

Jacques Urlusplantsoen Leiden, Netherlands

Renovation of privately owned flats with a central heating system new type cascade ground source heat pump developed under the TKI-program Urban Energy.

Key facts

Building

Location Leiden, Netherlands

Construction Dec 2017

Heat distribution in building, traditional 4-pipe system

Heated area 25.000 m² living

Level of insulation – kept as was installed in the 1970's.

Heat pump and source

Number of heat pumps 4

Installed capacity 1.5 MW

Operation mode monoenergetic

Heat source aquifer ground source

Brand and type [Linthorst TT68](#)

Refrigerant R134a

Sound level dB

Heating system

Heat demand radiator

Heating temperature 60°C

Domestic hot water

Type of system circulation system with individual delivery sets

Max. Temperature 70 - 80 °C

Legionella measures thermal

Storage size 200 m³

Number of storage tanks 10

Storage losses

Temperature control

Other information

Electric energy

Consumption year kWh

Investments costs unknown

PV installation none

Solar thermal none

Lessons learned

With this high temperature heat pump it is possible to install it directly as replacement in the old existing central heating and hot water system without other changes.



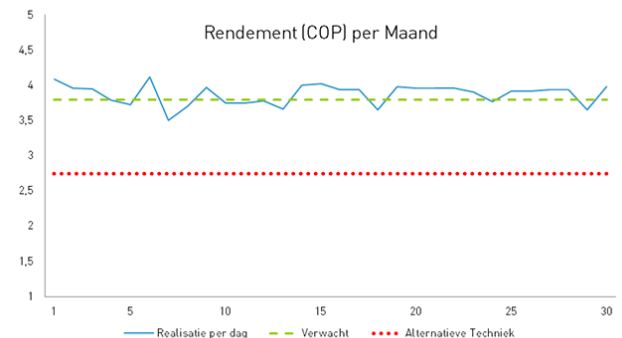
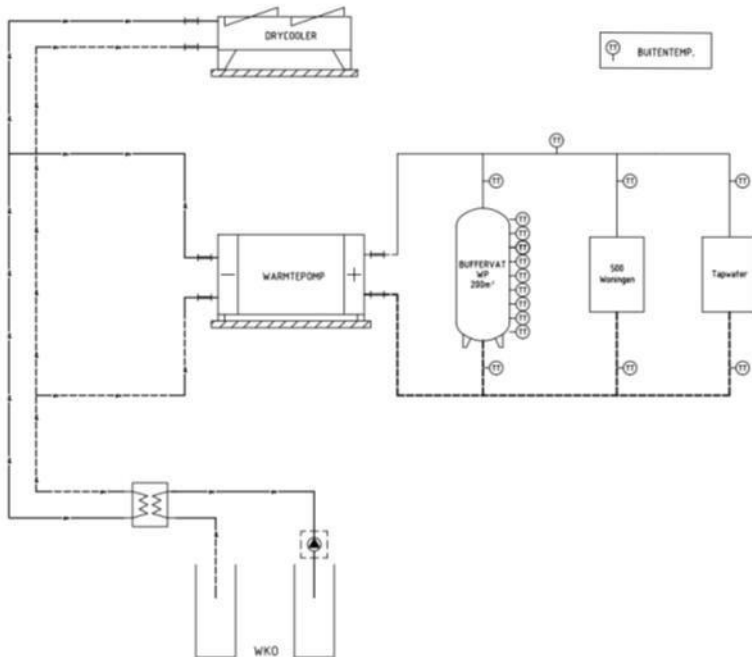
With the cancellation by Nuon of the existing heat supply contract (central generation with gas-fired CHP), the two VVEs (Owners Associations), Woonstichting Ons Doel and Libertas care centre in Leiden faced a challenge to find an alternative within a short time for two apartment buildings with 500 residential units and a heat demand of 14,000 GJ. The VVEs were concerned with the continuity of the heat supply without investment and in particular without any cost increase and a focus on sustainability.

The solution has been to install high temperature ground source heat pumps with a capacity of 1.5 MW, for space heating and hot water.

The existing gas boilers were kept available as backup/peak facilities. The unique feature of this concept is that an existing apartment building can become all-electric and sustainable without additional and costly building insulation and without adjustments to the indoor installation/climate system. This concept is possible with a High Temperature Heat Pump (TT68) developed by Linthorst under the governmental TKI-Urban Energy Program in order to transfer high rise complexes from a central gas supply to all electric.

In addition, a smart grid link is realized. Due to the presence of the heat pump technology and a 200 m³ buffer tank, there is flexibility at the moment when "energy generation" takes place. Through a smart grid link between this technology and the prices on the trade fair, electricity is purchased (and heat generated) when the price is low (or if there is overcapacity in the Dutch market, for example on a sunny day or when there is a lot of wind).

Jacques Urlusplantsoen Leiden, Netherlands, Technical details



Installation and performance results

Rendement per maand = Efficiency/month

Description of the technical concept

Linthorst Techniek developed under the governmental [TKI Urban Energy](#) Program a high-temperature heat pump for existing buildings. The TT68/80 heat pump can replace the central heating boiler without have to change the infrastructure of the building. A development of the high temperature heat pump started in 2010. The focus of building constructors for renovation is focused on insulation with a big impact for residents and not needed for relatively new buildings. This is a good option for 50% of the Multifamily buildings owned by housing corporations, but not so much for the buildings owned by VVE's.

Thus the goal was to develop a high-efficiency and high temperature heat pump with the challenge to deliver safe domestic hot water at a temperature of 65°C with a 68-degree heat pump. In the end by going for a multistage heat pump the water temperature boosts up to 70 or 80 °C from a ground source of 10 °C.

The management of the owner-occupied apartments is in the hands of an Owners Association (VVE). At the Jacques Urlusplantsoen there are two VVE's. Because these VVE's do not have any financial means to realize the sustainability independently, a third party Linthorst Energie Service provided this service as ExCo with rates that are far below the level as laid down in the Dutch Heat Act.

