

### DESCRIPTION

As part of POCITYF, the existing district heating connection of Alkmaar is extended with two apartment buildings at the Dillenburgstraat. With reference to the figure above: (1) in this DHC water is heated at the Biomass Energy Plant. (2) This hot water is pumped to the various transfer stations in the city via an underground and insulated main network. In the transfer station, the pipeline network branches out to the homes and businesses that are connected to the heat network. (3) The hot water flows through a heat unit (in the meter cupboard) into the heating system of the home. The heat exchanger in the heat unit heats the cold tap water. (4) After heat has been released in the home, the cooled water flows back to the heat source via a return pipe. There the water is reheated and the process repeats. This IE is connected to the 'Indirect delivery sets' (IE 2.2.4), allowing for a separation between temperature and pressure between the internal and external installations.

### INDICATORS

#### POTENTIAL DEGREE OF USEFULNESS

N/A

Already demonstrated in Lighthouse cities Yes

Cultural heritage compliance Yes

#### PERFORMANCE

82% reduction in CO2 reduction compared to heating with natural gas

#### COST

To be defined

#### DIMENSION

Design inlet temperature: 70° C

Realization started March 2021

Design return temperature: 40° C

Completed January 2022

#### SAFETY

Heating via a heat grid instead of natural gas, which makes the in-house system safer.

#### SUSTAINABILITY

82% reduction in CO2 emissions

### KEY REQUIREMENTS

- The heating installation of the houses/apartments need to be able to heat with water from 70 degrees, instead of the old heating temperature of 90 degrees. In order to make it possible to heat the buildings with a lower temperature additional insulation and/or new radiators are required.
- A suitable location for the installation of the heat exchanger and inhouse distribution system within the building.
- Make the installations for a suitable price, in order to make them affordable for the residents.

### ENVISAGED DEMONSTRATION IN POCITYF



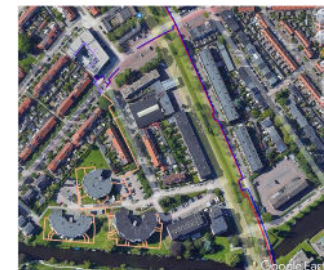
#### LOCATION

The heat network runs from HVC's bio-energy plant on the Jadedstraat in Alkmaar via Boekelermeer, Overdie, Kooimeer, Oudorp, De Nollen and Vroonermeer to the municipalities of Broek op Langedijk and Heerhugowaard.

The 2 apartment buildings at the Dillenburgstraat Alkmaar, in the southeast of Alkmaar, are in the centre of the district heating network.

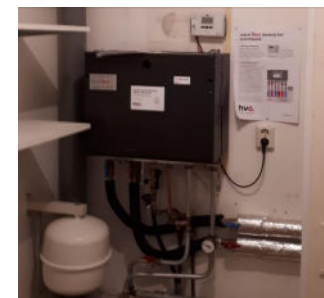
#### TIMELINE

- January 2019 - Start engineering/preparation phase
- September 2020 - Order of the materials has been placed
- March 2021 - Start of realization phase
- January 2022 - End of realization phase, installation is completed



#### DETAILS

Both building have been built in 1997 and are 25 years old. The first building, Dillenburgstraat 130-150, contains 21 apartments, with an average size of 70 square meter. The second building, Dillenburgstraat 151-182 contains 32 apartments with an average size of 60 square meter. The Woonwaard apartments at Dillenburg in 2021 have been connected to the existing heat grid (red and blue lines) via a secondary heat net (orange lines). In each apartment the indirect delivery sets have been installed and are now taking care of heat supply. The heat supply will be monitored as part of the POCITYF project.



#### TARGETED OUTPUT

Two apartment blocks, with a total of 53 apartments, connected to the (existing) heat grid in Alkmaar. Additionally gas stoves were replaced with electrical induction stoves, making the apartments entirely free from natural gas. The old gas meters and infrastructure have been removed

### IMPACT ON COMMUNITY

The switch from heating with natural gas to a heat network does impact the installations within the apartments. The gas boilers need to be replaced, and in some cases new radiators need to be installed since the heat grid has a different temperature range.

The installation caused some disruption within the house/apartment but only for a limited time. After installation the total system does not take up more space than the old system, therefore disruption is only caused during the installation.

### CULTURAL HERITAGE BUILDINGS COMPLIANT

Technically cultural heritage buildings can be connected to a district heating. Existing gas boilers and radiators can be replaced without large impact on the building. However since the DHC operating temperature is lower than the temperature range of gas boilers the technology works better if the buildings are better insulated. The DHC should therefore often be combined with other measures as well in order to make it function properly in older buildings. The main limitation of district heating for cultural heritage buildings is therefore the insulation, which may have a larger impact on the building. The potential degree of usefulness for district heating is therefore highly dependent on context.

#### OTHER COMMENTS - OPEN CONSIDERATIONS

When the first apartments were connected, the heating system did not operate as expected. The pumps in the distribution system were designed to feed a total of over 100 apartments. Since only a few apartments were connected at that time the pumps produced too much pressure, causing the pumps to switch off. In order to solve this problem the pumps were temporarily reduced in power until the other apartments were connected as well. This should be taken into consideration for future expansions of the district heating network.