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Hospitals, healthcare facilities and the low-carbon hot water challenge

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Commercial heating and hot water solutions

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Introduction

by Rob Erwood
Specification and Sales Director, Commercial

One of the largest health systems in the world, with a vast estate, including hospitals, clinics, and other healthcare facilities, the NHS is a significant energy consumer, estimated to account for 4-5% of the UK's total carbon footprint[1].

The impacts of climate change represent one of the biggest public health challenges of this century, requiring health services to adapt in order to respond to new and increased health risks. As part of its commitment to tackling climate change, the NHS has set ambitious targets for reaching net zero from its directly controlled emissions by 2040, and the emissions it can influence by 2045. In so doing, it aims to become the world's first net zero national health service. Reducing carbon emissions from hot water generation is one of the areas identified for achieving this target.

The high hot water demand frequently associated with healthcare premises makes it a clear focus for reduction in associated energy use and emissions. But it's one that comes with certain challenges – from the scale of the estate to the huge variety of building types and hot water systems and the specific considerations relating to domestic hot water (DHW) provision in these hygiene-critical environments.

In this guide, we discuss the particular requirements for hot water in hospitals and healthcare buildings, the challenges for estates and facilities managers in delivering reliable, sanitary hot water with reduced emissions, and the opportunities for improving the energy efficiency of hot water systems across the NHS estate to drive down its carbon footprint.

1 https://www.england.nhs.uk/greenernhs/wp-content/uploads/sites/51/2022/07/B1728-delivering-a-net zero-nhs-july-2022.pdf

Background information

In the United Nations' Intergovernmental Panel on Climate Change (IPCC) latest report on climate change, the message from the scientists was unequivocal. The pace and scale of action must speed up if we are to halt climate change, and requires "rapid and deep and, in most cases, immediate greenhouse gas emissions reductions in all sectors this decade"[2]. This sentiment was echoed in a recent report[3] by the Climate Change Committee on the pace of the nation's adaptation to climate change.

The UK government set a target of achieving net zero emissions by 2050 (2045 in Scotland). The NHS has a more ambitious goal, committing to achieving carbon neutrality by 2040, a target that requires significant action to reduce energy consumption and carbon emissions. Reducing hot water generation is an essential part of this effort as hot water is one of the most energy-intensive processes in healthcare facilities.

On 1 July 2022, the NHS became the first-ever health system to embed net zero into legislation through the Health and Care Act 2022[4]. This places duties on NHS England, and all trusts, foundation trusts, and integrated care boards to contribute towards statutory emissions and environmental targets.

Why the earlier target? The health service accounts for 4-5% of the UK's total carbon footprint and the NHS in England is responsible for 40% of the public sector's emissions[5]. As such, it has an important role to play in reducing carbon emissions, and the impact from taking immediate action to cut emissions and improve the sustainability of its operations will be significant.

The NHS is also driven by its mission to improve the nation's wellbeing and become more resilient to manage the accelerating effects of climate change on public health. Nine out of the ten hottest years on record happened in the last decade, with almost 900 extra deaths[6] caused by the summer heatwaves of 2019, according to Public Health England.

The NHS believes that taking action to reduce carbon emissions would bring direct benefits to public health. Following a net zero pathway, it estimates, will see 5,770 lives saved per year from reductions in air pollution alone.

4-5%

of the UK's total carbon footprint is attributed to the health service

40%

of the public sector's emissions come from the NHS in England

900

extra deaths caused by the summer heatwaves of 2019

2 https://www.ipcc.ch/report/ar6/syr/resources/spm-headline-statements/
3 https://www.theccc.org.uk/2023/03/29/climate-change-has-arrived-yet-the-country-is-still-strikingly-unprepared/
4 https://www.legislation.gov.uk/ukpga/2022/31/contents/enacted
5 https://www.bma.org.uk/what-we-do/population-health/protecting-people-from-threats-to-health/more-support-needed-to-help-the-nhs-reach-net zero
6 https://www.theguardian.com/world/2020/jan/07/heatwaves-in-2019-led-to-almost-900-extra-deaths-in-england

World's first net zero national health service

The NHS has formally adopted two targets to achieve its ambition to become the world's first net zero national health service, set as the earliest possible credible dates to achieve net zero emissions.

The first, for the NHS Carbon Footprint (emissions under direct control of the NHS), is to achieve net zero by 2040, with an ambition for an interim 80% reduction by 2028-2032.

The second is for the NHS Carbon Footprint Plus, (including the NHS's wider supply chain), which sets a target for net zero by 2045, with an ambition for an interim 80% reduction by 2036-2039.

Net zero targets across the nations

NHS England

In February earlier this year, NHS England published its NHS Net Zero Building Standard[7], a technical document aimed at providing guidance to meet the commitments to deliver a net zero health service by 2045.

This document looks at managing whole-life carbon, noting the "Standard will apply to all investments in new buildings and upgrades to existing buildings that are subject to HM Treasury business case approval process and are at pre-strategic outline business case approval stage from 1 October 2023 onwards".

