Einfield

Figure 1: Enfield [1]

Context

In Enfield, 8 tower blocs were heated by direct electric underfloor heating that was electrically powered directly from Enfield Council's landlord supply. This is an expensive and high carbon source of heat. The tenants had no control over the heating which often lead to them opening windows to control the temperature. There was also no metering provision and therefore tenants paid a fixed monthly fee to cover heating regardless of how much heat they required. Typical annual heat costs were £800 – £1,100 per flat, putting many tenants into fuel poverty and causing Enfield Council to have serious concerns about the health and wellbeing of their tenants. In order to reduce energy consumption and cost, Kensa Contracting and

16 underground water loops (each with eight 200m deep boreholes) connected to water-to-water heat pumps in each one of the 402 flats to efficiently provide heat.

ENGIE implemented ground source heat pumps to effectively provide heat to 402 flats.

How does the scheme work?

The scheme recovers the energy naturally stored in the ground. It consists of 16 underground water loops (each with eight 200m deep boreholes) connected to water-to-water heat pumps in each flat. The heat pump was installed with a hot water cylinder. Every flat has their own heating and hot water controls, and as the heat pumps were all connected to the flat's own electrical supplies,

every tenant automatically only pays for the heat they actually use, simply via their electrical bills.

The majority of the pipework is underground and at ambient temperatures which means there is no heat loss. All above ground pipes are insulated but that is only for condensation protection, there are still no heat losses in these sections. In addition to making the system more efficient, it also avoids the communal area overheating issues commonly found in district heating systems.

Results

Because of the high efficiency of the heat pumps (300%), the heating and hot water costs for each tenant are now £350-400 per year representing a massive saving (£450 – 700 per year) and making a significant difference to tenant's finances.

The project will save 773tCO_2 per year, a figure which will increase as the electrical grid decarbonises.

Cost of the scheme is just under £5 million. Nevertheless, as shared ground loop arrays are classed as district heating, the project was eligible for funding from the Non Domestic RHI, delivering £4.3million to Enfield Council over 20 years. Coupled with upfront investment from the ECO grant, Enfield Council are set recoup their capital costs for delivering the project.

Key facts

Building type: residential building (8 towers, 402 flats)

Heat source: 2.5 MW Aquifer Thermal Energy Storage system using heat pumps

Capital cost: £5 million but was offset by upfront grants via the ECO and 20 year quarterly income via the RHI.

Heat pump type: Kensa 'Shoebox' water-to-water heat pumps

Time frame: In operation since August 2018

Contact: Kensa

References

[1] "Enfield Council: Ground Loop Array Heat Pump - Case study", smart sustainable cities, https://smartsustainablecities.uk/enfield-council-ground-loop-array-heat-pump/

[2] "Low carbon heat: heat pumps in London", Greater London Authority, September 2018

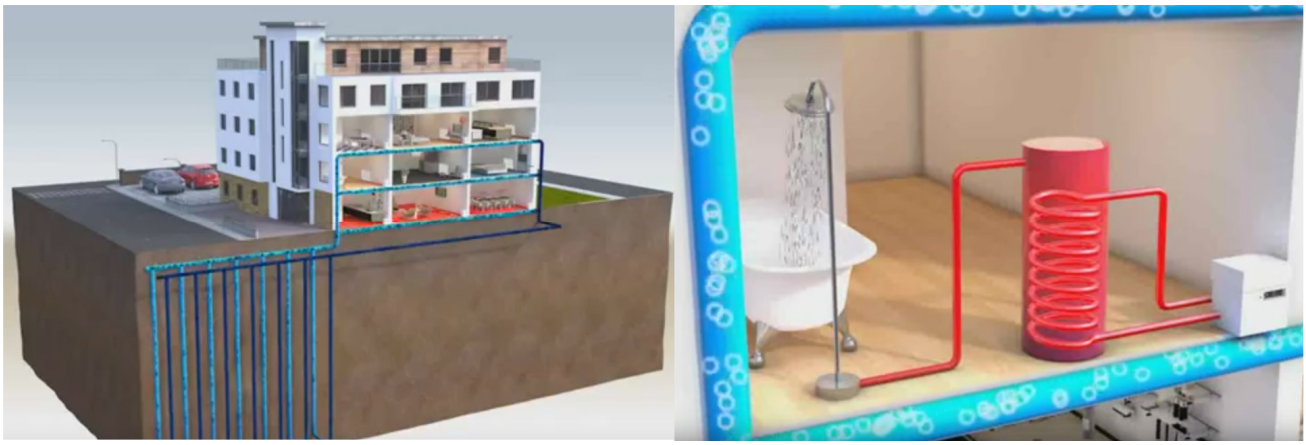

Figure 2: Overall water loops (left) and hot water supply system (right) (Source: Kensa)