



VENLO-BLERICK (The Netherlands)

42% energy saving for space and DHW heating

Total living expenses of tenants decreased by 7%

Collective CHP for four buildings, generated electricity supplied to the grid

Project data

Location, address:	Molenbossenflats complex
Region:	Limburg
Surroundings:	South-East of the country; less influence of the sea; low hilly landscape at German border
Climate:	Mild and humid
Heating degree days:	2794 (KWA Bedrijfsadviseurs, www.kwa.nl)
Year of construction and renovation:	1968 (constructed); 1997-1998 (renovated)
Typology:	Four gallery apartment buildings
No of dwellings:	608 apartments
Total floor area:	54,720 m ² (that is average of 90m ² per apartment)
Owner:	Antares Woonservice (housing association) in Venlo and Tegelen
Architect and Builder:	Atrivé (architect); Energy supply company (energy advice and WKK)
Costs of energy saving measures:	€ 9.700 per apartment (incl. VAT); out of which € 2.000 subsidies
Renovation financed by:	The owner; governmental subsidies; green financing with lower interest rate



Figure 1: Renovated Molenbossenflats (Courtesy of Antares Woonservice)

Objectives and Results

Within this renovation project, the Antares Woonservice housing association has achieved its objectives: to guarantee that apartments will be well rentable in the future (considering increasing number of seniors), to prolong the lifetime of buildings by 30 years, to invest in energy saving (42% energy saving for space and DHW heating is more than expected) and to improve the accessibility, safety and comfort.

Renovation concept

Key renovation features

- (Additional) Insulation
- High efficiency window frames
- High efficiency and acoustic glazing
- Collective combined heat and power station
- High efficiency boilers
- Thermostats for radiators
- Individual heat meters

State-of-the-art

Before renovation

Constructions [U-values: W/m²K]

2 buildings with:

- Non-insulated building shell
- New aluminum window frames with acoustic high efficiency glass on balcony side (HR) [1,6]

Another 2 buildings with:

- Non-insulated building shell
- Single glazing [5,1]
- Insulated parapet façades [0,81]

Installations (all 4 buildings)

- Collective central heating with conventional efficiency boilers (75%)
- Collective hot DHW supply
- Natural ventilation

After renovation

Constructions [U-values: W/m²K]

2 buildings with:

- Insulation of parapet and side façades [0,48]
- High efficiency glazing (HR++) [1,2]¹ and wooden window frames

Another 2 buildings:

- Insulation of parapet and side façades [0,48]
- New aluminum window frames with acoustic high efficiency glass (HR) on balcony side [1,6]
- High efficiency glazing (HR++) [1,2]² and wooden window frames

Installations (all 4 buildings)

- Collective combined heat and power installation for four apartment buildings (capacity: 755 kW)
- 4 high efficiency boilers
- Individual meters for heat consumption
- Thermostats for radiators

Energy saving and monitoring

Energy consumption before renovation:

KWh/m²: unknown
Energy Index: not available in 1998

Energy consumption after renovation:

KWh/m²: unknown
Energy Index: not available in 1998
Percentage saving³: 42% (space and DHW heating)
Gas consumption from 1980-1997 and 1997-2000 has been compared. The result is 42% decrease of gas consumption for space and DHW heating.



Figure 2: Renovated Molenbossenflats (Courtesy of Antares Woonservice)

Additional information

- A new central boiler house with combined heat and power installation has been constructed. The generated electricity is supplied to the net.
- The goal was to bring all apartment buildings to the same state as regards energy saving, comfort and additional measures.
- Tenants have been involved from the beginning through monthly information bulletin, information evenings, open days and individual visits. A test apartment has been established as well.
- Tenants have signed individual renovation contracts with agreements. Participation has been high – 99%.
- During renovation, the tenants have stayed in their own apartment.
- Except from energy saving and comfort improving measures, the following measures have been carried out: accessibility paths for wheel chairs to each apartment, removal of asbestos, new entrances and replacement of gutters.
- Due to the lower heating cost, the total living expenses have decreased by 7%. In order to pay back the investments, the rent will be increased more than by a standard rate in the next years.

Lessons learned and conclusions

- Before renovation, consider the tenant group that might grow in the future and adjust the renovation measures to it.

References

- [1] <http://www.senternovem.nl>
[2] Communication with Ms Wendy van Gulik, Antares Woonservice

¹ U-value of the glazing only

² U-value of the glazing only

³ Compared to the situation before renovation