

ADVECO NEWSLETTER

August 2023

Welcome to Adveco's August newsletter,

The future of low-carbon water heating for the commercial sector must, by necessity, be one that leverages the best of technology to hand. To this end we foresee greater acceptance of hybrid systems that blend technologies in the most efficient and cost-effective manner possible. This month we look at how this process can be applied to make the most of heat pumps as part of a sustainable strategy. We also track the impact of the Public Sector Decarbonisation Fund and usher in phase 3c, which could provide critical funding for carbon lowering projects across the UK.

For heating projects, we are pleased to announce an extension to our popular ranges of buffer vessels. Also, this month we take a look at a hybrid system in use for the past year in central London that is redefining how we think about tackling destructive limescale deposition in water heating applications...

Taking A Blended Approach To Sustainability



Low-carbon hot water systems for commercial projects will typically look to specify Air source heat pumps (ASHP). ASHPs are a technology that operates most efficiently at lower temperatures, making them highly applicable to domestic applications, but domestic hot water (DHW) systems for commercial properties require a 60°C working flow for safe operation and anti-legionella processes. This does not prevent the use of ASHPs as they can be pushed to deliver a higher percentage contribution, generating working temperatures of 45-50°C for preheat, but this at the cost of performance efficiency, requires electrical energy, and that has operating cost implications. However, when compared to an equivalent-sized direct-electric (i.e., from the grid) system, one with an ASHP can achieve carbon reductions of 42-47%, whilst

saving 25-35% of the energy costs.

The low-carbon hot water system will still be required to top up the heat to the necessary 60°C, preferably using an electric boiler. This, combined with the heat pump's reduced operational efficiency means it will still be much more expensive to run than an equivalent-sized gas-fired system based on a modern and efficient (109% net) water heater. The recommendation in this case is to keep electrical demand down by increasing the size of the hot water storage which is then heated more slowly. This is very different to the high energy input, and low storage seen with gas-fired systems.

A 30kW energy source can heat 750 litres/hour by 34°C, so when the system draws hot water at a faster rate than it can be heated to 44°C for hot showers you start to get complaints that the water is 'cold'. The larger volume cylinder helps to overcome this under sizing allowing for a two-hour reheat cycle that maintains enough water at 60°C to meet daily demand, whilst slowly heating reserves through the night when demand is minimal to meet the morning peak.

Despite this, carbon savings and costs are no longer aligned. As an example, if we take a building with an average occupancy rate of 23.5 with provision of basins, and shower/wet rooms, typically seen in student accommodations, care homes or boutique hotels, the yearly running costs resulting from a change from gas to direct electric would increase from £1019 to £3019 (based on electricity on average currently costing as much as 3.8 times that of gas). Even with an ASHP operating at optimum efficiency (for 35% recorded reduction in energy) costs would be £2862. Close to three times that of gas alone, so it is inherently important to consider the nominal value of the carbon reduction, especially if planning a refurbishment from gas to electricity.

New build projects, unless exhibiting very large hot water demands, will struggle to receive permission (under Part L of the building regulations) for a new gas connection and as a result will specify electric-based systems. This still should lead to application design that blends ASHP for preheat with other sustainable options that can include solar thermal, but particularly electric boilers.

The simplest approach for a low carbon hot water system blends preheat, such as from an Advenco FPI32 ASHP with, for example, the Advenco ARDENT 9-100 kW electric boiler to supply thermal energy to a mains water-fed compact indirect cylinder. Balancing such a hybrid electric system is key to ensuring efficient operation, so consideration needs to be given to controls to assure the water heating remains consistent, and that the two technologies do not fight each other. Working in a balanced combination, enables systems to be sized down, by as much as half in terms of ASHP requirements. This delivers immediate capital savings as electric boilers are far less expensive compared to an equivalent heat pump. You also immediately reduce the physical size of the system embodied carbon and demand from the electric supply.

As a high-temperature heat source, the electric boiler is capable of providing temperatures of up to 75°C and should be used in place of an immersion as these are not designed for primary heating. Immersions are relatively costly to purchase and operate and prone to rapid limescale development and failure in hard water areas, so should only be incorporated as a back-up for additional system resilience. Specifying an electric boiler is far more advantageous, preventing scale deposition, as well as delivering further system redundancy since the boiler will incorporate multiple immersions within its chassis.

