Barl’lo, Belgium

Heat pumps in harmony with nature

The project demonstrates how heat pumps can be used for both heating and cooling in buildings that are (almost) energy neutral.

Key facts

Buildings
Location: Bornem, Belgium
Construction: 2007
Heat distribution: underfloor heating
Heated space: 8400 m²
Structure: 3 flat blocks (4 storey each, 58 apartments total)
Level of insulation: very good

Heat pump and source for heating
Number of: 1 per block
Operation mode: Monoenergetic
Heat source: groundwater

Heating system
Heat demand: 420 kW
Heating temperature: 35°C

Heat pump and source for domestic hot water
Type of system: individual
Max. temperature: 55 °C
Source: Clivet geothermal heat pump

Other information
Coefficient of Performance: 4.5
Refrigerant: R410A

Lessons learned
- The installation of groundwater heat pump can be a part of accomplishing even the highest ecological building requirements
- The Natural Cooling function can sufficiently cool apartments by using groundwater

In northern Belgium, between Brussels and Antwerp, lies the commune of Bornem. In 2021, a new block of apartments was built there, in the middle of a leafy green park.

The ‘Barl'lo’ complex consists of three sustainable four-storey blocks with flats of various sizes covering a total of 8,400 m², designed by architectural firm Binst Architects.

As the energy requirements for new buildings are very strict in Belgium, comfort systems play a key role in the overall rating, thus value, of the property.
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Description of the technical concept

Guido Hendrickx, business development manager at Clivet distributor Thercon Belgium, explains:

“The three blocks of flats are equipped with geothermal heat pumps, underfloor heating and high thermal insulation. The heat pumps provide heating in winter and cooling in summer by exploiting groundwater. Thanks to the Natural Cooling function, groundwater is used in summer to fully fit with cooling needs without activating the refrigeration circuit.”

To maximize the efficiency of the system, the water temperature for underfloor heating is set at 35°C.

Domestic hot water is produced separately in each flat with water-to-water heat pumps using the Clivet heat pump as the source.

The results

Thanks to his system, the complex has achieved one of Flanders’ highest ecological levels, BEN ‘Bijna-energieneutraal’, meaning the building is almost energy neutral and the energy it still uses is green.

The complex is therefore sustainable in terms of both the landscape, with its green roofs and biodiversity gardens, and the environment.