Daisyfield Towers, Blackburn

Innovative scheme to retrofit shared ground heat exchange systems to three tower blocks in built-up urban area, trialing space-saving medium-depth boreholes in largest scheme of its kind in the UK

Courtesy of Kensa Contracting

Project highlights

- **Estimated lifetime carbon savings of 6,556 tonnes of CO_2**
- **Installation carried out in conjunction with electrical works and sprinkler system**
- **Residents remained in homes throughout installation**
- **Innovative medium-depth (up to 300m) boreholes drilled underneath green spaces adjacent car parks**

Project details

Together Housing and Kensa Contracting have been working together since 2018 on a programme of retrofitting shared ground heat exchange systems to existing dwellings across their housing portfolio.

In this scheme, obsolete gas boilers were removed and replaced with Kensa's individual in-dwelling heat pumps linked to a shared ground array as part of a £4.6m improvement programme including electrical upgrades and a new sprinkler system.

Due to the highly congested urban location, Kensa worked with specialist designers and drilling experts to trial 300m depth boreholes to reduce the number of boreholes required.

The scheme serves 183 properties as well as communal areas and a ground floor café and is expected to produce a lifetime CO_2 saving of 6,556 tonnes whilst saving residents money.

Key project information

Setting	**Urban**
Type of properties	**Residential, high-rise blocks**
No. of buildings	**3**
No. of dwellings	**183**
Type of project	**Retrofit**
Tenancy type	**Social tenants**
Project developer	**Together Housing**
Installer	**Kensa Contracting, Genius Energy Lab, Geodrill**
Heat pump	**Kensa Shoebox 3/6kW**
Thermal storage	**Included, type unknown**
Ground heat exchangers	**84 boreholes, 300m depth**
Total project size	**820kW (est.)**
Previous heating system	**Individual gas boilers**

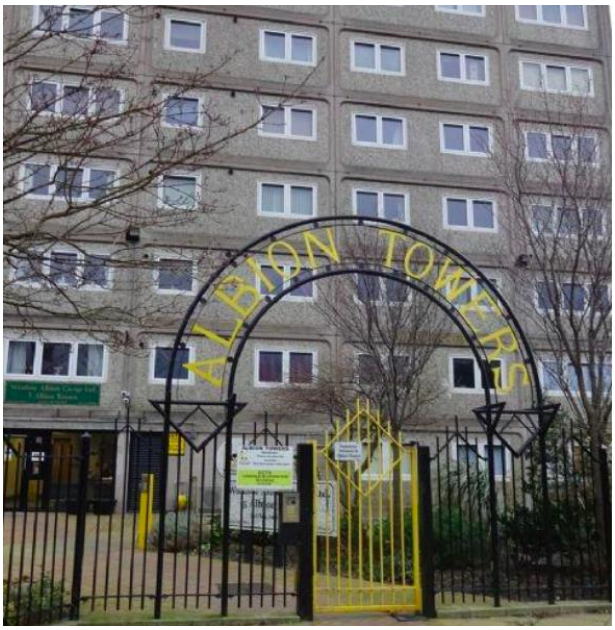
References & further information

https://www.kensacontracting.com/together-housing-daisyfield/

https://www.procure-plus.com/wp-content/uploads/2020/12/PP-Together-HPCY-V3.pdf

Albion Towers, Manchester

Existing gas boilers removed from 17-storey 1970s tower block, replaced with shared ground system based around advanced monitoring and control



Courtesy of EHPA

Project highlights

- **Custom 1–6 kW inverter-driven heat pumps designed for the project to reduce peak demand by 70%**
- **System powered by solar PV, batteries and national grid**
- **Innovative coaxial borehole system**

Project details

Salix Homes worked with Ground Heat to replace existing gas boiler system with individual heat pumps, new radiators and a shared ground array as part of a £3.9m upgrade. The system is expected to save 8,903 tonnes CO_2 over the 20-year life of the project and reduce resident heating bills.

Ground Heat worked with Austrian heat pump manufacturer Heliotherm to design bespoke inverter-driven heat pumps specified to residents' criteria. The system includes remote monitoring and the ability to modulate in-line with demand to reduce the peak load of the system, thereby reducing the size of the borefield.