Carbon reduction under an all-electric approach is a given, and, as the grid becomes less dependent on gas-fired power stations, carbon emission figures from a system should continue to reduce over time, future-proofing sustainability gains from an implemented DHW application deploying ASHPs.

Public Sector Decarbonisation Fund Launches Phase 3c

The UK Public Sector Decarbonisation Scheme (PSDS) is a government-funded program designed to support the UK's net zero emissions target by 2050 by providing grants to public sector bodies to help them decarbonise their buildings. This is important as most of the buildings in the public sector still rely on burning fossil fuels for heating, hot water, and catering.



Phase 1 and Phase 2 of the PSDS have been successful in helping to decarbonize public sector buildings in the UK. The schemes have awarded over £1.75 billion in grants to over 1,300 public sector bodies, which have helped to decarbonise more than 2,000 public buildings. These projects have resulted in a reduction of more than 1.25 million tonnes of carbon emissions.

Phase 3 of the Public Sector Decarbonisation Scheme, worth £1.425bn, was launched on behalf of the Department for Energy Security and Net Zero in 2021 to supply grants to public sector bodies over the period 2022 to 2026. Phase 3c of the PSDS was launched in July.

Read on to understand why public sector bodies should apply for funding and further links about the scheme...

Advenco Extends Range of Buffers Vessels For Heating Projects



Commercial central heating projects require an inertia tank or energy storage vessel to support multiple return flow temperatures or multiple heat sources, such as renewables or low- and high-grade heaters. The 'Buffer' tanks come in a wide range of sizes from 300 to 5,000 litres, with bespoke tanks offering even larger storage options covering truly large commercial demands.

At Adveco we are pleased to announce an extension of our Buffer ranges, that not only includes the premium MSS range of carbon steel shell primary system buffers, but now adds the new MSB standard range of carbon steel tanks. The MSB range features numerous high-, mid-, and low-level connections to ensure compatibility with almost any heating application. Such tapplings enable the tanks to be used with multiple return flow temperatures or multiple heat sources including glycol fluid based systems for solar and heat pump installations.

The MSB range includes buffer vessels with capacities from 300L to 5,000L. All tanks are rated to 3 bar as standard, with options to 6 bar working pressure, and temperatures up to 95°C

For projects demanding higher system pressure, MSS tanks offer 6 bar working pressure as standard with options available to 10 bar for the most demanding applications.

Adveco's MSB Buffers from 300 to 2,000 litres are available now and can be delivered to your project within one month of ordering.

DISCOVER MSB BUFFERS

One Year Without Limescale



Adveco has demonstrated how a restaurant virtually eliminates limescale from its hot water application to ensure business-critical daily operation. Adveco is working in partnership with a global restaurant brand to support the rollout of net zero restaurants demonstrating low-emission innovations throughout its chain of UK drive-through and high street franchises.

Through the application of live metering, Adveco has demonstrated to the customer that servicing domestic hot water (DHW) water demands of between 1200-1500 litres per day could equate to as much as 20% of total energy usage within the organisation's target net zero restaurants.

One year ago, the refurbishment of a restaurant in the King's Cross area of London provided an opportunity to address the emissions generated by this provision of hot water for the restaurant. The location also previously had struggled with problems of limescale due to the hardness of the water supply, so creating an application which eliminates limescale was key.

Working to an all-electric specification, Adveco designed an application that would harness its' 9kW [FPI32 air source heat pump \(ASHP\)](#) for preheat with additional top-up heat supplied by an [ARDENT P 12kW](#) electric boiler. These would supply thermal energy to a mains water-fed compact SST500 stainless steel twin-coil indirect cylinder. The system was conceived, in part, to address the customer's concerns over system resilience, particularly with regards to damaging limescale build-up which is a serious and potentially expensive problem for commercial hot water systems installed in hard water areas.