Whereas the 'Delivering a 'Net Zero' National Health Service'[8] report has set the following goals:

- Reduce directly controlled emissions (the NHS Carbon Footprint) by 80% by 2028 to 2032 and achieve net zero by 2040
- Reduce emissions it can influence (our NHS Carbon Footprint Plus) by 80% by 2036 to 2039 and achieve net zero by 2045.

NHS Scotland

NHS Scotland is aiming to become a net zero health service by 2040 at the latest, to play its part in tackling the climate crisis. As building energy use makes up the largest proportion of its greenhouse gas emissions, it has set the following goals:

- Reduce greenhouse gas emissions from its estate by at least 75% by 2030 compared to a 1990 baseline
- Use renewable heating systems by 2038 for all NHS-owned buildings
- Have net zero emissions for all of its buildings by 2040 or earlier where possible[9].

At the same time, the Scottish Government has an aim for all public sector buildings to use zero-emission heating by 2038. In light of this, NHS Scotland's new facilities must either be designed to use renewable heating systems from the outset or have a clear plan to do so by 2038 where a renewable heating system is not currently practicable.

7 https://www.england.nhs.uk/estates/nhs-net zero-building-standard/
8 https://www.england.nhs.uk/greenernhs/wp-content/uploads/sites/51/2020/10/delivering-a-net-zero-national-health-service.pdf
9 https://www.gov.scot/publications/nhs-scotland-climate-emergency-sustainability-strategy-2022-2026/pages/1/

NHS Wales

The NHS Wales Decarbonisation Strategic Delivery Plan published by the Carbon Trust sets out 46 initiatives for decarbonising NHS Wales. It includes the following commitments:

- Reduce carbon emissions by 16% by 2025, increasing to 34% between 2026 and 2030
- Ensure that every building has undergone an energy-efficient upgrade by 2030

And the following initiatives:

- Progress a transformational energy and water efficiency retrofit programme across the estate – every building with a long-term future will have undergone a multi-technology energy efficient upgrade by 2030
- Ensure all buildings have up-to-date, standardised building management systems (BMS)
- Integrate Modern Methods of Construction (MMC) into the design and construction of new buildings
- Prioritise low-carbon heating solutions as a key design principle. No fossil fuel combustion systems are to be installed as the primary heat source for new developments[10].

10 https://www.gov.wales/sites/default/files/publications/2021-03/nhs-wales-decarbonisation-strategic-delivery-plan-2021-2030-summary.pdf

Opportunities to reduce energy use in buildings

The NHS has reduced its carbon footprint considerably in the last 10 years, with an estimated 62% reduction in emissions from 1990 to 2020, and an approximate reduction of 26% in the wider Carbon Footprint Plus[11]. But clearly, considerably more work remains to be done.

Significant opportunities have been identified to reduce emissions from energy use in buildings, waste, and water, and to transition to new sources of heat generation. Given the high demand for hot water that is frequently associated with healthcare premises – from comfortable conditions and catering to in-house sterilisation and laundry – this service is a clear target for efficiency improvement and emissions reduction. But it's one that comes with certain challenges for NHS estates and facilities managers.

An estimated

62%

reduction in emissions in the NHS

1990-2020

11 https://www.england.nhs.uk/greenernhs/wp-content/uploads/sites/51/2022/07/B1728-delivering-a-net zero-nhs-july-2022.pdf

Unique requirements

In no other environment is access to an efficient and sanitary supply of water more important than healthcare. Ensuring an adequate, reliable hot water supply is key to the whole operation, creating comfortable conditions for patients and staff and maintaining clinical standards, as well as being essential for treatment purposes.

Hospital hot water distribution systems are highly complex. The design and function of the systems must ensure that water is adequately stored, cycled and distributed to prevent a build-up of harmful bacteria. Preventing the risk of bacterial build-up (mostly related to the control of legionella bacteria in water systems) is of particular concern due to the ability of a large number of different microorganisms, biotoxins and other contaminants to cultivate in water.

The Health and Safety Executive (HSE) advises that hot water should be stored at at least 60°C and distributed so that it reaches 55°C at point of use in healthcare premises to reduce the risk of legionella.[12]

Associated with this is the need to avoid the risk of scalding and burns, particularly for the protection of vulnerable patients. Temperature control will need to be provided at hot water outlets used by persons at risk of being scalded.

The British Health Technical Memorandum (HTM) 04-01[13] (SHTM 04-01 in Scotland and WHTM 04-01 in Wales) sets out best practice to keep hospital water supplies in a safe, clean and hygienic condition.

Further statutory guidance to support hospital trusts in achieving the net zero ambition is set out in the Delivering a Net Zero National Health Service[14] report.

Best practice guidance helps stakeholders – including estates and facilities managers, suppliers and NHS management – to mitigate the risks associated with the large, complex systems found across UK hospitals, clinics and surgeries.

