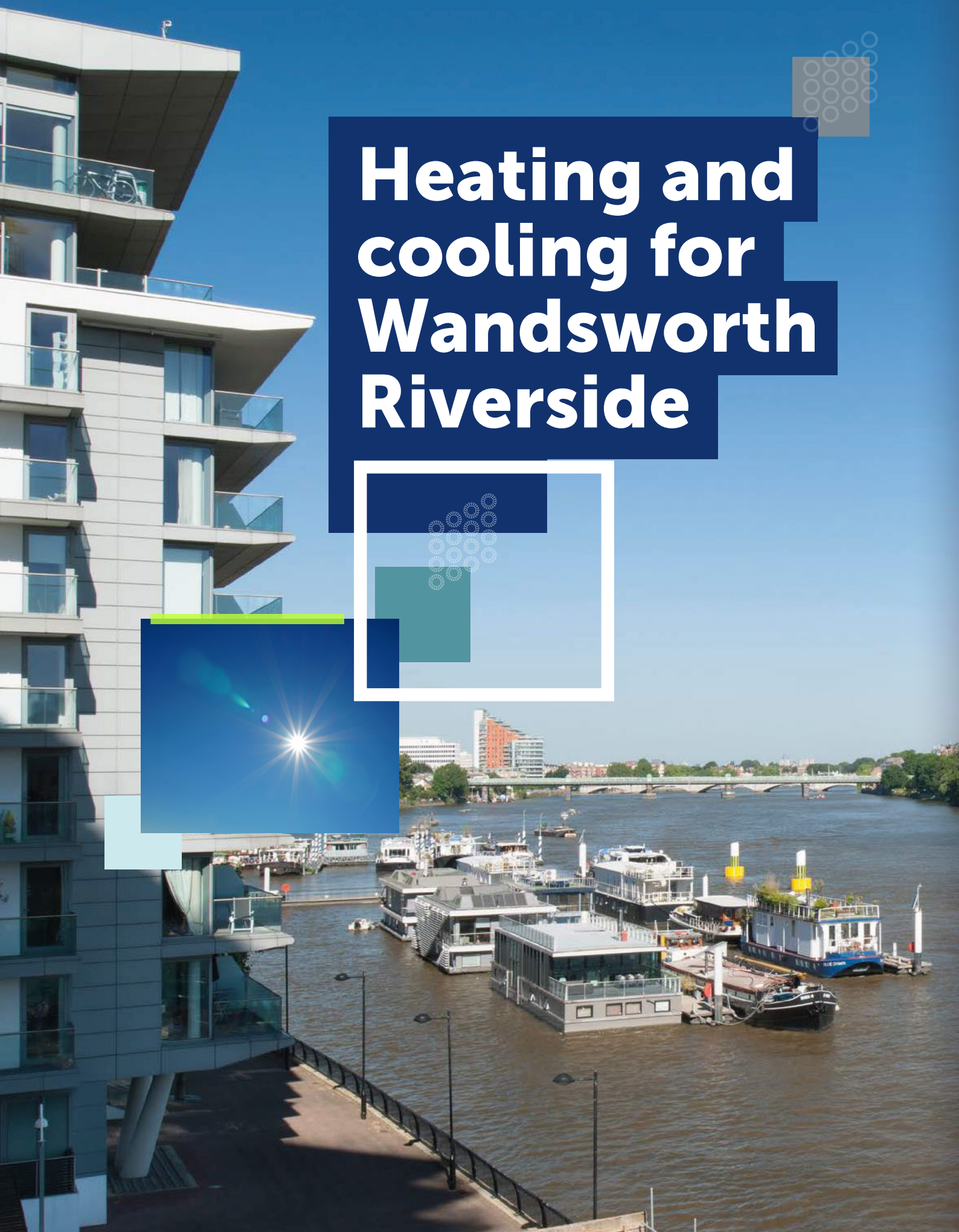
sse Energy Solutions

Heating and cooling for Wandsworth Riverside



Our involvement

A new approach

Wandsworth Riverside Quarter, one of our innovative landmark district heating schemes, comprises 550 residential units together which consists of six blocks and a further 2,973 m^2 of commercial space.

SSE worked with a geothermal/heat extraction expert to design an Aquifer Thermal Energy System (ATES) for this heating and cooling project. This is a highly innovative, integrated energy system which combines open loop ground source heat pumps in combination with gas Combined Heat and Power (CHP) to provide low carbon heat, hot water, cooling and electricity all under the control of SSE's ESCo team.

