



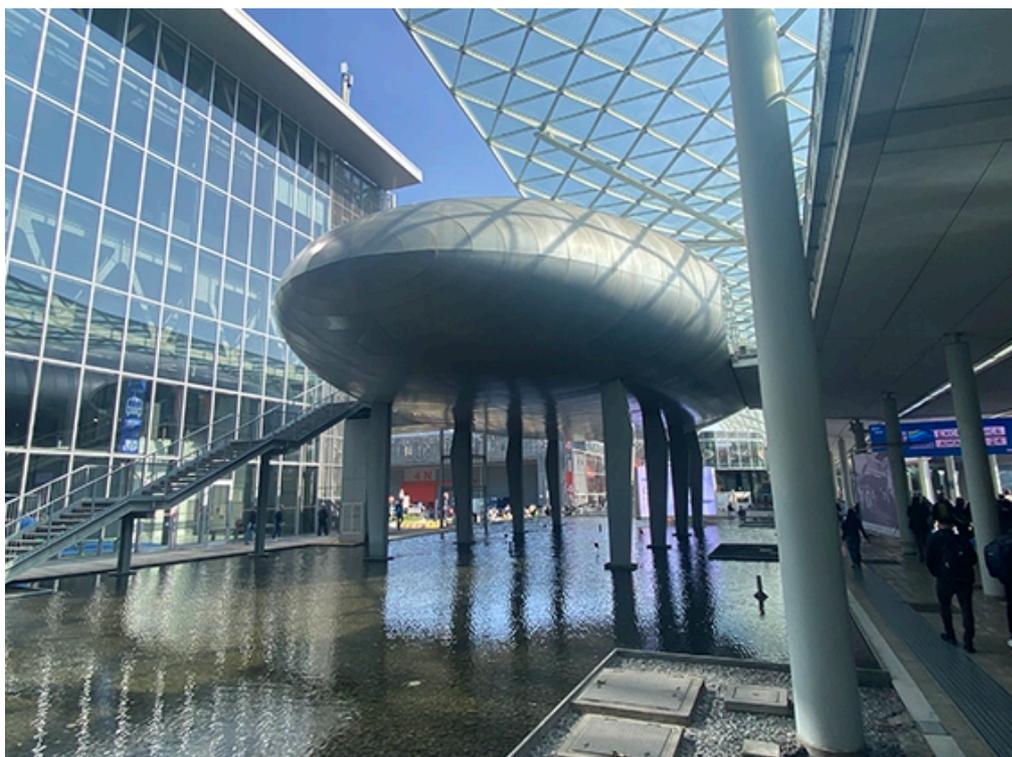
Welcome to Adveco's April newsletter,

This month we hit the floors for the biannual Mostra Convegno Expocomfort (MCE) event held in Milan, Italy, and ask if the Europeans are stealing a lead over the UK in terms of delivering sustainability for commercial buildings? Here in the UK with the NHS setting aggressive net zero targets for its built estate, we look at how GP's surgeries, with smaller, very specific needs should be approaching introducing greater sustainability with hot water applications.

Finally, not a week goes by without us reading or explicitly being told that heat pumps are the answer to delivering net zero. The truth is there remains no single technological response, especially when it comes to the varied and specialist needs of hot water for the commercial sector. Incorporating heat pumps for hot water can be more complicated than you realise so we take a moment to assess the current advantages and disadvantages of the technology to help decide if heat pumps are the best fit for your project...

ADVECO THE EUROPEAN PERSPECTIVE - FROM THE FLOOR AT MCE 2024

The biannual MCE – Mostra Convegno Expocomfort, has become a major focal point for those showcasing advancements in the HVAC (Heating, Ventilation, and Air Conditioning) and plumbing sectors. This year's event has placed a firm emphasis on sustainability, with manufacturers unveiling energy-efficient technologies, green building materials, and smart systems focused on reducing environmental impact.



There are also strong trends on the exhibition floors building on sustainability, including biomimicry and artificial intelligence. Sustainability remains a core theme throughout Mostra 2024. A large proportion of the exhibits have highlighted the use of recycled materials, eco-friendly production processes, and products designed for longevity and easy repair. There is also a growing emphasis placed on the circular economy, where resources are kept in use for as long as possible, minimising waste and environmental impact.

As always, Italian design remains a major draw at Mostra, and designers are increasingly prioritising user experience and wellbeing. Products are being created to promote comfort, functionality, and a sense of connection with nature. This is evident in the rise of biophilic design principles and biomimicry, whereby designers are not only incorporating natural elements and materials into living and workspaces to enhance user well-being but are also seeking to emulate nature's responses to address real-world challenges. Examples on display included utilising self-regulating temperature control inspired by animal adaptations.