12 https://www.hse.gov.uk/legionnaires/hot-and-cold.htm
13 https://www.england.nhs.uk/publication/safe-water-in-healthcare-premises-htm-04-01/
14 https://www.england.nhs.uk/greenernhs/wp-content/uploads/sites/51/2022/07/B1728-delivering-a-net zero-nhs-july-2022.pdf

The scale of the challenge

The vast scale of the NHS estate, the diversity of buildings and the differing heating systems within the NHS estate add to the complexity of the challenge.

Certainly, new hospitals and NHS buildings will be designed to require less heat for operational use and optimised for a decarbonised electricity grid. In buildings like these, a fully electric approach to DHW based around renewable solutions, such as heat pumps and direct-fired electric water heaters, is likely to be the favoured approach.

However, these new hospitals are just the tip of the iceberg, accounting for less than a fifth of the secondary NHS care estate. It's the older stock that is the real challenge.

New hopitals account for less than

20%

of the secondary NHS care estate

The reality is that transitioning a huge hospital premises from gas-powered steam or high-temperature water heating systems to a low-carbon solution can be a hugely complex task for estates and facilities managers.

The same applies to the primary care estate with its 7,000 GP practices in England, spread across 9,000 buildings, many of which currently rely on high-temperature heating systems for heating and hot water provision. Moving to a low-carbon system is likely to require careful planning and budgeting – as well as support from heat experts.

Identifying the financially and technically feasible opportunities to drive down emissions from DHW in these buildings can be daunting. But while there can be no silver bullet solution, there are numerous opportunities to achieve more sustainable, energy-efficient hot water generation across healthcare premises. The focus should be on reducing operational energy usage and increasing renewable energy supply where possible, all the while prioritising safe water. With this in mind, let's explore some of the options.

Reduce energy usage

The first step should always be to identify and act immediately on any opportunities to reduce energy demand. Energy efficiency is critical because it lowers energy consumption and associated emissions and costs. The cleanest and cheapest kWh of energy is, after all, the one we don't use.

Where hot water is concerned, quick wins might include switching to low-volume shower heads and taps to reduce water and energy usage or adding lagging to pipework to reduce heat losses.

In buildings where a central boiler plant and calorifier provide both heating and hot water, separating out the hot water is advisable to avoid unnecessary energy use. Heating is typically only required from autumn through to spring and is needed constantly while the building is occupied. Hot water is an annual requirement and required each day the building is in use. However, there are peaks and troughs in demand for hot water throughout the day.

For this reason, it is senseless to generate these two very different requirements from a single source. Having dedicated plant for each means that the chosen technology can be sized more closely and, therefore, accurately to meet the specific requirements for each building. This makes more effective use of energy and opens up the ability to site direct electric or direct gas-fired hot water equipment at – or very close to – point of use.

Another option to improve energy efficiency might be to upgrade any non-condensing direct-fired water heaters to more energy-efficient Andrews Water Heaters condensing units like the MAXXflo EVO to drive down energy consumption and emissions. Condensing units are on average up to 20% more efficient than their non-condensing counterparts and can be a viable option as an early stage on the road to net zero if budgets are tight and the building isn't ready for net zero technology.

Heat pumps

For the larger task of replacing the heating system, air source heat pumps (ASHP) are widely viewed as one of the favoured technologies to decarbonise heating and hot water across the NHS estate. We are pleased to offer both low and high-temperature heat pumps in the near future as part of our Remeha ASHP range.

Using refrigerant technology to heat domestic hot water is an attractive proposition for reducing associated emissions as the potential efficiency of air source heat pumps can be up to 400% in many cases. This means that for every 1kWh of electricity used to run the heat pump, you get up to 4kWh of heat output. Certainly, in newer buildings, heat pumps will play a key role in achieving low-carbon hot water.

But it can be more challenging to make older hospitals benefit from an ASHP solution. Converting large existing hospitals that use gas-powered steam or high-temperature water heating systems to a low-carbon solution, for example, will typically need to be carried out in several stages.

Available space, time and budget will be some of the factors that should be considered at the outset. The electrical capacity of the site will be a further consideration when switching to electrical heat, especially where EV charging points are in place.

Putting a clear roadmap in place – identifying the overarching goals, the available time to complete the work, the budget and any funding opportunities – will make it possible to plan out and design the various stages of work. As an experienced manufacturer with hot water expertise, we at Baxi can advise on the available options as well as the latest technologies and designs to help trusts plot the most appropriate decarbonisation pathway for their individual estates.

High and low-temperature heat pumps

When considering DHW generation, there are a number of ways in which ASHPs can be used.

Let's consider possible ASHPs design strategies using different types of heat pumps – low temperature and high temperature.