SSE has worked with the client team throughout the construction process, bringing our many years' experience, to ensure that commissioning of new phases can occur whilst the performance and integrity of the live network is protected. This is a complex exercise and a common challenge for multi-phase developments.

The scheme design was conceived in 2010 in response to the "London Plan" requirements for the generation of on-site energy in tandem with minimum standards for carbon abatement; fundamentally to address the need for the energy provision to the site to be 'lean, clean and green'.

The technical solution identified was a relatively new approach for a heat and cooling network and hugely ambitious. The site uses open loop ground source heat pumps, drawing water from a series of four "cold" and four "warm" wells up to 100m deep under the site. These run in combination with gas boilers and gas CHP to provide low carbon heat, hot water, cooling and electricity to this multi-phase development.

Under a Joint Development Agreement with our client, Frasers Property Development (Frasers), SSE worked with the development team, engineering consultant, Hoare Lee, and geothermal heat abstraction expert, IFTech, to bring our expertise as a system operator and integrator.

Complex systems such as this require careful design and commissioning and the operational challenges of extending the networks to each new phase of the development whilst maintaining efficient and reliable supplies to customers already connected, must be overcome.

Working closely with the client's construction and commissioning teams, SSE provided commissioning specifications and operational protocols (which incorporated ongoing lessons learned) to help to ensure reliable supplies throughout. Once each phase was complete an exercise to re-optimise the whole system was undertaken.

Because of the phased development of the site the hydraulic design of the networks need to have some excess capacity/capability installed. Usually this takes the form of large diameter low loss headers, that allow unstable and fluctuating conditions to prevail during energy use provision for the commissioning stages of future phases. During these periods, SSE manually intervenes to provide a stable network operating experience for connected customers.

The use of low loss headers on heating and cooling networks is contrary to textbook guidelines to achieve the intended network operating temperatures. SSE has successfully developed and deployed a BMS control strategy on another similar system it operates to achieve the widest possible cooling network operating temperatures whilst still retaining the low loss header.

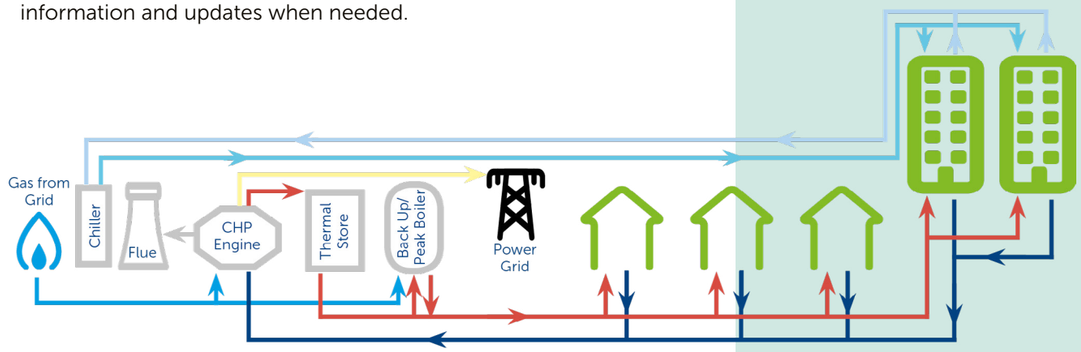
Our engagement

Our Customer Service team do everything they can to provide the customers at Wandsworth Riverside Quarter with all the care and facilities they need for a comfortable time with us.

We provide a variety of ways for our customers to get into contact with us. Our dedicated call centre work 24/7/365 to answer any queries or issues and we have several social media channels set up with the added benefit of being able to convey information and updates when needed.

As often as possible, team members hold Community Engagement Roadshows, where members of the community can come out, sit down with us, discuss issues or request information and receive direct responses from our trained and experienced team.

Information is key and we do all we can to ensure customers have all the relevant information they need whenever they need it. All customers receive a welcome pack providing full details of our service, together with energy saving tips when they first move into the property. Our website also hosts a plethora of downloadable and online content for customers to peruse through.



The on-site energy centre contains all the equipment needed to generate, store, pump and control the heating and cooling system in your area.

The Energy Centre

The on-site energy centre contains all the equipment needed to generate, store, pump and control the heating and cooling system in your area. This includes large boilers, an engine, thermal store and chillers. We capture the heat and deliver it around our network to ensure you have constant access to heating and hot water. We also pump chilled water around a separate network of pipes for when you need to reduce the temperature in the home.