At the other extreme, we have technology-driven approaches with design being shaped by artificial intelligence (AI). Several companies are showcasing AI-powered tools for product development, architectural planning, and interior design. These tools offer features like personalised design recommendations, material optimisation, and automated prototyping, aiming to streamline the design process and enhance efficiency.

The line between physical and virtual is also blurring, several exhibitors offered immersive virtual tours of their products, showcasing design concepts within a digital space enabling remote collaboration between designers, manufacturers, and clients globally. Others let the robots do the talking with automated production lines on display.



In terms of hot water provision, there were expected trends and surprises. The proliferation of heat pumps was clear, and whilst most offered appliances based on R32 refrigerant, there was a clear drive to deliver lower GWP systems based on propane (R290) as the refrigerant of choice. Most of these units were intended for the domestic setting, but higher output, high-temperature versions were on display and we can expect these to proliferate in the market later this year and through 2025.



Whilst many suppliers of gas water heating were citing hydrogen blend ready appliances, the Hydrogen Hub was drawing attention for its more holistic vision of an Italy with a nationwide 100% hydrogen network, there were only a few actual systems on display. As in the UK, the EU remains one to watch in terms of the widespread adoption of green gas as an answer to net zero targets. Given the low-key stance on hydrogen, it was also somewhat surprising to see solar systems, both PV and solar thermal having a smaller footprint on the show floor than in previous years. Especially given the recent discussions highlighting a greater need for the technology, especially on public buildings across EU states. In another two years this is one trend that could well have reversed on the exhibition floor.



Crucially Mostra is not just a platform for showcasing products, it also serves to foster dialogue and collaboration within the design and technology sectors to shape a future. Mostra 2024 paints a picture of a design landscape driven by innovation, sustainability, and a focus on human well-being. The integration of AI, the rise of the metaverse, and the increasing emphasis on biomimicry offer a glimpse into the exciting future of design.

While Mostra 2024 focuses heavily on advancements in design and technology, specific legislative updates regarding European commercial hot water systems tend not to be so directly addressed, but anticipated future directions are set to have a major influence on continental Europe and by default will influence or directly sway thought in the UK.

Sustainability legislation currently addresses three key pillars, energy efficiency, renewable energy integration and water conservation.

The continuous push for increased energy efficiency is regarded as the key driver. This translates to regulations mandating minimum energy performance standards for water heaters and boilers. Manufacturers are constantly innovating to meet these evolving standards, leading to the development of more efficient heating technologies. Encouraging the use of renewable energy sources for hot water generation tends to sit at a national legislative level incentivising or mandating the use of solar thermal collectors, heat pumps, or biomass boilers in commercial settings. Regulations promoting water-saving measures are also gaining traction. This might involve mandating specific water usage limits for hot water systems or encouraging the installation of water-efficient fixtures and technologies.

The Energy Performance of Buildings Directive (EPBD) is the current overarching framework for setting minimum energy performance requirements for new and renovated buildings in the EU. It indirectly impacts hot water systems by promoting energy-efficient solutions for heating and domestic hot water production. The Ecodesign Directive sets the requirements for energy-related products, including water heaters and boilers. These requirements focus on improving energy efficiency, reducing energy consumption, and promoting the use of renewable energy sources.

Looking forward, the greatest change is expected to sit with the revision of the Ecodesign Directive, which is replaced by a new regulation called the Ecodesign for Sustainable Products Regulation (ESPR). ESPR will expand beyond just energy-related products, aiming to encompass a much broader range. This could include furniture, textiles, electronics, and more.

Energy efficiency remains important, but the ESPR places greater emphasis on broader environmental aspects. This includes considerations like minimising material use and promoting the use of recycled materials, extending product lifespan and strengthening existing 'Right to Repair' initiatives. This is intended to help further facilitate repairs to reduce waste, requiring products be designed to better support disassembly and re-use of components at the end of their lifespan. This circularity also means it is likely to aim to further limit the use of hazardous materials in products.

The changes are, unsurprisingly expected to further tighten energy efficiency requirements for water heaters and boilers. One way to achieve this will be the introduction of a 'digital passport', a digital record containing information about a product's composition, materials, and manufacturing processes. This aims to improve transparency and facilitate responsible sourcing and recycling.

Overall, the proposed revisions aim to move beyond just energy efficiency and establish a more comprehensive framework for promoting sustainable product design, production, and consumption within the European Union.

