

De Bomenwijk - Delft, Netherlands

Renovation of an existing mixed housing quarter owned by housing corporation Vestia

Key facts

Building

| | |
|---------------------|-----------------------|
| Location | Delft, Netherlands |
| Construction | 2012 |
| Heat distribution | in building |
| Heated area | m ² living |
| Level of insulation | |

Heat pump and source

| | |
|----------------------|------------------------------------|
| Number of heat pumps | 87 |
| Installed capacity | 4 kW/heat pump |
| Operation mode | monoenergetic |
| Heat source | ground |
| Brand and type | ITHO-Daalderop WPU |
| Refrigerant | R134a |
| Sound level | 45 dB |

Heating system

| | |
|---------------------|------------------------|
| Heat demand | hydronic floor heating |
| Heating temperature | 35 °C |

Domestic hot water

| | |
|----------------------------------|-------------------|
| Type of system | see overview |
| Max. Temperature | 60 °C |
| Circulation system | |
| Legionella measures - thermal | |
| Storage size | 150 litres |
| Number of storage tanks -1/house | |
| Storage losses | 40 Wh |
| Temperature control | – see description |

Other information

| | |
|------------------|---------|
| Electric energy | |
| Consumption year | kWh |
| Investment costs | unknown |
| PV installation | none |
| Solar thermal | none |

Lessons learned

Read page 44 in Dutch Heat Pumping Technologies Journal



The Elzenbloesem plan is the first sub-plan of the restructuring van de Delftse Bomenwijk, originally designed by Van Tijen post-war district. The existing porch houses have here replaced by a new row of single-family homes and one hook-shaped apartment building with underground parking and business space on the Elzenlaan. The entrance to the district is marked by a residential tower in combination with a supermarket along the Lindelaan. The architecture is modern and inviting, with a lot of glass. Everything is built in a tight white brick.

The houses are permanently heated (and in summer cooled) with a heat pump system. In the cavity of the front facades are bat boxes built in. The individual electrical heat pumps by ITHO-Daalderop are monoenergetic, providing the heat demand for space heating via an underfloor heating system. Only in order to guarantee heat delivery in case of malfunctions is an electrical element present in the heat pump. In principle, this does not contribute to the annual heat supply.

The heat pumps have individual closed loop ground source for the terraced houses and an open collective source for the two apartment buildings. Due to the heat extraction in the winter, the ground source is relatively cold in the summer. By using this source as free cooling the houses and apartments are cooled in summer, thus regenerating the ground source.

The control goes via a main room thermostat which is leading and which determines whether there is cooling or heating in the house.

<https://www.ew-installatietechniek.nl/artikelen/open/warmtepompen-passen-bij-duurzame-herstructurering/20180115164828>