London is one area that particularly suffers from this issue, with unprotected commercial systems known to incur irreparable damage to immersions and cylinders. Adveco ran some initial tests at the location including use of a direct immersion. Immersions are designed for use as a secondary heat source preferably acting as an emergency back-up should there be a failure in the primary system, but we are seeing more specifications with them used as a primary heat source as buildings shift away from gas to electric as a low-carbon alternative. This is not recommended.

On this occasion, the test immersion was used constantly for a week to supply heat. The high heat intensity of the immersion, even during this short period of time, demonstrated excessive levels of limescale deposition on the heating element. When limescale forms and remains on the heat transfer surface, because it is non-conductive, the surface becomes insulated leading to overheating of the element. Over time this will cause it to rupture if the heat cannot be dissipated. Under these monitored conditions the lifespan of the immersion was estimated to be a matter of months, yet their cost is not too dissimilar to that of the ARDENT electric boiler.

A move to electric that still eliminates limescale...

An advantage of incorporating the ARDENT electric boiler was that it heats water using an array of smaller immersion heaters located in a small tank within the boiler housing rather than directly installed into the

hot water tank. This creates a sealed 'primary' loop to the indirect coil in the SST500 cylinder. The electric boiler heats the same water continuously so there is only a small, finite amount of scale in the system which will not damage the elements. The heat exchanger in the cylinder is a large coil operating at a relatively low (80°C) temperature. The intent was by controlling temperatures and employing an indirect method of water heating the system the common problems of destructive limescale build-up seen in direct immersion electric heating would be eliminated.

One year on from the commissioning of the system, the first annual warranty servicing demonstrated the efficacy of this approach. Upon removal of the coil from the SST500 for inspection it was clear that limescale deposition had been minimised. What little limescale which had deposited on the coil surface over the year could be easily wiped from the surface, before placing back into the cylinder.

With the cylinder forming significantly less scale, the restaurant has gained from vastly improved reliability while reducing maintenance demands, for both operational and maintenance savings on top of crucial emission reductions.

Visit the [Adveco restaurant](#) resource for more guidance on delivering low carbon and renewables to help achieve net zero restaurants by 2050.

READ ADVECO'S HANDBOOK ON COUNTERING LIMESCALE

Sustainable Electric Hot Water



Solar Thermal

A proven and extremely reliable technology, solar thermal offers a clear path to reducing CO₂ emissions and offsetting expensive electric costs for organisations using large amounts of hot water. Adveco's collectors with drain back provide a low maintenance option to help achieve sustainability goals.

FIND OUT MORE



Air Source Heat Pumps

The FPI32 & L70 ranges of commercial Air Source Heat Pumps (ASHP) for the provision of preheat in domestic hot water applications. Adveco ASHPs can be supplied as a part of a bespoke hybrid, or all-electric system, as well as an element of a prefabricated plant room system.

FIND OUT MORE



ARDENT Electric Boiler

ARDENT is designed to serve as an indirect water heater or heating system. Wall-hung and floor-standing variants for those seeking to avoid a reliance on gas energy supplies. In hard water areas the ARDENT electric boiler can be used to dramatically reduce the costly build up of damaging limescale.

FIND OUT MORE

Adveco 2023 Product Guide

Fully updated from July 2023, this useful reference guide provides a full summary of Adveco's current product portfolio. Don't forget these are just the start of our offering, acting as the buildings blocks for your bespoke hot water systems...

2023 PRODUCT GUIDE



Discover Adveco's expanding range of low carbon and renewable products

[FUSION packaged electric water heaters](#)

[FPi R32 monobloc Air Source Heat Pump](#)

[ARDENT Electric Boilers](#)

[L70 Air Source Heat Pumps for larger projects](#)

[Hot Water Cylinders, Indirect Water Heaters, Calorifiers & Buffers](#)

[Commercial Gas-Fired Water Heaters](#)

[Standalone Heat Recovery from Chillers](#)

[Offsite Constructed Packaged Plant Rooms](#)

☎ 01252 551540

✉ Enquiries@adveco.co

Adveco Ltd. is the hot water specialist with more than 50 years of expertise in the building service industry. Adveco Ltd 2023. Unit 7 & 8 Armstrong Mall, Southwood Business Park, Farnborough, Hampshire, GU14 0NR