Low-temperature ASHPs can be used with direct electric or direct gas-fired solutions to raise the DHW to safe temperatures. The direct electric approach, using direct electric cylinders such as the Megaflo, with capacities of up to 2500l, and Megaflo Flexistor, with options up to 2500l in both 6 bar and 10 bar, is more likely to be the option of choice. But this would involve higher volumes of stored DHW – certainly compared with low-storage direct gas-fired water heaters which the building may previously have relied on. [See Fig 1]

If considering this solution, it's important to give thought to potential issues relating to available space and weight for the larger cylinders – particularly when dealing with rooftop or non-basement plant rooms. The possible presence of legionella within the larger volumes of stored water will also need to be carefully monitored and managed.

High temperature ASHPs like our new Remeha Effenca range coming soon are capable of delivering the high flow temperature required to meet the design temperature for sanitary hot water. The advantage of using High Temperature heat pumps is that it avoids the need for an alternative form of technology to store the DHW above legionella temperatures (60°C or higher). This makes it a truly low-to-zero carbon solution.

This option also offers greater design flexibility and requires less space, for a much simpler design and easier installation. However, it should be noted that the coefficiency of performance of heat pumps falls off at higher temperatures, affecting the real-world efficiency and subsequently operating costs.

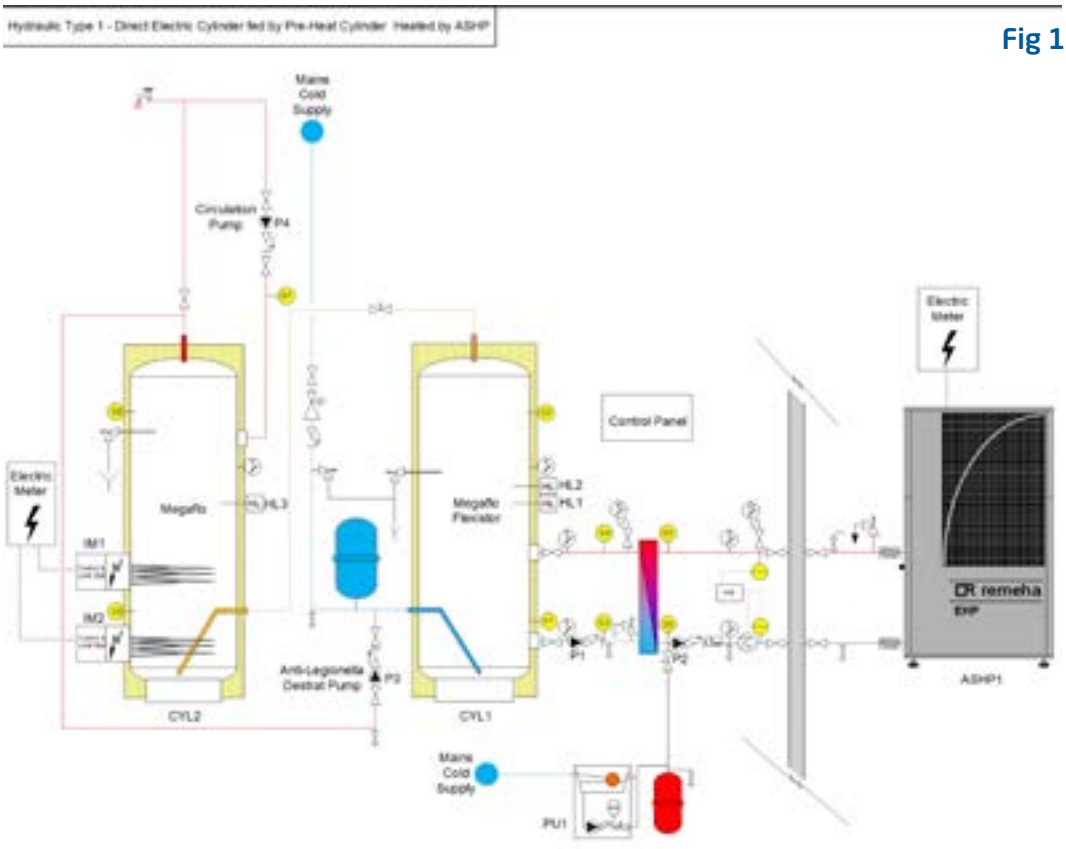


Fig 1

Hybrid approach

The low-carbon credentials of heat pumps are well established in new build and some existing buildings, but capital expenditure and operating costs may influence the design strategy decision when dealing with older NHS buildings. While the aim of the NHS is to transition to zero carbon technologies, full decarbonisation could take some time to achieve. So, for practical reasons, a balance may need to be struck to meet the year-round requirements for reliable, efficient, sanitary hot water.

