

ADVECO NEWSLETTER

Welcome to Advenco's September 2024 newsletter,

Net zero is clearly on the agenda for most UK organisations, but how quickly is adoption taking place in the commercial and public sectors? Advenco recently commissioned a research report, and the results have been eye-opening. We knew gas-fired systems form the traditional backbone of UK water heating, but the degree of inertia seen across multiple sectors for transitioning away from gas has been a surprise. Given much of the work we do is in the new build space we have been at the cutting edge of the move toward electrical water heating, but it is very apparent that retrofitting existing UK commercial building stock is a challenge that has, for the most part, been ignored by government in favour of addressing the needs of domestic properties. With that in mind, this month we also take a deep dive into the challenges of introducing electric water heating into buildings and provide some timely advice on the use of immersions and electric boilers for primary water heating.

Whether choosing to stay with gas or move to electric water heating, our expert sales team is on hand to advise and help you navigate the process. Sales, Service & Technical teams also took the rare opportunity to enjoy a warm summer's evening this month, to meet up and visit Advenco's new premises in Milton Keynes. The offices at The Pinnacle building form a hub for Internal Sales & Service and a central meeting point for our regional sales engineers. If you want to discuss projects with your regional representative their contact details can be found on the website [contact us pages...](#)



Bucking The Trend: Gas Water Heating & Net Zero



According to research conducted on behalf of Advenco into the adoption of low-carbon technology gas-fired applications continue to dominate the UK commercial landscape. Of the 2,800 commercial sites specifying new or refurbished hot water systems between 2019 and 2023, the research demonstrated 74% had committed to gas-fired appliances. Despite the introduction of a limitation on new gas grid connections for heating systems in 2022, gas remained the popular option throughout 2023 with installations rivalling and even exceeding numbers recorded in 2019 across major vertical sectors including education, healthcare and catering.

While new build focuses on electric water heating and heat pumps, the retrofit market has predominantly remained on gas, despite most locations (73%) stating commitments to net zero. When questioning consultants and contractors, heat pumps will always be specified for heating, but the majority stated heating and hot water in many cases are best left separate, which from a design perspective makes absolute sense.

While hybrid hot water systems are being specified for new build, for retrofit the majority of those questioned confirmed that while initially leaning toward heat pumps, they were encountering problems with costs, infrastructure and design. There were also concerns over European regulation changes on refrigerants, and the safety of propane units, also highlighted recently by the Building Engineering Services Association (BESA). As a result, specifications are being revised back to gas when connections are available. Reasons cited included gas being much simpler, familiar, and cost-effective to replace and run as electricity remains considerably more expensive than natural gas in the UK, at the time of writing, gas costs 5.48p per kWh (kilowatt hour), versus electricity, at 22.36p per kWh. A proportion of the refurbishment work recorded was driven by a need to replace ageing systems rather than actively addressing energy efficiency to reduce carbon emissions.

For commercial premises with an existing gas connection upgrading to new condensing gas-fired appliances remains an option without fear of breaching new building regulations until 2035. With expected working lifespans of at least 15 years for well-maintained water heaters that option takes many buildings well into the 2040s when the expectation is that the next generation of proven renewables or grid green gas (hydrogen) are likely to be more cost-effective alternatives. Given

expectations that approximately 70% of existing non-domestic building stock will still be in use by 2050, this exposes a major requirement for the government to clarify and invest in future energy sources to enable widescale, nationwide transition to low-carbon energy before 2050.

For businesses using gas and intending to refurbish hot water applications, Adveco offers comprehensive metering services to assess demands and generate advanced theoretical modelling to shape sustainability strategies and deliver a lower-cost transition to electric water heating.

For organisations with high, daily hot water demands, or site complexities such as a lack of external space which can curtail the use of heat pumps or solar thermal systems Adveco offers two ranges of direct-fired condensing water heaters – the AD and the ADplus for instantaneous demands. Both ranges provide a compact, floor-standing design that is easy to introduce into an existing plant room. High efficiency translates into 30% savings in fuel consumption, making it more cost-effective while reducing emissions. Both AD and ADplus exhibit ultra-low NO_x and CO emissions. 20% hydrogen-blend ready out of the box, the AD & ADplus can help bridge towards the next generation of more cost-effective sustainable technologies.

