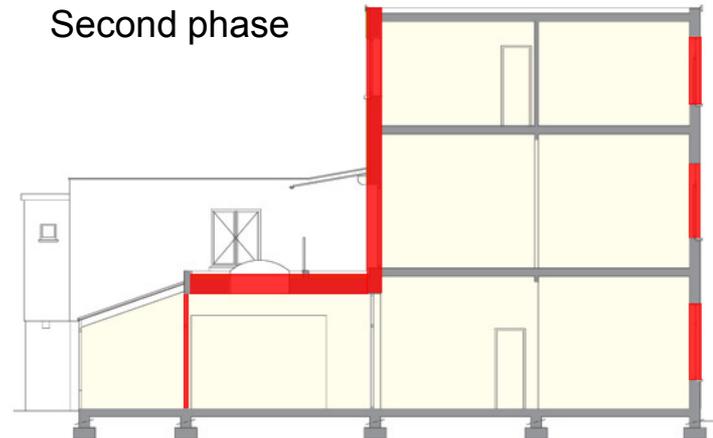
This project is a good example of how relatively small changes can still have some improvement on the energy consumption of a dwelling and how the user behavior of a dwelling can influence the energy consumption.

First phase



- Insulation of flat roof in extension
- Preparation of the future connection between roof and exterior insulation

Second phase



- Exterior insulation of the back facade
- Replacement of windows from single glazing to double or triple glazing
- Wall treatment against humidity

4. THERMAL ENVELOPE

Roof construction :

U-value: 0,33 W/m².K

(before: U-value: 3,49 W/m²K)

Materials. (exterior to interior) / (existing – new):

Roofing	-
Hard insulation PUR	10 cm
Vapor barrier	-
Existing roof deck	2,2 cm
Existing wooden structure	18cm
Existing gypsum fibre board	1,25 cm
U = 0,33 W/m²K	31,45 cm

Wall construction :

U-value: 0,48 W/m²K

(before: U-value: 2,82 W/m²K)

Materials. (exterior to interior) / (existing – new):

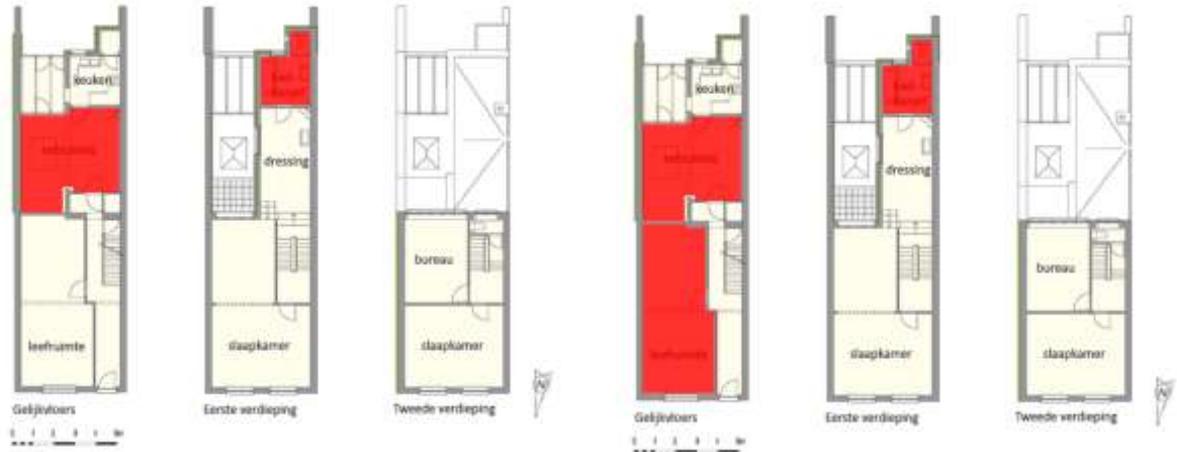
Roofing	-
External plaster	0,5 cm
EPS insulation	6 cm
Existing masonry	18 cm
Existing plaster	1,5cm
U = 0,48 W/m²K	26 cm

Windows

HR double glazing (U-value glass: 1,1 W/m²K,
U-value profiel: 1,3 W/m²K)

Winter strategies

Heated rooms



Winter strategies during the day

Winter strategies during the night

Summer strategies



Solar protection

5. BUILDING SERVICES

OVERALL DESIGN STRATEGY

HEATING SYSTEM

A high performance boiler was installed in 1995 is still in use.

COOLING SYSTEM

There is no cooling system installed. Natural ventilation is used to cool down the rooms if necessary.

VENTILATION

No ventilation system. To avoid the condensation problems in the bathroom, A ventilator with humidity detector was installed. Kitchen and bathroom are one above of the other to have shorter pipes.

HOT WATER PRODUCTION

The domestic hot water is produced by a flow geyser.

RENEWABLE ENERGY SYSTEMS

12 PV panels with a total area of 22m².

Systems



Existing high-performance boiler



Exhaust fan with humidity dedection in the bathroom and exhaust ventilation grille in the rear façade.

6. ENVIRONMENTAL PERFORMANCE

WATER MANAGEMENT

ECOLOGICAL MATERIALS

INDOOR CLIMATE

INDOOR AIR QUALITY

LIGHTING QUALITY

7. MORE INFORMATIONS

RENOVATION COSTS

The total costs of the renovation was ca. 32000 euro. 15967 euro was spend on facade insulation and plastering, the renovation of the roof costed 3809 euro and the new joinery was 6877 euro.

Water management

A rainwater tank has not been installed, but water is saved by using a dual flush button in the toilet.



Ecological materials

The owners have considerate to use ecological materials but the thickness of the ecological insulation to reach the same value than with a traditional material was too much. Therefore this was not an option.

Indoor climate

The owners have found a system to heat up the building per area. Bathroom and dinning room are heated during the day and during the night they also heat up the living room.

Indoor quality

Because the owners found the indoor air quality acceptable, they choose not to install a ventilation system.

Lighting quality

The building has large glazing areas. To have even more daylight entrance, a new sky light was added on the flat roof above the dining room.