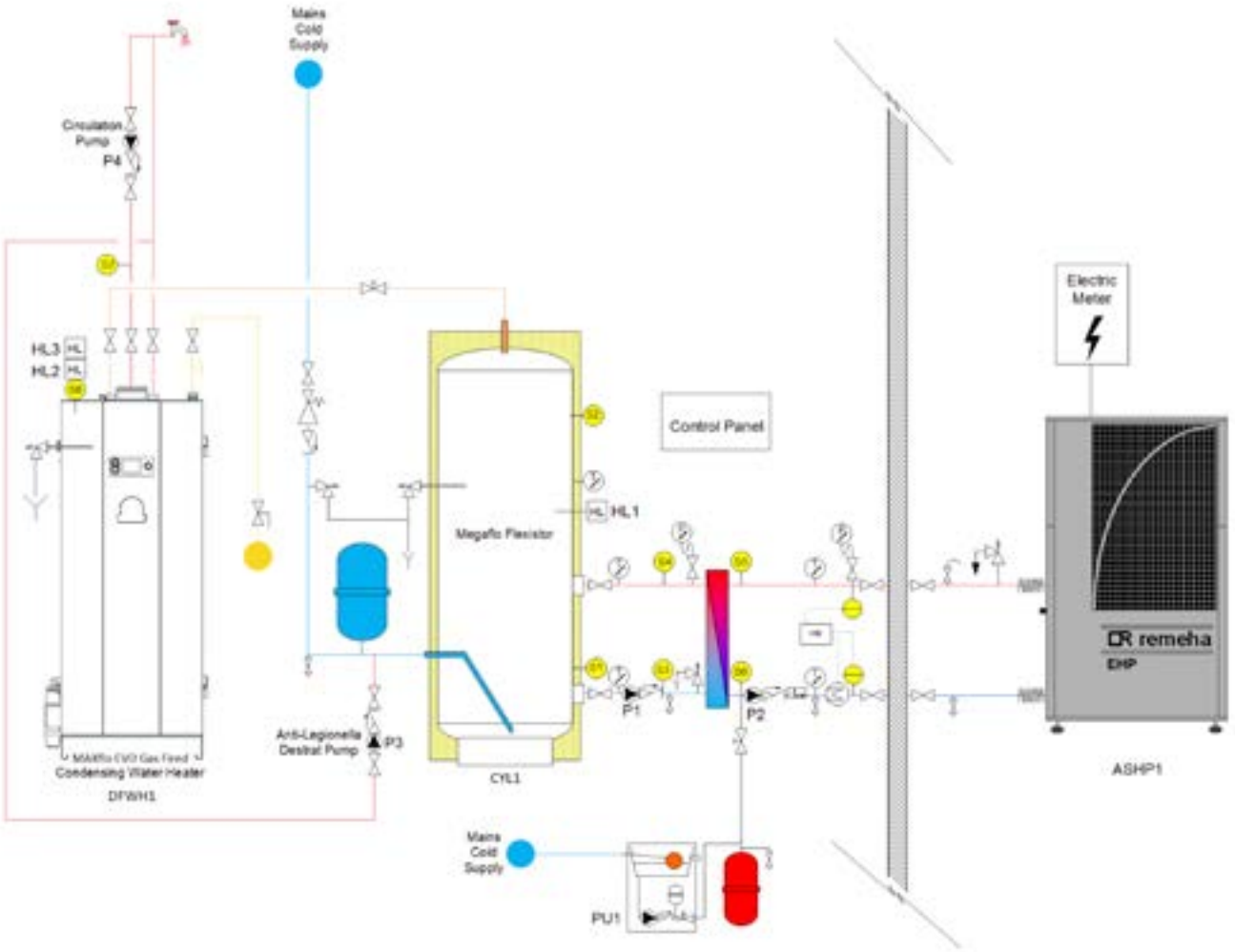
On projects where an all-electric solution is not considered suitable, a hybrid approach to hot water generation using two energy sources should not be overlooked as an important step on the net zero path. With refurbishment projects, for example, where the natural gas supply might be maintained, there is the opportunity to use ASHPs to preheat direct gas-fired water heaters (DGFWH). [See Fig 2]

Integrating ASHPs and DGFWHs in a hybrid system can provide a practical solution to the project limitations previously described, while meeting hot water demand more sustainably and making significant progress towards decarbonisation.

In time, the remaining natural gas use can be cut by using renewable gases. In this way this approach offers a practical opportunity for important immediate efficiency gains and emission reduction in older NHS buildings.

Hydraulic Type 2 - MAXXflo EVO gas fired Fired Water Heater fed by Pre-Heat Cylinder Heated by ASHP

Fig 2



From a design perspective, there are advantages to be gained from using high-efficiency DGFWHs over indirect DHW systems (boiler calorifiers) and direct electric systems – storage, for one. DGFWHs have greatly reduced storage compared with other systems, which means less weight – and fewer issues if being sited within rooftop plant rooms. Importantly, energy usage is also reduced, along with associated emissions, as there is less water to maintain at temperature.

Legionella is another case in point. Some DGFWHs like the Andrews Water Heaters MAXXflo Evo come with in-built anti-legionella functions as standard, making control of legionella far more straightforward, reducing maintenance time for facilities managers. Those DGFWHs with smart return temperature sensor technology have the ability to provide further energy and emission savings by reducing the time required to complete the pasteurisation process.

As a final point, it is generally accepted that where a design includes renewable technology, such as heat pumps, project costs are higher.