Those systems with gas as a primary energy source can still make commitments to net zero through the application of solar thermal as a source of pre-heat to offset at least 30% of annual energy demands. Between 2019 and 2023 the adoption of solar thermal exhibited consistent growth as recognition of its ability to actively cut operational costs of gas and electricity-based applications and reduce carbon emissions for faster return on investment has influenced its specification. On many accounts, solar thermal was perceived as the easiest and most effective way of offsetting existing gas-fired systems for active investment in measurable sustainability.

DISCOVER MORE ABOUT HIGH EFFICIENCY GAS WATER HEATERS

Electric Water Heating - The Pros and Cons For Commercial Sites



Electric water heating has quickly become the predominant choice for commercial new builds for specification, meeting the demands of Part L and securing necessary BREEAM points. For organisations currently reliant on gas for their water heating needs, the impetus is to look at alternatives as part of wider sustainability strategies, with electricity being an obvious choice. It is not; however, a black-and-white decision as electric water heating can present a range of advantages and pitfalls, each of which can significantly impact operational efficiency, cost, and overall effectiveness. Understanding these factors is crucial for making informed decisions about water heating applications, especially in pre-existing buildings.

Advantages of Electric Water Heating

Electric water heating offers some clear advantages, most notably they can be highly energy efficient, particularly when compared to traditional gas heaters. They convert almost all their electricity into heat, minimising energy waste. This efficiency can be particularly advantageous in commercial buildings where energy costs constitute a significant portion of operating expenses. Combined with precise temperature control, which is essential in commercial applications where specific water temperatures are required, consistent performance is ensured. It can improve the efficiency of operations in settings like restaurants, hotels, and healthcare facilities.

Electric water boilers can be extremely compact, lending themselves to installation in smaller and more restrictive spaces. This space-saving feature is particularly beneficial in commercial buildings where space is at a premium. Electric water heaters are also generally easier to install than their gas counterparts because they do not require venting or gas lines. This simplicity can reduce installation costs and time, making them an attractive option for both new construction and retrofits. Additionally, electric units often have fewer moving parts, leading to lower maintenance needs and costs over time.

With no risk of gas leaks, and no production of harmful combustion by products, such as nitrogen oxide or carbon monoxide, Electric water heaters pose fewer safety risks compared to gas water heating. This makes electric water heaters a safer choice for commercial buildings where safety regulations and concerns are paramount.

From a sustainability standpoint electric water heaters will be seen to be more environmentally friendly, especially when powered by renewable energy sources. Whilst the electricity grid cannot yet claim to be a net zero energy source, it is in the process of becoming decarbonised, so an electric system would be a means to future-proof a building's energy demands looking forward towards 2050. This alignment with green energy initiatives can help commercial buildings reduce their carbon footprint and meet sustainability goals.

And the Pitfalls of Electric Water Heating

While electric water heaters are generally easier and cheaper to install, high-quality, high-capacity electric units can have a higher initial cost than gas units. This initial investment can be a deterrent, especially for smaller businesses with limited capital, but the most significant disadvantage of electric water heaters is the potentially high operating costs. Electricity remains considerably more expensive than natural gas in the UK, at the time of writing, gas costs 5.48p per kWh (kilowatt hour), versus electricity, at 22.36p per kWh which can lead to substantial operating costs, especially in commercial buildings with high hot water demands. As we have observed, the overall efficiency and environmental impact of electric water heating depends on the source of the electricity. In the UK a notable proportion continues to be generated from fossil fuels (32% from gas versus 51% zero-carbon sources in 2023) so the environmental benefits are significantly reduced.

Of more concern is that electric water heating can place a significant additional load on a building's electrical system. In commercial settings with substantial electrical usage, adding high-demand electric water heaters can strain the system. From our experience, we are already seeing projects

adding extremely costly upgrades to electrical infrastructure as part of refit, something better hot water design could help avoid.