Recent negative press has reported residents do not feel able to control the system to deliver the warmth they expected, emphasising the need for careful consideration for users in system design, clear guidance on how to use the system, and hands-on support where required.

Key project information

Setting:	**Urban**
Type of properties:	**Residential, high-rise block**
No. of buildings:	**1**
No. of dwellings:	**135**
Type of project:	**Retrofit**
Tenancy type:	**Social**
Project developer:	**Salix Homes**
Installer:	**Ground Heat**
Heat pump:	**Heliotherm 1–6 kW GSHP**
Ground heat exchangers	**Coaxial boreholes**
Total project size	**400kW (est.)**
Previous heating system	**Individual gas boilers**

References & further information

https://ground-heat.co.uk/projects/overhauling-how-manchester-city-council-heats-its-social-housing-portfolio/

https://www.manchestereveningnews.co.uk/news/greater-manchester-news/fed-up-tower-block-tenants-19717740

https://hpa.ehpa.org/albion-towers-modernisation/

Oberry Fields, Warwickshire

New development of nine high-specification homes in rural setting, with individual heat pumps connected to shared borehole array

Courtesy of Barbour Product Search

Project highlights

- **High efficiency new homes ranging from three to five bedrooms**
- **Intended to be a showcase for low carbon development**
- **Heat pumps combined with an array of other energy saving technology for buyers to choose from**

Project details

Private housing developer Housestyle Countrywide worked with installer Be Green Systems to deliver a shared ground heating system with 3-, 4-, and 5-bedroom properties connected to seven 120m boreholes.

Each home features a Vaillant flexoTHERM 8kW heat pump combined with a 310l hot water tank, and underfloor heating. Additional energy saving options for the homeowners to choose include:

- MVHR
- Wardrobe ventilation
- Background comfort cooling
- Air conditioning
- Solar PV panels
- Solar batteries

Expected annual energy bills £350 to £400 - a significant reduction compared to the UK average.

Key project information

Setting:	**Rural**
Type of properties:	**Residential, individual dwellings**
No. of buildings:	**9**
No. of dwellings:	**9**
Type of project:	**New build**
Tenancy type:	**Owner-occupier**
Project developer:	**Housestyle Countrywide**
Installer:	**Be Green Systems**
Heat pump:	**Vaillant flexoTHERM 8kW**
Thermal storage	**310l hot water tank**
Ground heat exchangers	**7 boreholes, 120m depth**
Total project size	**72kW (est.)**

References & further information

https://www.vaillant.co.uk/downloads/case-studies-1/oberry-fields/oberry-fields-web-optimised-1417151.pdf

https://www.begreensystems.co.uk/Oberry_Fields_Case_Study.html

https://www.barbourproductsearch.info/vaillant-flexotherm-at-ecofriendly-development-news049828.html

Martin's Field, Caerphilly

Retrofitting distributed heat pumps and shared ground array to replace old night storage heaters for 20 dwellings

Courtesy of MasterTherm

Project highlights

- **Closely-knit site of apartments and semi-detached homes made shared ground heating ideal choice**
- **Residents had reported high costs and poor levels of comfort with outdated electric heating**

Project details

Caerphilly Country Borough Council sought to reduce costs and improve comfort levels for tenants and chose to replace the old night storage system with a shared ground heat array.

The homes were each installed with a compact MasterTherm Aquamaster inverter-driven heat pump which can modulate between 30-100% output to suit household demand. Each heat pump in the 20 homes outputs between 1 and 5kW, and the system is fed by a total of 10 boreholes located in the car park and surrounding land.