Offsite solutions

Whether planning to install a complete plant room to serve a new build hospital, or refurbish the hot water heating system in an existing building, it's worth exploring the use of offsite solutions.

Prefabrication makes everything easier – installation is faster and simpler, onsite time and labour is reduced, health and safety is improved, and quality assurance is enhanced.

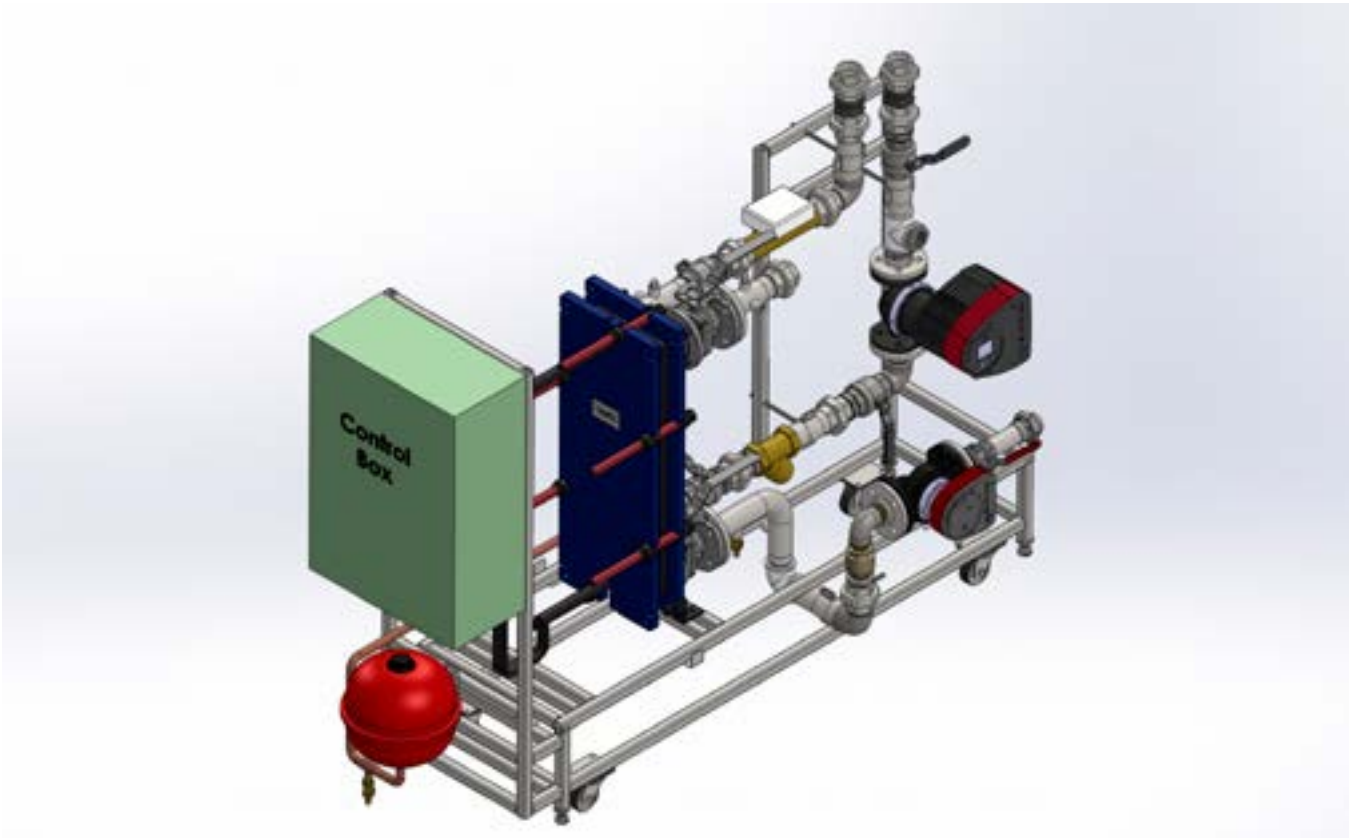
How can the offsite technique be applied for DHW solutions? The options range from the largest containerised plant rooms to prefabricated modules that are purpose-designed to provide a high-quality plug-and-play solution.

For example, if planning on integrating ASHPs in the next phase of the refurbishment project, now's a good time to consider using a bespoke, offsite prefabricated interface unit between the heat pump and cylinder or DGFWH technologies. This could integrate a specially sized plate heat exchanger (PHE), pumps and control panel, all bespoke to meet the specific project requirements.

Each prefabricated module is typically designed using BIM tools and 3D computer-aided design (CAD) modelling. This enables revisions to be made collectively while supporting best practice in design, installation, operation and maintenance.

Once the design has been agreed, production takes place in a quality-controlled factory environment. Thanks to the use of specialist machinery, improved control procedures and comprehensive end-of-line testing, the highest build quality can be achieved with offsite solutions. An additional benefit is that offsite fabrication has the potential to reduce waste, leading to a lower environmental impact.

