



# CLADE

## Leisure Centre Case Study



The customer's ambition is to reduce carbon emissions from this vital local sports facility. As a relatively modern building, the main source of emissions was the boilers.

Working with the local energy services provider Clade, they manufactured a 200kW thermal CO<sub>2</sub> heat pump for the leisure centre located in the north west of England.

The heat pump replaces fossil fuel gas-fired boilers to provide heat and hot water to the building and swimming pool.

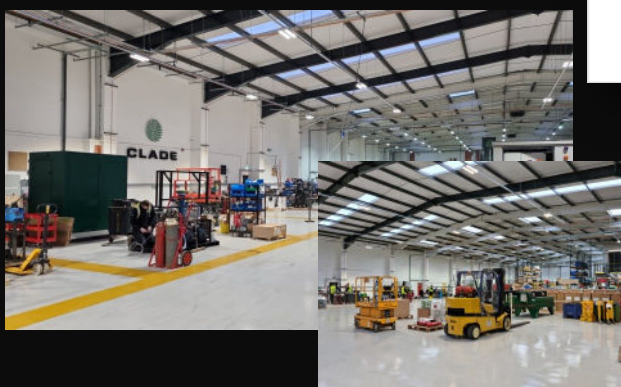
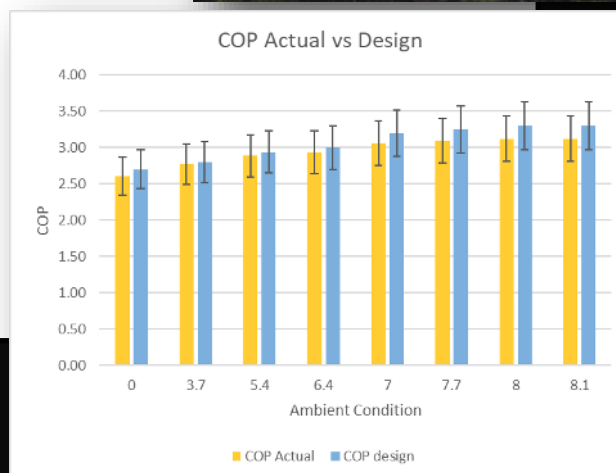
The air source heat pump is located outside in free air to absorb as much energy from the air as possible; the heat is then piped in to the building.

The Clade Oak air source heat pump uses CO<sub>2</sub> as the working fluid. CO<sub>2</sub> is a natural, non-toxic and low GWP working fluid which delivers high flow temperatures and high efficiencies and the lowest possible climate impact.

CO<sub>2</sub> efficiency is dependent on the return temperature. As shown in the graph to the right, the return is held steady whilst the flow varies to suit demand and maintain maximum efficiency.

The second graph shows how the heat pump performs against design, measuring performance can be challenging because of the number of variables involved; however, Clade control and analytics package demonstrates performance is as designed.

Air source heat pump efficiency varies over the year as temperatures change. This heat pump was installed in winter and experienced some chilly nights performing well. Clade will use data to optimise performance over the next year to maximise carbon saving.



Clade is a UK industrial engineering company which manufactures, installs and connects heating and cooling assets to energy systems across the built environment. With over 30 years of experience of working for blue chip customers, Clade is leading the energy transformation in heating and cooling using cutting edge natural refrigerants.

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