Key project information

Setting:	**Semi-rural**
Type of properties:	**Residential, mix of semi-detached homes and flats**
No. of dwellings:	**20**
Type of project:	**Retrofit**
Tenancy type:	**Social**
Project developer:	**Caerphilly County Council**
Heat pump:	**AQ17i MasterTherm 1-5kW**
Ground heat exchangers	**10 boreholes**
Total project size	**50kW (est.)**
Previous heating system	**Electric night storage heaters**

Courtesy of Mastertherm

References & further information

https://www.mastertherm.co.uk/case-study-martinsfield-newbridge

https://www.mastertherm.co.uk/heat-pump-aquamaster-inverter

Bromford, Shropshire

Replacement of electric night storage heaters with communal ground array in off-gas rural site

Courtesy of Kensa Contracting

Project highlights

- **Individual Kensa 6kW shoebox heat pumps installed in every bungalow**
- **Sited in airing cupboards along with new hot water tank**
- **Residents expected to save £300-£350 per year on heating bills**

Project details

Bromford Housing Association worked with Kensa Contracting to provide lower-cost, lower carbon heating and hot water to residents. The system features remote monitoring by the social landlord, with tenants able to make minor adjustments.

Nigel Gosling, Senior Contracts Manager, Bromford Housing Association said:

"The installation was very positive for our first experience of GSHP, and we would be confident to look at further installs through Kensa. The set up was well organised and coordinated. The pre and during works information provided to us and the customers was first class, and the use of known heating installers helped all works run to plan."

Feedback from residents:
"I'm now spending less on my whole house heating as I was on one electric heater previously!"
"The heating is great, comes on when I want it."

Following positive feedback from residents, Bromford Housing Association has since undertaken further projects with Kensa at sites in Gloucestershire to further upgrade their social housing stock and improve resident comfort.

Key project information

Setting:	**Rural**
Type of properties:	**Residential, bungalows**
No. of dwellings:	**16**
Type of project:	**Retrofit**
Tenancy type:	**Social**
Project developer:	**Bromford Housing Association**
Installer	**Kensa Contracting**
Heat pump:	**Kensa Shoebox 6kW Twin**
Ground heat exchangers	**8 boreholes**
Total project size	**96kW (est.)**
Previous heating system	**Electric night storage heaters**

Courtesy of Kensa Contracting

References & further information

https://www.kensacontracting.com/ground-source-review-bromford-housing-association/

https://www.kensacontracting.com/ground-source-review-bromford-phase-two/

Enfield, London

Largest shared ground heat array in England with 400 flats retrofitted with Shoebox heat pumps

Courtesy of Kensa Contracting

Project highlights

- **Largest district ground source system in England**
- **Residents select own energy provider and choose the best tariff for them**
- **Project completed in under one year with residents remaining in their homes throughout**

Project details

A pioneering scheme in urban shared ground heat exchange development. The London Borough of Enfield wanted to replace obsolete electric heating for local authority tenants and leaseholders.

In designing the system, Kensa split the installation into 16 “micro-districts” each supplying half a tower block, simplifying project logistics and allowing for parallel workflows, reduced timescales and disruption to tenants.

The project expects to save 773tCO_2 per year, and it is understood that tenants have saved £450–£700 per year in heating and hot water costs, giving nearly £9 million in collective lifetime bill savings over the nominal 40-year system lifetime.

To facilitate the works, the primary contractor set up a site office in the basement of the tower blocks for staff facilities and a resident meeting and respite area for when work was taking place in their dwelling. Leaseholders were charged a discounted rate to connect to the system, taking into account income to landlord of RHI for 20 years.

Key project information

Setting:	**Urban**
Type of properties:	**Residential, high-rise blocks**
No. of dwellings:	**400**
No. of buildings:	**8**
Type of project:	**Retrofit**
Tenancy type:	**Social & leasehold**
Project developer:	**London Borough of Enfield**
Installer	**ENGIE / Kensa Contracting**
Heat pump:	**Kensa Shoebox 3/6 kW**
Ground heat exchangers	**128 boreholes in 16 clusters of 8**
Total project size	**1.8MW (est.)**
Previous heating system	**Electric heating**

Courtesy of Kensa Contracting

References & further information

https://www.kensaheatpumps.com/englands-largest-district-ground-source-system-breaks-new-ground/

https://www.kensacontracting.com/englands-most-innovative-district-ground-source-system-wins-industry-oscar/

Barns, D. 2022. Unlocking the potential for thermal energy storage in the UK (PhD thesis)