



## HULL UNIVERSITY TEACHING HOSPITALS SAVE ENERGY AND CUT EMISSIONS WITH INNOVATIVE HEAT PUMP SYSTEM



**ICS Cool Energy** multi-pipe chillers and heat pumps took over from the hospital's gas boilers, reducing heating system's gas consumption by almost

**69%** in first five months of operations, and help **Hull Hospitals** on their way to **carbon neutrality.**

### THE CHALLENGE

---

For the hospital, maintaining the right temperature, humidity, and air quality is essential to ensure comfortable and healthy conditions for patients' care and staff's comfort all day and night. Sanitary hot water is just as vital for cleaning and hygiene in a hospital environment.

Hull University Teaching Hospitals (HUTH) NHS Trust was looking for the best way to retrofit and decarbonise their heating system with the latest heat pump and multi-pipe chiller technologies.

The existing heating plant serving two wards, office areas and seven operating theatres in the Hull Royal Infirmary, was based on 650kW gas boilers, and designed for a return hot water temperature of 80°C. This temperature range was also one of the main requirements for the new, environmentally friendlier technology.

## THE SOLUTION

**Philip Ayres, Regional Sales Manager at ICS Cool Energy:**  
"Over the last few years, innovation in cooling and heating has progressed immensely. Today's technologies offer significant environmental and energy benefits, compared to the ones that they are designed to replace like the fossil-fuelled heating. When Hull Hospitals approached ICS Cool Energy to retrofit their existing heating system, we knew we have the right solutions to ensure the low-carbon heat so critical for the hospital wards and theatres".

**James Watts, Engineering Project Manager at Hull University Teaching Hospitals NHS Trust:**  
"We discussed our requirements with several installation companies, and they were all saying it wouldn't be possible to retrofit the system using heat pumps. The team at ICS Cool Energy proved them wrong. ICS clearly explained the benefits of electrifying our heating, which involved adding a cascade system with the i-FH heat pump and a multi-pipe chiller unit to our existing installation".

The Hull Royal Infirmary's new heating system is based on an ICS Cool Energy multi-pipe Aptus chiller and an i-FH heat pump set to take over from gas-fired boilers.

The installed ICS Cool Energy Aptus multi-pipe unit can offer simultaneously up to 574kW of cooling and 695kW of heating, allowing the shift from a separate boiler and chiller to one single unit, reducing both operational costs and saving on energy. Featuring two completely independent water circuits, the units ensure precise temperature control for both leaving chilled and hot water. For the production of hot water, the units use renewable and recovered energy, and can replace the existing fossil-fuel boiler and chiller system to deliver both cooling and heating for the building with no direct greenhouse gas emissions.

To boost the hot water temperature to the 80°C levels desired by the hospital, the multi-pipe chiller was paired with the 429kW i-FH water-to-water heat pump. The i-FH can deliver hot water between 50°C and 80°C, with source temperatures from +5°C to +30°C, offering a unique opportunity to move to renewable energy heating.

The installation and leading pipework for this project proved to be an engineeringly complex task, requiring changes to the infrastructure and integration of the hospital's chilled water and heat systems. Two of the old chillers were removed and the gas-boilers were temporarily kept for emergency. The hospitals' Building Management System (BMS) was programmed to efficiently manage the old and new elements of the cooling and heating systems.



"We discussed our requirements with several installation companies, and they were all saying it wouldn't be possible to retrofit the system using heat pumps. The team at ICS Cool Energy proved them wrong. ICS clearly explained the benefits of electrifying our heating, which involved adding a cascade system with the i-FH heat pump and a multi-pipe chiller unit to our existing installation".

**James Watts, Engineering Project Manager at Hull University Teaching Hospitals NHS Trust**

## THE RESULTS

---

Since being commissioned in October 2022, the new system has practically taken over the full heating load with the boilers kicking in just sporadically. In the first five months of operations, the average gas consumption dropped by almost 69%, reaching a record low of 40,748 kWh in February 2023 – compared to over 221,594 kWh in February 2022.

**Alex Best, Head of Capital at Hull University Teaching Hospitals NHS Trust:**

“This project and the significant progress in our decarbonisation efforts have been made possible thanks to the government grants received by the Trust. The decarbonisation aspect of the project is further reinforced, as we use the electric power coming from our solar plant to power for the cooling and heating units”.

The hospitals’ decarbonisation of heating project involving switching from gas fired boilers to renewable sources of heating is part of their ambitious Zero30 commitment to be carbon neutral by 2030. Their efforts to use sustainable technologies in buildings have been recognised many times by the industry, including winning the ‘Sustainable Achievement Award’ from the Institute of Healthcare Engineering and Estates Management (IHEEM) in 2021.

**Alex Best, Head of Capital at Hull University Teaching Hospitals NHS Trust:**

Our efforts put us among the greenest hospitals in the UK and we are aiming to become one of the first hospital trusts in England to reach zero carbon emissions by 2030, up to 15 years earlier than the targets set by the Department of Health. The Trust has already made some significant progress towards this goal. Our project with ICS Cool Energy and the replacement of gas boilers with heat pumps is an important milestone in our journey. We also created a solar farm of 11,000 panels, which currently generates enough power to meet the daytime needs of the entire hospital site.”

**Philip Ayres, Regional Sales Manager at ICS Cool Energy:**

“The ICS Cool Energy i-FH and multi-pipe units are an example of product development that can create a sustainable heating sector, contribute to mitigating climate change and massively reducing buildings’ and processes’ carbon footprint. It is uplifting to work together with partners like Hull Hospitals, and together put sustainability front and centre, demonstrating the capabilities of the new technologies”.



Date code: 04/23

Our International Offices: England and Wales: 0800 774 7426 | Ireland: 04692 52934 | Scotland: 01698 7445 40 | France: 01 60 66 80 83  
Germany: 0800 0116 0117 | Netherlands: 088 258 2580 | Belgium: 0800 29 110 | Austria: 01236 81 73 | Switzerland: 055 505 66 22

 UK HIRE & SERVICE: 0800 840 4210  
UK SALES: 0800 774 7426

ICSCOOLENERGY.COM