Building on this evolving EU framework, individual EU member states can implement further, stricter regulations. These might involve additional energy efficiency targets, specific requirements for renewable energy integration, or water conservation measures tailored to their national context.

What is clear from Mostra 2024 is that the prioritisation of energy efficiency and sustainability remains front and centre of conversation. Businesses are preparing to adhere to future regulation changes, which will no doubt drive greater demand for incorporating renewable energy sources and smart technologies to further optimise their hot water systems.

For the latest legislative developments visit the European Commission website via the button below and search for either Ecodesign or Energy Performance of Buildings.

EUROPEAN LEGISLATION

NET ZERO CHECK UP FOR GP SURGERIES



The NHS has committed to two target dates for achieving net zero emissions: for emissions the NHS controls directly (the NHS Carbon Footprint) a net zero target of 2040 has been set, with an ambition to reach an 80% reduction through 2028 to 2032. For the emissions that can be influenced (NHS Carbon Footprint Plus) the target is net zero by 2045, with an ambition to reach an 80% reduction between 2036 to 2039.

GP surgeries play a crucial role in these ambitious targets. Transitioning to sustainable practices not only benefits the environment but should also aim to reduce long-term operating costs and promote well-being for patients and staff. Advenco can help provide a practical roadmap to navigate the journey towards net zero, with a specific focus on water heating as a strategic launchpad for broader sustainability gains.

The NHS continues to invest in new building work as part of the ongoing task of modernisation but, a large proportion of General Practice will be expected to continue using space within extant buildings. With that in mind, it's important to understand where you are now to get to where you need to be in the most efficient and cost-effective manner. Setting a baseline is therefore the starting point, so begin with an energy audit, analyse your surgery's hot water demands and energy consumption patterns, especially identifying phases of peak use. You can assess your current carbon footprint using a host of tools, and the NHS offers [guidance and examples](#), for water heating Advenco provides extremely accurate, low-cost, low-impact assessment that meters daily demands and enables a complete evaluation of your current hot water system (typically a gas boiler and/or immersion heaters) in terms of its energy efficiency, age, and suitability for your needs. Rather than estimating hot water use based on patient flow and staff activities, which is a typical approach usually characterised by misconception and inflated demand, metering provides absolute data that can act as a foundation for new system design that is sized correctly to your needs and can address net zero requirements for low carbon emission generation.

Water heating is a straightforward, low-impact place to begin improving sustainability, as the majority of changes are likely to be contained to the plant/boiler room. External changes will be a result of the siting of renewables to help offset energy demands and operational costs. Upgrading a hot water system can be a fast, a matter of hours, project with minimal impact on clinical operations.

For GP clinics with an existing grid gas connections immediate advantage can be garnered from invest in high-efficiency water heating. Though not strictly in line with net zero thought replacing outdated systems with A-rated gas water heaters remains a commonly chosen option. One with can be further enhanced with the application of solar thermal pre-heat. It is well worth exploring the feasibility of integrating solar thermal panels with your hot water system to capture free solar energy for a proportion of the year. High-efficiency [solar thermal collectors](#) mean that single panel could offset as much as 30% of the annual energy demands for hot water by a surgery. This option is particularly advantageous for surgeries with even a small amount of unused roof space which has regular sun exposure and is not occluded by trees or other buildings. Consistency of high-temperature water generation may be an issue for NHS estates, so much

attention has been given to [air source heat pumps](#) (ASHPs) as an alternative source of preheat. ASHPs, particularly if powered by renewable electricity, offer significant efficiency gains and CO₂ emission reductions most of the year. Heat pumps have their [strengths and weaknesses](#), which is why Adveco stresses the need for a hybrid approach to draw the best from a variety of technologies working together in a cohesive system to optimise energy use, hot water output and operational costs. In this way, renewables such as ASHP and/or solar thermal are deployed to provide pre- and mid-heat hot water which is then topped up to the required +60°C for safe daily operation by either gas, or more preferably an electric boiler.

Additionally thought can be given to demand reduction measures, such as implementing water-saving measures like low-flow taps, showerheads, and aerators. It is also important to understand the value of promoting behavioural changes among staff and patients, encouraging shorter showers and responsible water usage.

Water heating is complex and inherently more costly, usually due to oversizing of systems, however these traditional capital investment costs are vanishing with the application of metering. And unlike space heating, there is no requirement to improve the building fabric, so you don't need to retrofit a surgery with improved insulation, draught-proofing, or invest new, more efficient ventilation systems. At least not right now. Moving forward these measures can significantly reduce heat loss and energy demands for space heating, but do not apply to hot water making upgrades relatively fast and painless.