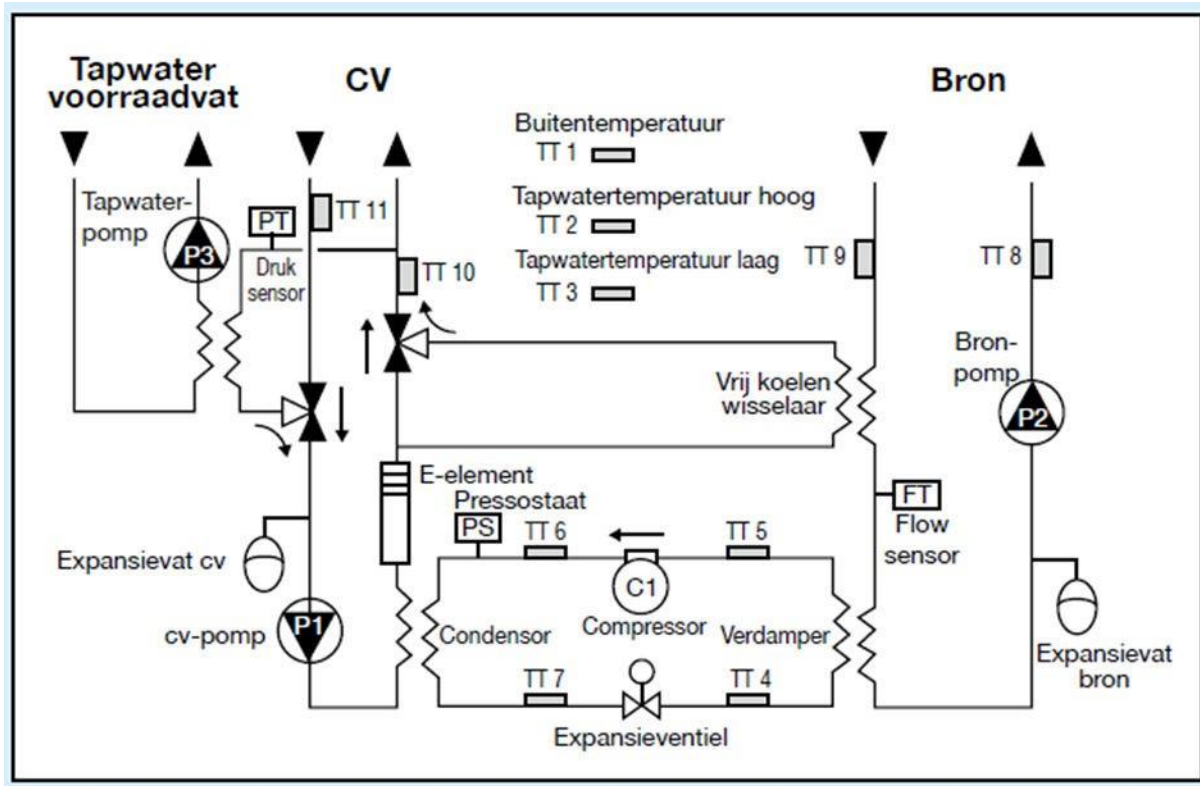
The concept that Vestia applied in the Bomenwijk is fairly simple, but the corporation has a holy belief in it. The concept is based on closed vertical soil exchangers with individual heat pumps. The choice for a closed source system is primarily a strategic choice, because it allows a flexible way of building. "The investment costs are not that high, so if things are going wrong with the sale of houses, the interest charges still have to live," explained Mohammed Bachri of Vestia Energie. In a single-family home, the individual source can be sold, but why not a collective heat pump? Bachri: "The possibilities for applying customized work tailored to the housing requirements are much wider with an individual heat pump. In the meantime we have realized many projects with heat pumps and we monitor almost all of them. The susceptibility to interference during operation (and therefore the costs) is significantly higher with collective heat pumps than with individual heat pumps and the consequences are noticeable with all connected homes. "These facts go against any logic. With a project of several hundred heat pumps, you would assume that a collective system would be more favourable in terms of operation. But that is not true, according to Bachri.

"The EPC score is on average 0.55 (the standard for project preparations was 0.8). This also shows the evidence that Vestia does not use the heat pump as an easy instrument to score favourably with regard to the EPC. Without a heat pump we would have reached a score between 0.70 and 0.72. The nice score of 0.55 was achieved primarily through good insulation, perfect details finishing and excellent airtightness (measured 0.4).

Balanced ventilation, in combination with heat recovery, is also part of sustainable renovation according to the Vestia strategy. "Despite all the negative reporting, we continue to find this the best choice in combination with heat pumps. Certainly when applying Itv systems there is no conceivable better return. Far behind it is the CO₂-driven demand flow system. We reject application of self-regulating or manually operated schedules. "

Vestia points out the importance of monitoring. That is important for various reasons, Bachri emphasizes. "Among other things for an effective handling of a fault report, but monitoring also makes a fairly accurate estimate possible for future maintenance. Vestia has developed a separate tool for this. The monitoring tool also uses Vestia to alert the user to his own consumption compared to that of his neighbours. Monitoring as benchmarking. It helps the tenant to use energy consciously. "There is another reason why Vestia attaches so much importance to monitoring. Vestia has promised its tenants a certain return. Based on this, the standing charge rate that the corporation charges is partly based. "And if the return can no longer be guaranteed, it will immediately have consequences for the standing charge rate. Then we will end up with it. "

Bomenwijk, Netherlands, Technical details



Description of the technical concept

Each apartment and house has an individual double function heat pump with a 150 liter DHW storage tank, which is kept at 60 °C. In order to find the right balance between a high efficiency and optimal comfort for the residents, the hot water system has three control options:

- Economy: Water in the tank is heated once a day during the overnight at off-peak rate to a temperature of 60 °C.
- Comfort: Control as in the economic position, with additional use of the heat pump during the day, as soon as the temperature of the water falls below 45 °C, the water is heated to 55 °C.
- Booster mode: For additional hot water an electrical element can be switched on. This is done with a button on the main thermostat.



Within the housing corporation of Vestia the focus of new construction shifts towards increasing the quality and sustainability of existing housing stock. Focal point is provide housing for socially vulnerable and care for the needy. In recent years, the housing corporation also pays much attention to controlling the tenant's living expenses and preventing energy poverty. Thus more and more attention is paid to CO2 reduction and energy saving.