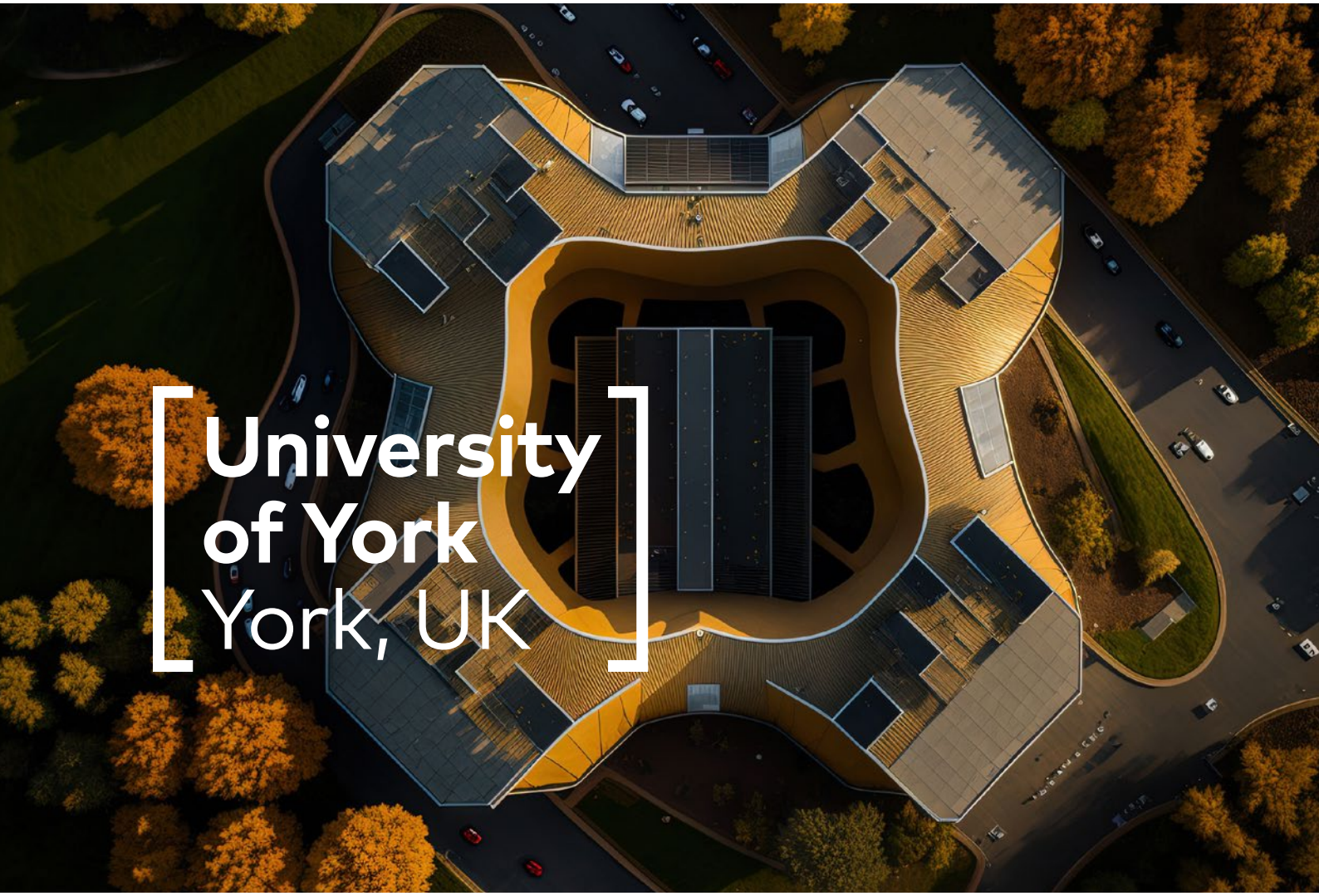
IMI Hydronic Engineering



University of York
York, UK

Project Type: Public Building Renovation

Location: York, United Kingdom

Products used: TA-Scope, IMI TA PICV

Breakthrough Engineering

The Project

The University of York's Biology department conducted an extensive renovation project to improve the cooling system's efficiency. The proposal was to optimise the chilled water network supplying the existing chillers, cooling a comprehensive range of buildings and critical lab space. The project's primary goal was to increase energy efficiency while addressing the research labs' inability to reach the required indoor temperature during summer.
The project was delivered in two phases spanning over about a year.

The Hydronic Challenge

The original system struggled to deal with cooling loads at peak demand due to the oversized three-port control valves at the chillers and insufficient differential pressure control within the piping network. Too much water was passing around the bypass circuits at the chillers nearest the pumps, which meant that some circuits could not receive the required load during summer months, even though the chiller units had the capacity to deliver.

Under the current design of variable volume conditions using PICVs, each circuit had no bypass capability to serve minimum pump turndown. This led to pumps acting against closed circuits, potentially causing them to malfunction and eventually fail. Finally, the system needed to be appropriately balanced.

The Solution

The IMI Hydronic Engineering technical team analysed the hydronic network and, working closely with the University of York's Estates Department, identified all the challenges mentioned above. IMI HE's engineering services drew up the schedules based on these initial findings.

The team first provided the training and support needed to re-commission the valves and actuators. Once the training was completed, engineers from The University of York Estates team and the installation contractors could commission the system using the TA-Scope measuring device. During this process, the team was also able to identify and size the remaining PICVs required for the renovation.

The primary and secondary pumps were changed to pressure-controlled self-modulating pumps in the second phase. To ensure the best energy savings options, the control valves at the chillers were changed from 3 ports to 2 port PICV from IMI Hydronic Engineering. These PICVs take advantage of the pumps' ability to modulate, reducing the pump speeds at times of low demand.

As of mid-2022, the renovated system has been running optimally. Even during the peak summer season in 2022, the AHUs fitted with PICVs fitted experienced no issues controlling the air temperature. In most areas, the valve positions were no more than 50% open and could maintain a temperature of 18 degrees even with external temperatures of 40 degrees. This starkly contrasts with the previous years when the system frequently experienced issues reaching the needed temperature during the summer months.

The valve upgrades, proper system balancing and pump optimisation greatly improved system performance and will contribute to energy savings, which the customer is measuring to evaluate the payback time. In the case of this renovation, it was only necessary to replace some of the system components and optimise others. A combined approach such as this can decrease energy consumption substantially and increase user comfort.

Products Used

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