



## RAAMSDONK (The Netherlands)

**Maximal parcel of measures: 70% gas saving**

**Rent en energy saving guaranty given by housing association**

**External insulation bricks for façades - new look!**

### Project data

Location, address:	Cornelis Oomestraat and De Oude Melkhaven (Raamsdonk)
Region:	Noord Brabant
Surroundings:	Open lowlands of the central Netherlands, close to rivers Bergse Maas and De Waal, and close to the city of Breda
Climate:	Mild and humid
Heating degree days:	2688 (KWA Bedrijfsadviseurs, <a href="http://www.kwa.nl">www.kwa.nl</a> )
Year of construction and renovation:	1963-69 (constructed); 2000-2002 (renovated)
Typology:	Row family houses
No of dwellings:	42 dwellings
Total floor area:	3,360 m <sup>2</sup> (average of 80m <sup>2</sup> each dwelling)
Owner:	Volksbelang (housing association)
Architect and Builder:	Bouwkundig-buro C.Ph.Struik; Energie 2050; Jbr import bv; Hendriks & Coppelmans; Ecofys, CEA
Costs of (energy) saving measures:	€ 39,900,- per house (incl. VAT) (total costs, non-energy measures included, out of which € 3,300 subsidies)
Renovation financed by:	The owner, governmental subsidy for energy saving measures (EPR)



Figure 1: Renovated row family houses in Raamsdonk (courtesy of the Volksbelang housing association)

### Objectives and Results

Within this renovation project, the intention of the Volksbelang housing association has been the improvement of the constructional quality, quality of living and energy saving.

The Volksbelang has managed to persuade tenants to agree with the realization of energy saving measures by means of giving a guaranty for the rent, to be saved energy and by renovation of a model house in which all measures have been realised and displayed to tenants.

The energy saving has been spectacular: 50% in average and 70 % using a maximal parcel of measures (all measures mentioned in the Key renovation features). This energy saving has been achieved by means of proved and efficient technologies and is therefore for most housing associations feasible.

### Renovation concept

#### Key renovation features

- External insulation of façades
- Insulation of roofs
- High efficiency glazing
- Insulation window frames
- High or improved efficiency boiler
- Solar collectors
- Mechanical ventilation
- Heat recovery based on ventilation air

## State-of-the-art

### Before renovation

#### Constructions [U-values: W/m<sup>2</sup>K]

- Non-insulated roof (most of dwellings) [1.78]
- Non-insulated cavity façades [1.92]
- Wooden or steal window frames
- Single [5,1]<sup>1</sup> or double glazing [2.9]
- Several houses have been insulated after 1980

#### Installations

- Individual boilers (conventional or higher efficiency)
- Local heating devices (13 dwellings)
- Local kitchen gas boiler for DHW (36 dwellings)
- Natural ventilation

### After renovation

#### Constructions [U-values: W/m<sup>2</sup>K]

- External insulation of roof [0.30]
- External insulation of cavity façades [0.35]
- New or adjusted insulation window frames
- High efficiency glazing (HR++) [1.1-1.3]<sup>2</sup>
- Chimneys wrapped in insulation casing

#### Installations

- Individual boilers with improved (4 dwellings) or high efficiency (8 dwellings)
- Solar collector (12 dwellings)
- Mechanical ventilation
- Heat recovery based on ventilation air (80% eff.)

## Energy saving and monitoring

#### Energy consumption before renovation:

KWh/m<sup>2</sup>: 240 (gas only)  
Energy Index<sup>3</sup>: 1.06 (average of all 42 dwellings)

#### Energy consumption after renovation:

KWh/m<sup>2</sup>: 72 - max.; 120 - average; (gas only)  
Energy index: 0.59 (average of all 42 dwellings)  
Percentage saving: max. 70% ; average 50%  
Gas consumption has been monitored for one year after the renovation has been finalised.



Figure 2: Situation before renovation (courtesy of the Volksbelang housing association)

## Additional information

- Tenants did not consider the to be taken measures as necessary, because there were no complaints. The Volksbelang housing association has decided to give a guaranty that the tenants shall not have too high expenses because of the renovation. The guaranty has been given that the first five years, the rent (total living expenses: bare rent, energy costs and maintenance) will not increase by more than 0.5% than the average rent in this housing association.
- To persuade the tenants and give a good example, a model house has been established in which all measures have been realised.
- For the realisation of energy saving measures, the natural moment of the regular planned renovation has been chosen. Except from mentioned measures, storage rooms have been renovated in all houses.
- Comfort increasing measures have been offered to tenants in a form of measure packages, which included: a dormer window in the bedroom, fixed trap case to the attic and a more luxurious version of the kitchen unit. For comfort measures, the rent has been increased.
- The Volksbelang housing association has chosen for external insulation of roof and cavity walls. External insulation means fewer nuisances for tenants, higher efficiency and lower costs.
- Because of, among others, external insulation bricks, the houses have got a fresh new upgraded look.

## Lessons learned and conclusions

- The Volksbelang housing association has made the investment in the renovation in order to minimize the rent increase. The investment can be paid back within several years. The Volksbelang is satisfied with the result and intends to include energy saving measures in the future renovation projects as well.
- In 2006, the Volksbelang housing association has started a renovation project with 95 houses, based on the principles and experience gathered at the renovation of dwellings in the Cornelis Oomestraat.

## References

[1] <http://www.senternovem.nl/kompas/woningbouw/praktijkvoorbeelden>

[2] Communication with Mr Jaap van Wijgerden, Volksbelang

[3] Ecofys, CEA and Energie 2050: Nieuwe energiemaatregelen in de bestaande bouw in Brabant; 2003

<sup>1</sup> Total U-value of glazing and the window frame

<sup>2</sup> U-value of the glazing only

<sup>3</sup> Calculated by EPA - Energy Performance Advice programme for existing residential buildings