When production is complete, the compact, wheeled interface unit is delivered to site for rapid connection, saving time, hassle and space.



CASE STUDY

Pioneering with packaged plant rooms

One Scottish NHS trust is pioneering a flexible approach to meet a whole series of requirements related to heating refurbishment. NHS Greater Glasgow and Clyde is successfully using a packaged plant room to minimise disruption, improve health and safety, maintain continuity of service and make progress towards its climate goals.

When the existing boiler plant serving the Maternity Unit at the Queen Elizabeth University Hospital needed replacing, there were a number of concerns, from improving the efficiency of the heating system to asbestos considerations. As a master plan for the overall site, potentially including future connection to a district heating system, was already in development, the solution also needed to be future-proof.

Baxi Packaged Solutions was selected by project consultant Craig Gallacher at WGM Consulting Engineers to design and build the externally sited packaged plant room. This contains three Remeha Gas 620 Ace boilers with a total output of 3,600 kW to provide the required high-output space heating, complete with all pipework, an air/dirt separator and a dosing pot, along with power and lighting via a small distribution board.

The plant room is designed to connect to a new low-loss header and plate heat exchangers in the main building and provides sufficient space to accommodate this equipment if required at a future date. As the container will last for 20 to 25 years, there is an opportunity to use it for other sites, meaning that the intermediate solution for the maternity unit is not wasted.

The NHS estates team said:

> “From patient care, safety and continuity of services, through to retrofitting new, sustainable plant into existing buildings and systems, the complexities can be overwhelming. This plant room solution covers everything from the immediate needs of the building as well as wider board views, giving us the flexibility to develop the existing estate in line with the overall NHS net zero values and targets.”

Point-of-use electric water heaters

A further opportunity to reduce emissions from hot water in hospitals and GP surgeries is to use point-of-use water heaters to provide safe hot water.

Point-of-use electric water heaters like the Heatrae Sadia Multipoint range can provide an efficient option in areas like washrooms or kitchens, as they only use energy when hot water is required. The broad output of the range, with both horizontal and vertical models, means the unit can be perfectly suited for any area from a low-demand 1-3 outlets right the way up to high-demand kitchens and washrooms. Installing a point-of-use water heater like this advanced range, that incorporates anti-legionella functionality, water pasteurisation and anti-tamper design, will ensure that water is adequately stored, cycled and distributed.

Infection prevention

As hygiene-critical environments, it is vital that hospitals prevent bacterial build-up and cross-contamination. The UK Health Security Agency (UKHSA) recently highlighted the work it is doing to help hospitals to prevent the spread of infections[15]. Working with hospitals and academic partners, UKHSA is attempting to gain a better understanding of how infections spread in different environments, which is key to reducing their spread, preventing outbreaks and keeping the public safe.

Technology is already available to help deal with this. Good hot water heaters like the Heatrae Sadia Supreme, for example, incorporate antibacterial silver ion agents to prevent the growth of bacteria. Silver ions work by puncturing holes in bacterial membranes and binding of essential cell components like DNA, preventing basic reproductive functions from occurring. However, it should be noted that concentration of silver should not exceed the recommendations set out in HTM 04-01 guidance. Whats more, products like the Heatrae Sadia Supreme provide instant boiling water when and where it is needed and includes features such as the Intelliboil™ Plus technology which ensures energy efficient management of the boiling cycle, bringing the water to boil on demand; if there is no use for an hour, it reduces the temperature down by 10°C, which saves energy until the unit is used again.

Combining this technology with pasteurisation will inhibit cultures from developing. Clinically focused equipment should also have anti-corrosion fonts to prevent contamination from chemical breakdown of metal parts. This helps keep the surfaces clean and hygienic and reduces the risk of cross-contamination.

15 https://ukhsa.blog.gov.uk/2023/03/15/using-science-to-design-out-healthcare-associated-infections/

Water quality

Implementing a robust water treatment strategy should be a key part of the maintenance programme to ensure efficient operation of equipment and help extend the lifetime of products.

Water quality can differ across the UK. Selecting products with polycarbonate tanks, for example, will limit the amount of scale that builds up in a unit, while suitable water treatment will raise the quality of water supplied in a hospital. This is especially important for the majority of south, east and central England where water is hard to very hard.

Water treatment is also identified as another effective method of bacteria control. This is a specialism in its own right, and we would advise consulting with specialist water treatment companies.

Maintenance

Treating water is only one part of the process. Ongoing maintenance of the hot water system is also crucial to ensure that all the above criteria are continuously met.

As prolonged disruption to a hospital's water supply must be avoided, another consideration should be to install products that are designed for easy maintenance. Examples include equipment with built-in inspection hatches, multiple immersion elements or multiple gas engine modules that keep maintenance times to a minimum and can offer inbuilt redundancy. This will free up time and stop unnecessary expense.

Choosing robust products that are designed for easy upkeep and built to last will also help avoid unnecessary time and expense related to maintenance.

