

Bunhill Heat and Power - Islington

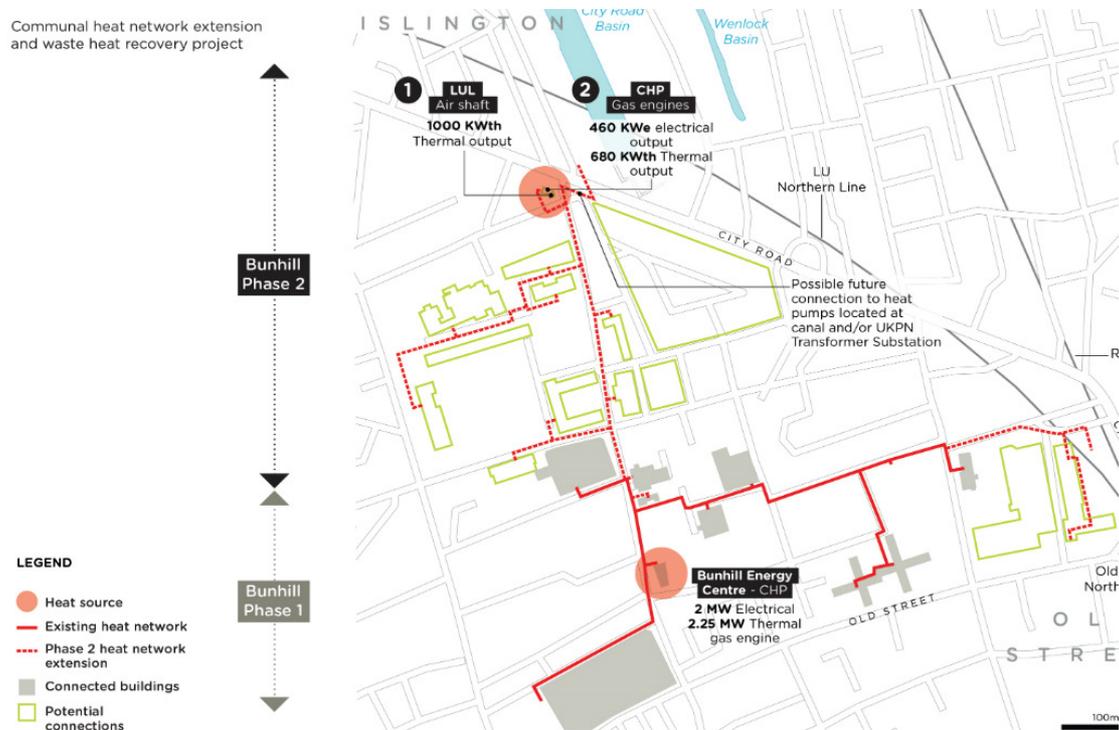


Figure 1: Islington map representing the two phases of Bunhill Heat and Power [1]

Context

Bunhill Heat and Power is a project made by the Islington Council in order to provide low carbon heating and electricity to 1350 dwellings. It's composed of 2 different schemes. The older one (Bunhill Energy Centre) is a gas CHP scheme providing heat and electricity to 850 homes. The new one (Bunhill phase 2) is a heat pump recovering low-grade waste heat from the London Underground to heat 500 dwellings.

How does the scheme work?

The Bunhill Energy centre (built in 2012) consists of a 1.9MWe gas CHP engine and a 115m³ thermal store with two kilometres of insulated district heating pipework. The energy centre uses the heat created from the electricity production in order to heat water

The heat pump extracts waste heat from a London underground ventilation shaft to supply heating and hot water to 500 dwellings

that is piped into people's homes. This scheme is more efficient than a normal power station, for which the heat is only a waste product.

Bunhill phase 2 (built in 2019) consists of a 1MW heat pump that extracts waste heat from a London underground ventilation shaft (Temperature is between 18 and 28°C) and upgrades it to 80°C to supply heating and hot water to dwellings. The heat pumps works in tandem with a coil that can both draw heat from or release cooling into the London Underground. Furthermore, two 237kW CHP gas engines are co-located with the heat pump. They both, as well as providing heat,

supply electricity to the pump and export electricity to the grid. This special feature enhances system technical and economic performance. Finally, a thermal store is also implemented in the scheme.