Becoming sustainable in terms of hot water can literally be achieved overnight, with compact, low-emission systems such as Adveco's [FUSION electric water heaters](#) taking a matter of hours to install and be operational. This is a great way to begin engaging staff and stakeholders in a sustainability programme for a surgery. Engaging the staff is a critical element in making net zero a reality, real, overt improvement helps to educate and motivate staff on the importance of energy conservation and encourage participation in behavioural change initiatives. As part of a wider greener NHS, it also helps to share sustainability efforts with patients to foster community engagement and promote responsible healthcare practices.

Change comes with cost, both in terms of capital investment and operational costs. There is an overt opportunity to leverage government grants and financial incentives available for NHS organisations seeking to transition to net zero. Initiatives like the Salix Finance Green Loan Fund and the Public Sector Decarbonisation Scheme offer valuable support, but making your case for smaller projects can be difficult, this is why a metered project is so advantageous. For a very small investment, less than £1000, the data provides proof of concept and extremely cost-effective options that save thousands of pounds, all of which can help secure all important grant money to deliver a project.

As the process develops regularly tracking energy consumption and carbon footprint after implementing changes is recommended. This gives you the ability to compare against baselines and measure system progress against the theoretical modelling and so identify areas for further improvement. This is especially advantageous when communicating net zero achievements with stakeholders and through annual reports generating transparency to foster accountability and encourage learning within the wider NHS community. Remember, achieving net zero is a continuous journey, not a one-time destination. By starting with water heating, embracing broader sustainability measures, and actively engaging stakeholders, GP surgeries can play a pivotal role in building a more sustainable future for the NHS and healthier, more energy-efficient workplaces for both staff and patients.



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The image features the Adveco logo in green and white, with the text 'HOT WATER SPECIALISTS' below it. To the right is a diagram of a solar thermal system showing solar panels, storage cylinders, and a heat exchanger. The background is a light blue and green gradient with a sun icon on the left.

AIR SOURCE HEAT PUMPS & WATER HEATING IN COMMERCIAL BUILDINGS



With growing concerns over sustainability and energy efficiency, commercial buildings are increasingly looking for alternatives to traditional gas water heating. Air source heat pumps (ASHPs) have emerged as a promising option, offering potential benefits in terms of reduced carbon footprint, and improved reliability. However, like any technology, ASHPs come with limitations that need careful consideration before implementation in a commercial setting. Adveco considers the key advantages and limitations of ASHPs for hot water provision in commercial environments, aiming to provide a balanced perspective for informed decision-making.

Heat pumps for hot water generation, such as Adveco's FPI-32 or L70, work by extracting heat from the ambient air, utilising electricity to power the process. Compared to conventional electric resistance heaters, ASHPs can achieve significantly higher Coefficient of Performance (COP) values, translating to 3-4 times more energy output for every unit of energy input. This energy efficiency enables the ASHP to deliver equivalent heating for less input, and, since the unit utilises a renewable energy source – ambient air – carbon reductions are either minimised, or there may be no direct emissions during operation at all. This makes ASHPs an attractive option for businesses aiming to reduce their carbon footprint and align with sustainability goals.

The efficiency of ASHPs will decline as ambient air temperatures drop. The UK has a relatively mild climate, even winter extremes are unlikely to prevent operation as most ASHPs will operate as low as -25°C . The efficiency will fall though as the unit works harder to achieve the typically cited 30°C working flows required for domestic operation. In extreme cold then, supplemental heating sources would be needed to maintain desired hot water temperatures.

This is true of commercial applications in typical operation as the need for higher temperature working flow is a major safety requirement. To raise temperatures to the necessary $55\text{-}60^{\circ}\text{C}$ means working the ASHP much harder as overall efficiency drops off at higher temperatures. Working the ASHP harder consumes more electric energy, which in turn negatively impacts operating costs. Although more efficient than resistance heaters, ASHPs still rely on electricity to operate. Fluctuations in electricity prices or grid unreliability can affect operational costs and system performance. For those transitioning from gas-fired water heating to ASHP driven systems, failure to factor in the difference in cost between currently cheaper grid gas versus electricity (as much as 3.5 – 4 times the cost) can become a major operational issue.