In terms of actual use, electric water heaters generally have slower recovery rates compared to gas water heaters. This means they take longer to heat water after the initial supply has been depleted. In commercial settings with continuous hot water needs, such as hotels or large office buildings, this slower recovery can be a drawback, necessitating either larger or additional units to meet demand, or if using an indirect electric boiler then a larger cylinder, in a similar way to heat pump driven systems.

Finally, water heating for commercial applications can have a significant impact on operations demanding robust and resilient 24/7/365 operation. If the electric water heating system is entirely dependent on the electrical grid should there be a power outage, these units will not function, leading to a lack of hot water. For businesses where a continuous hot water supply is critical, this dependency can pose a significant risk requiring additional emergency power supplies which will be extremely costly.

Considerations for the adoption of electric water heating in commercial properties

When considering electric water heating for commercial buildings, it is essential to weigh the specific advantages and pitfalls against the operational needs and constraints of the business. The key factors which should be considered are hot water demand, energy costs, infrastructure, environmental goals, Safety and Regulatory Compliance and backup.

If considering a transition to electric water heating start by assessing the volume and consistency of hot water demand. Talk to Advenco about metering hot water in your buildings as it is a low-cost activity that can pay dividends both in terms of capital investment and long-term operational costs. The data gained also helps when it comes to evaluating the local cost of electricity versus alternative fuels like natural gas. Businesses with high and constant hot water usage might find electric water heaters less suitable due to higher operational costs and slower recovery rates. However, for businesses with moderate or intermittent demand, electric units can be highly effective. If lower electricity costs or renewable energy sources are available, electric water heaters can still be cost-effective.

Modelling applications of real data is also critical when assessing and planning potential increases to the electrical infrastructure of a building. In our experience, significant upgrades specified to accommodate new electrical systems can be substantially pared back with better sizing and optimised design of electric water heating. If not, these costs, which are potentially very high in urbanised and city centre locations, must be factored into the decision.

For organisations with strong sustainability goals, or access to government funding for net zero projects electric water heating, powered by renewable energy sources, will align well with environmental initiatives, helping to reduce the overall carbon footprint and may in some circumstances offset cost concerns and help meet mandated investments in sustainable processes such as outlined in ESOS and SECR. Electric water heating may also offer advantages in terms of safety and compliance with local building codes and regulations, particularly in urban areas where gas installations might be restricted or pose additional risks.

In regions prone to power outages, it is essential to have a backup plan to ensure a continuous hot water supply. This might include battery backups or hybrid systems that combine electric and alternative heating sources such as solar thermal.

Electric water heating in commercial buildings offers a range of benefits, including energy efficiency, ease of installation and maintenance, safety, space efficiency, environmental impact, and precise

control. However, these advantages must be balanced against potential pitfalls such as high operating costs, load on the electrical system, slower recovery rates, dependence on the electrical grid, initial costs, and environmental considerations related to the energy source. By carefully evaluating these factors in the context of their specific operational needs and local conditions, commercial building operators can make informed decisions that optimise both efficiency and cost-effectiveness in their water heating as a first step towards a wider sustainability strategy for their buildings.

ELECTRIC WATER HEATERS

Electric Water Heating – Boiler Versus Immersion



Very often, as a business-critical service, domestic hot water (DHW) can also be one of the key contributors to carbon emissions from commercial buildings. As commercial organisations roll out their net zero strategy for the built estate, many are opting to transition to electricity as a means of heating water. This has led to an increase in the use of electrical immersions as a primary heat source, but this approach can have catastrophic results in terms of business continuity if the property is in a hard water area. For this reason, Advenco is advocating a move to electric boilers to ensure system resilience, ease of maintenance and avoidance of costly damage.

Physical, electromagnetic water conditioners do not provide sufficient protection. We've seen the evidence of this with organisations which have cut gas from their systems, transitioning to all-electric hot water with DHW buffers heated by immersions. Despite market-leading physical conditioners installed on both the cold inlet and secondary return, every site in hard water reported failures of immersions within four months to a year. Only a salt-based water softener will offer adequate protection, but there is a better, and more cost-effective way of addressing limescale, and that is to use an electric boiler instead.