Results

Based on the latest national grid carbon emission estimates, the whole scheme has a carbon intensity of 0.107kg/kWh. The phase 1 gave a CO₂ savings of 1800T/year and cost £3.8 million that were funded by grants secured from the Greater London Authority and the Homes and Community Agency.

Moreover, the network has been developed whilst affording residents a minimum 10% reduction in their energy bills, with no public or private subsidy for the operational costs.

References

[1] "Bunhill 2 District Heating Network - Heating up London", Ramboll, <https://uk.ramboll.com/projects/ruk/heating-up-london>

[2] "Bunhill Heat and Power – capturing waste heat from the London Underground", Euroheat & Power, <https://www.euroheat.org/knowledge-hub/bunhill-heat-power-capturing-waste-heat-london-underground/>

[3] "Bunhill Heat and Power: Case study", Islington, 2013, <https://isep.org.uk/wp-content/uploads/BUNHILL-case-study-2013.pdf>

Key facts

Building type: residential building (1350 dwellings)

Heat source: 3 gas CHP engine (1.9MWe, 2x 237kWe) + heat pump (1MW)

Carbon Intensity: 0.107kg/kWh

Supply temperatures: up to 80°C

Source temperature: between 18 and 28°C

Design Heat pump COP: 3

Time frame: Phase 1 and 2 in operation respectively since 2012 and 2019

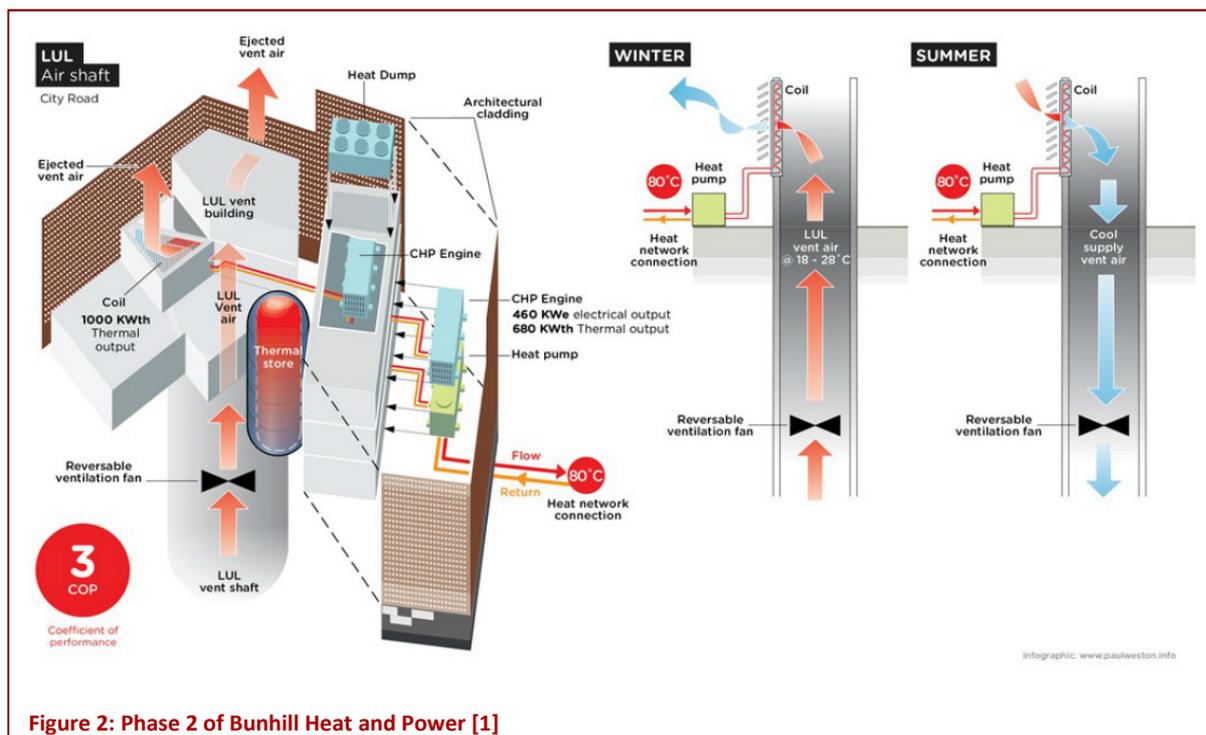


Figure 2: Phase 2 of Bunhill Heat and Power [1]