How the technology works

The design in this case was for the heat pumps to provide heat for space heating only. The system has three circuits; one for space heating, one for hot water and one for cooling. The heat pumps provide a 45°C flow that directly feeds underfloor heating (UFH) in each property. Efficiency gains are made as little or no cold water is required to blend into the UFH system to cool the flow down.

A 25,000-litre thermal store is fed by a CHP engine and gas boilers. These provide supplementary heat to the heating network as well as hot water via the dedicated hot water circuit. Low carbon CHP electricity supplies the energy centre and heat pumps.

SSE worked to ensure that CHP electrical output services heat pump and landlord loads before any surplus is "spilled" to grid, thereby maximising the economic benefit of the CHP and ensuring a fully integrated on site energy solution.

In the so called "shoulder months" in Spring and Autumn, some customers have a heat demand and others cooling. Because the heat pumps are "reversible", they have the ability to provide both. Hence at certain points in the year instead of extracting heat or coolth from the aquifer, we can capture the heat rejected from the properties that are in cooling mode and send it back to the heat pumps to bring it back to operating temperature and recirculate in the heating circuit.

Similarly, we take the cooler return flows from customers with a heating demand and send these to a heat pump to further reduce the temperature and recirculate in the cooling loop.

The three-circuit approach which enables the heat pumps to work at maximum efficiency levels providing space heating and 1.4MW of cooling capacity (whilst hot water is provided by CHP and gas boilers) coupled with low return temperatures and optimum use of CHP electrical and heat output mean that this is a great example of an integrated energy project.

2019 estimate

Heat pumps compared to traditional gas boilers saved

132 tonnes of CO_2

These innovative technologies mean lower cost of operation, lower carbon and lower tariffs for residents.

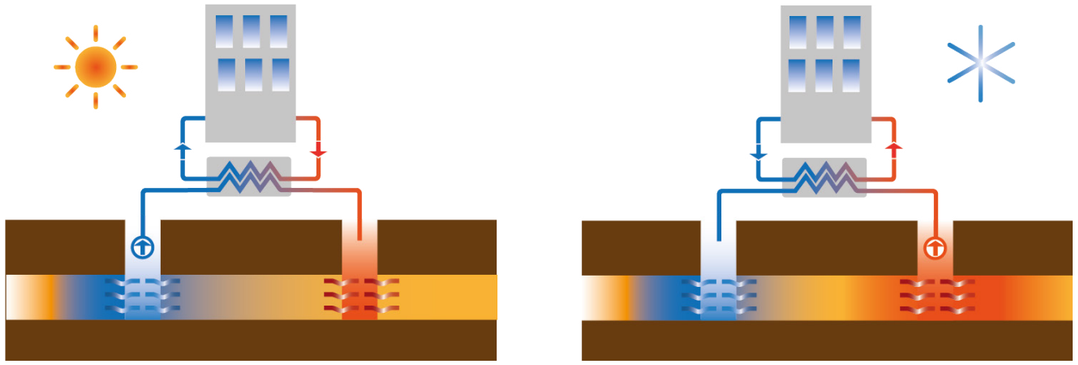
Lower carbon

These innovative technologies, when combined in an integrated energy solution, mean lower cost of operation, lower carbon and lower tariffs for residents.

The system has carbon savings at its heart. SSE's role has been to ensure that the design, commissioning and operation are optimised to maximise that carbon saving potential.

In 2019 we estimate that use of the heat pumps to provide heat and cooling rather than traditional gas boilers and electric chillers, saved 132 tonnes of CO_2.

One of the key benefits of this heat pumps led project is that as the electricity grid decarbonises so the heat and cooling we provide becomes ever more low carbon and the savings versus the gas boiler continue to grow.



Designed to meet local energy needs and drive Net Zero

Smart distributed energy infrastructure solutions

SSE Energy Solutions is part of SSE plc, a UK based FTSE 100 company with 75 years' experience operating in the fast-changing energy industry. SSE Energy Solutions plays a major part in the emerging consumer-led energy system, and provides key services to enable users to benefit from new ways to optimise and manage their low carbon energy use.

Our Distributed Energy business teams adopt a whole system approach by investing in, building and connecting your localised, flexible energy assets to accelerate your path to net zero and create a more resilient energy system for the long-term.

Right now, your decision to pick SSE Energy Solutions, part of an established renewable energy company investing in all our futures, will be the right choice for you and for our environment.

Let us tell you how we can support your journey

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