By employing an indirect method of water heating and controlling temperatures the all too common problem of destructive limescale build-up can be effectively eliminated. Working in conjunction with an indirect cylinder to provide DHW in an effectively sealed 'primary loop', the expectation is for little to no scale build as the boiler recirculates the same finite amount of water through the heat exchanger. Key to this is maintaining a relatively low (80°C) temperature reducing heating intensity on surfaces that would otherwise accelerate scale formation. The use of an electric boiler supersedes an immersion because it comes complete with a range of controls which would otherwise need to be addressed via the building management system (BMS), which would require costly switchgear and an expert electrical contractor or BMS specialist.

Controls offer a variety of options, including soft start, soft stop; load sharing among internal heating elements, stepped modulation down to 33% of load; control of maximum flow temperature; control of kW output (downrating); overcurrent and overheat protection; weather compensation; plus, fault relay for alarm output to BMS. All of this helps to monitor and maintain the necessary consistency of water temperature and avoid points of high-intensity temperature.

Although an electric boiler will use a few extra Watts for a small pump, it will offer a heating efficiency identical to immersion heaters. However, as scale formation increases immersions will take longer to heat water meaning the boiler will offer greater efficiency over time. Also, as the electric boiler efficiency is not dependent on flow temperature, it can still provide high primary temperatures that give short cylinder reheat times and easily achieve the required temperatures for regular legionella purging. It is worth noting that the presence of limescale also provides a surface that can help promote legionella growth within the calorifier.

You could argue that immersions are easier, cheaper options, that is certainly true if you are installing a 12 kW immersion into a large tank, which will cost you £300 to £700 and, if well maintained, should last. However, if you are trying to add, for example, a 24 kW immersion to a smaller tank, then the complexity of that unit will see the pricing rise quickly to as much as £1500, plus the cylinder will require larger access which also comes at an additional cost. That is what you would also expect to pay for a 24 kW electric boiler, with all the advantages it brings.

With little to no scale build-up, an electric boiler system will exhibit increased reliability and improved response time, whereas immersions will take longer to heat water as scale formation increases around the element hampering its efficiency. The use of multiple heating elements within the boiler also avoids the single point of failure issue seen with immersions, providing built-in redundancy, and when balanced by controls for most efficient use will see system lifespan improve. With less need for descaling maintenance costs are reduced. Servicing is also easier as the boiler can be wall or cylinder-mounted on either side allowing for flexible installation clearance without the need to withdraw a long immersion heater. There is also no need to drain down the cylinder, which would otherwise interrupt water provision during maintenance or repair.

The use of direct electric immersions in hard water areas, even if the water is treated, will almost certainly lead to limescale build-up, which if left unchecked even for a few months can become an expensive or even catastrophic problem for commercial hot water systems. If it contributes to the development of Legionella, then it can also have serious health implications. Electric boilers on the other hand offer an EcoDesign-compliant, cost equivalent, simpler to control, ultimately more efficient to run, and easier to maintain system that has a greater lifespan. It should be the technology of choice for any organisation seeking to secure low-carbon DHW.

ARDENT ELECTRIC BOILERS FROM ADVECO



ADVECO
HOT WATER SPECIALISTS

FUSION

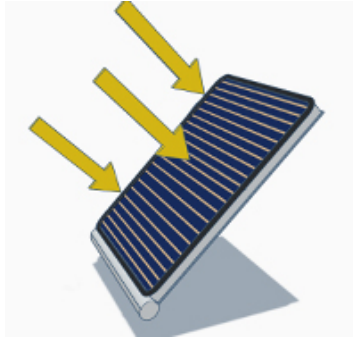
FUSION Pre-Size Electric Water Heating For Commercial Projects

- Optional integrated ASHP or specify for Solar Thermal preheat
- 9-35kW / 300-750 litre / 6kW backup immersion / 80 variants

HAR AWARDS 2023
HIGHLY COMMENDED 2023

FUSION PACKAGED ELECTRIC WATER HEATING

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.

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[2024 PRODUCT GUIDE](#)



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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