



First pellets heated social housing project in Belgium *Zonnige Kempen, Belgium*

Summary

Zonnige Kempen is a progressive social housing company, building lots of new projects in which renewable and sustainable techniques in materials, water and energy are integrated. Together with VITO they started up this pellet boiler project. The pellets project consists of the building of 26 new collective heated dwellings. The project is located in the municipality of Grobbendonk.

The heating installation consists of a wood pellets boiler (100 kW) in combination with a gas fired boiler (100 kW). The aim is to cover 90% of the heat demand with wood pellets, resulting in a pellets consumption of about 42 tons/year or 61 m³/year. Integration of a pellets boiler results in a reduction of fossil fuel consumption with 85% or 190 MWh/year and a CO₂-emission reduction with 38 tons per year.

Zonnige Kempen finances the main part of the project itself but receives 35% of the additional cost of a pellet boiler instead of a gas boiler from the programme of the demonstration projects of the Flemish government.

End-user area

- New buildings
- Refurbishment of buildings
- Transport and mobility
- Financial instruments
- Industry
- Legal initiatives (regulations, directives, etc)
- Planning issues
- Sustainable communities
- User behaviour
- Education
- Other

Target Audience

- Citizens
- Households
- Property owners
- Schools and universities
- Decision makers
- Local and regional authorities
- Transport companies
- Utilities
- ESCOs
- Architects and engineers
- Financial institutions
- Other

Technical

- Energy efficiency
- Heating
- Cooling
- Appliances
- Lighting
- CHP
- District Heating
- Solar energy
- Biomass
- Wind
- Geothermal
- Hydro power
- Other

Context

The social housing company "Zonnige Kempen" is the youngest social housing company in the Flemish part of Belgium. The working area with about 150 000 inhabitants encloses 11 communities. The aim of the social housing company is to let and sell dwellings to poor people. In all projects both new building and renovation the social housing company strives for sustainability in using materials, water and energy.

Objectives

For the project of 26 social dwellings in Grobbendonk, the social housing company decided to go for a pellet boiler. This choice fitted in their philosophy of environmental friendly housing, economical for its users and a good example for the community.



Process



The social housing company was introduced by VITO to the pellet boiler technology on a conference of renewable energy. The company set their mind on this kind of technology. Once at the office, a suitable project to implement a pellet boiler was selected together with VITO and a consulting company.

The design of the project was made by the consulting company. Integrating a pellet boiler and a pellet storage capacity of 64 m³ in a building was a new fact, but with the help of VITO and some experienced pellet boiler suppliers the new building was dimensioned for this system. For the heating of the dwellings a collective heating installation consisting of a boiler on wood pellets (100 kW) and a gas fired boiler (100 kW) is planned. Both boilers are working in cascade with priority to the wood pellets boiler. 90% of the heat demand will be filled in by the pellet boiler, only 10% by the gas boiler. This choice was made to provide the social housing a back-up system. The supply of pellets has to come from abroad because it is not developed in Belgium.

The construction of the buildings will start in the autumn of 2006, the end of the project is foreseen in 2007. Once the boiler is running, the installation will be monitored and followed up. This information will be shared to the end-users by publishing a brochure. Some demonstration material will be available in the new buildings itself.

Financial resources and partners

The total investment cost from the design till the construction is 84 k€ tax included. With the introduction of pellets instead of natural gas a reduction of around 3000 €/year in energy price can be achieved. The project is financed by Zonnige Kempen itself but greatly supported by the Demonstration-support of VEA (Flemish Energy Agency of the Flemish Government).

Components/Services	Costs
Phase 1 : Design	4 k€
Phase 2 : Construction	12 k€
Phase 3 : Assemblage / Installation	58 k€
Phase 4 : Start-up	7 k€
Phase 5 : Monitoring	3 k€
Total :	84 k€



Results

The implementation of this pellet boiler will realise a reduction of the primary energy consumption of 85% or 190 MWh/year in comparison to the reference situation (only a gas fired boiler). The CO₂-emission reduction of the pellets boiler would be about 38 tons per year or 85% compared to the reference situation. For the calculations a CO₂-emission factor for natural gas of 56.1 g/MJ was taken.

Duration of heat demand	6.054 h/year
Running hours of pellets boiler	4.246 h/year
Running hours of gas boiler	1.831 h/year
Heat production pellets boiler	180 MWh/year or 90%
Heat production gas boiler	20 MWh/year or 10%
Total heat demand	200 MWh/year
Pellets consumption	200 MWh/year
Pellets consumption	41,6 ton/year
Pellets consumption	61,1 m ³ /year
Natural gas consumption	22 MWh/year
Natural gas consumption	2.400 m ³ /year
Primary energy consumption reference	222 MWh/year
Primary energy consumption project	22 + 10 MWh/year
Reduction of primary energy consumption	190 MWh/year or 85%

Lessons learned and repeatability

The following experience had the team with the set-up of the project:

- Implementing the pellet boiler and the storage capacity into the social dwellings, was new for all the parties working on the project. The extra space needed for the pellets storage, the extra safety measures for the storage of the pellets gained special attention during the design and construction.
- Finding pellet boiler suppliers was easy, but selecting one was more difficult
- The supply of pellets is not completely secured in Belgium because at the moment certified pellets have to come from abroad. That's why the social housing company decided to install a gas boiler too as back-up system.

The know-how of implementing a pellet boiler in dwellings has increased with this project. The knowledge will be shared through a building centre, demonstrations of the installation and brochures which should encourage other companies to implement this renewable technology.

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Other literature available: ODE-nieuwsbrief, September 2005, www.ode.be

Title: Eerste sociale woningbouwproject verwarmd met pellets

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