For this reason, an ASHP is rarely the single response for commercial scenarios with very high hot water demand applications such as restaurants, hotels, schools, universities, care homes, hospitals or industrial facilities. Large and/or higher temperature ASHPs are available yet may still not be suitable for all commercial applications. Their cost may be prohibitive and, depending on the size and capacity, ASHPs might require dedicated space for installation, which could be a limitation in buildings with reduced space availability. As with any hot water application, actual usage data, especially peak demand, is critical for accurate sizing and a good way to gauge if an ASHP is the correct response for the building in question. In most cases hybrid systems combining ASHPs with preferably electric boilers, such as the ADVECO FUSION boiler systems, but also gas, as well as solar thermal as a source of mid-heating is going to be the preferred way forward. ASHPs are available in a wide range of sizes and configurations, allowing for flexible implementation in buildings of various sizes and hot water demands. Using the hybrid model, the ASHP is deployed to maximise the seasonal COP (SCOP) operating consistently at the greatest efficiency year-round to raise the water temperature to between $40\text{-}45^{\circ}\text{C}$. This is then passed into the system for topping up to the required 60°C minimum system temperature, by either the boiler or solar thermal and boiler combination. The ability to manage consistency of flow temperature, even when ambient temperatures drop, without driving the heat pump too hard is truly advantageous. Combined with a grid-connected boiler, such as Adveco's ARDENT, delivers a robust all-electric, lower-carbon applications that will meet and exceed most current building regulations. Increasing the number of ASHPs is also a relatively simple option, so long as the building has enough connected amperage to support installation, meaning adjusting capacity needs as circumstances change is still relatively straightforward.

The initial purchase and installation cost of heat pumps for hot water can be higher compared to conventional systems. This can be a barrier for businesses with limited upfront capital, so it is worth investigating financial incentives on offer from the government to encourage the adoption of renewable energy technologies. In the UK small businesses currently have access to the same funding support and consumers seeking to replace existing gas boilers with an ASHP. However, for the time being, most commercial organisations will need to factor in the additional costs associated with purchasing units. Commercial-scale water heating is inherently more complex and therefore more costly to initially invest in, but ASHPs are relatively quick and simple to install. Once in place, when compared to gas boilers or other fossil fuel-based systems, ASHPs have fewer moving parts and require less frequent maintenance. A system

based around an ASHP will therefore expect to demonstrate lower service costs and increased uptime for hot water delivery.

While ASHPs offer numerous advantages in terms of energy efficiency, environmental impact, and potentially long-term cost savings, their limitations need to be carefully assessed. Conducting a thorough feasibility study, considering specific operational parameters and available government incentives, is crucial before making a decision. By balancing the advantages and limitations of ASHPs against the specific needs of your commercial facility, you can determine if this technology represents the most sustainable and cost-effective solution for your hot water requirements.

Choosing the correct hot water heating application for a commercial environment requires careful consideration of various factors, including building type, hot water demand, climate, budget, and sustainability goals. Proper design, installation, and maintenance are crucial when optimising ASHP performance and maximising its benefits. Adveco, with more than 50 years of hot water design expertise, is here to help with consultation and can advise if ASHP technology or a hybrid mix of renewable technologies is the best resolution for your building project. Adveco's temporary metering service and system sizing can also help create a more accurate financial analysis for the lifecycle costs of ASHPs compared to any existing and other alternative technology, including upfront costs, operating expenses, and maintenance requirements. This can provide valuable insights for decision-making whilst organisations wait for further potential government incentives to come into force.

By carefully considering all factors and conducting a thorough assessment, businesses can leverage the advantages of heat pumps for hot water needs while mitigating potential limitations, contributing to a more sustainable and cost-effective future.

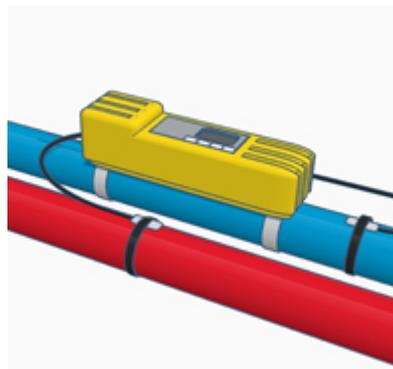
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Sustainable Hot Water



FUSION

Adveco's FUSION packaged electric water heaters offer a range of low-carbon, all-electric applications for commercial projects with a wide choice of pre-sized variants combining ARDENT electric boiler,



Live Metering

Data gathering, sizing and bespoke system recommendation for commercial properties intending to replace legacy gas systems. Live Metering supplies business-critical information to create 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

cylinder, ASHP, controls and immersions.

sustainable applications that are optimised to meet all hot water storage and delivery demands.

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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 2024. Unit 7 & 8 Armstrong Mall, Southwood Business Park, Farnborough, Hampshire, GU14 0NR