Plotting pathways

In conclusion, when it comes to hot water, there are challenges and opportunities associated with improving energy efficiency in hospital and healthcare buildings.

Improving the energy efficiency of a hot water system will reduce energy demand and associated emissions and costs while improving its operational performance for better outcomes for patients and staff. Quick wins to reduce energy demand such as pipework lagging should be acted on now. Upgrading any inefficient equipment with more energy-efficient technology might be an appropriate early stage in the decarbonisation journey. Using renewable and low-to-zero carbon technologies will further support the NHS in reducing its carbon footprint but are likely to require thorough planning.

As each project and building type will have its own particular requirements, estates and facilities managers will benefit from advice and support to enable them to plan their own unique roadmap to the energy transition. The route they choose will depend on many factors, including costs, available space and electrical power and reliability.

A number of guidance documents are available, but due to the complexity of the challenge, it's advisable to consult with specialists. Your manufacturer of choice should be willing to make available their experience and expertise, not just on their specific products but also with regard to the legislation and guidance around this subject.

As hot water experts, we at Baxi understand the requirements and, with an encyclopaedic knowledge of the latest technologies and techniques, are able to recommend the most appropriate solution.

Guidance documents

Technical guidance is available to support NHS estates and facilities managers in creating sustainable, energy-efficient buildings that meet the needs of patients now and in the future.

These documents include:

Delivering a Net Zero Health Service[16]

Health Technical Memorandum (HTM)[17]

NHS Net Zero Building Standard[18]

16 https://www.england.nhs.uk/greenernhs/wp-content/uploads/sites/51/2022/07/B1728-delivering-a-net zero-nhs-july-2022.pdf
17 https://www.england.nhs.uk/publication/safe-water-in-healthcare-premises-htm-04-01/
18 https://www.england.nhs.uk/wp-content/uploads/2023/02/B1697-NHS-Net zero-Building-Standards-Feb-2023.pdf

Modern products to answer your heating and hot water challenges

Areas to consider	Solution	Baxi Commercial Solutions Products
Flues and ventilation		
• New flue will be required if switching to a condensing boiler or water heater from non-condensing products • Siting of air source heat pump or low NOx boiler and ensure the required ventilation/space is available.	Talk to your expert technical sales team early in the project – they can help find the right solution	Room sealed flue/conventional flue headers provided as options
Accessibility		
• Ceiling heights • Floor space for maintenance • Doorway and stairway sizes • Siting of air source heat pump	Prefabricated rigs; wall-hung boilers; integrated castor wheels for boilers; offsite prefabricated plant rooms; air source heat pumps; point of use hot water products generate hot water at site rather than in plant room	Comprehensive boiler range, cascade and bespoke rigs offered as space-saving solution, prefabricated plant rooms can be sited away from existing plant room. Multipoint, Multipoint ECO and Supreme
Time constraints		
• Always-on plant room requirement • Phased projects • Projects requiring minimal disruption	Prefabricated rigs and plant rooms	Complete packaged plant room design and manufacture
Sizing		
• Do not assume current heating and hot water sizing is correct • Calculate heating and hot water loads accurately • Avoid over-sizing	Air source heat pumps, hybrid systems and condensing boilers; cascade approach; wide modulation; separate water heaters; plate heat exchangers	Remeha high, mid and low temperature air source heat pumps, Andrews Water Heaters Size-It software, PHE sizing

Areas to consider	Solution	Baxi Commercial Solutions Products
Water condition		
• Is pipework also being refurbished? If not, consider separating systems • Encourage cleaning of hydronic systems	Plate heat exchangers; hydronic system separation; separate water heaters; low-loss headers; point of use hot water generation	Plate Heat Exchanger/ Low Loss Header (Air Dirt Separator) available as standard, point of use products
Controls		
• Vital for energy-efficient operation • Smart kit offers built-in controls and remote monitoring potential • Hybrid controls for both ASHP and gas technology heating and hot water solutions	TRVs; modern boilers with built-in controls	Range of sequencing and weather compensation controllers available
Air quality and environment		
• Location • Consider air source heat pumps, point of use and low-NOx solutions • Does the property have consistent heating and electricity requirements?	Air source heat pumps combined with condensing boilers or water heaters, point of use hot water generation	Remeha high, mid and low temperature air source heat pumps, range of boilers with NOx emissions as low as 16mg, Multipoint, Multipoint ECO and Supreme

Get in Touch

Our expert teams have specialist product, technical and legislative knowledge that means we can identify and deliver a solution based on each individual building and bespoke to its requirements.

We know our products and how to optimise their performance. So consult with us early and potentially save time and fees in producing a holistic design that achieves premium performance and savings.

T: 0345 070 1055 baxi.co.uk/united

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baxi.co.uk/knowledge-centre

Baxi
Brooks House
Coventry Road
Warwick
CV34 4LL

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with company number 03879156 and registered office address:
Brooks House, Coventry Road, Warwick, CV34 4LL.
VAT registration number is 604665837.

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