

Case Study

Fully electric hot
water heat pump
and space heating
solution for Avenue
Road development



Avenue Road build-to-rent development benefits from low-carbon fully electric hot water heat pump and space heating solution

The landowner for Avenue Road in Wolverhampton made an early decision to electrify a new development of 14 build-to-rent apartments, built by Compton Residential Development Limited, through the specification of a hot water heat pump system by [Dimplex](#), part of Glen Dimplex Heating & Ventilation. The chosen system includes the [Dimplex Edel hot water heat pump](#) and [PLXE direct acting panel heaters](#), Xpelair Natural Air180 [mechanical ventilation with heat recovery \(MVHR\)](#), DX200 and DX150 bathroom and kitchen fans and [Creda CLR electric towel rails](#). For the building owner, specification of the system simplified [Part L](#) compliance and ensured significantly lower long-term maintenance costs than a gas-based solution could deliver. Lower running costs and easy and convenient space heating, hot water and ventilation also benefit the occupiers.

In 2018 Cronin Developments Consultancy Ltd was appointed to deliver a compliant building to current standards, regulations and legislation within the constraints of an extant planning permission. Andy Cronin, Managing Director of Cronin Developments, commented: "After the client decided that gas would not be used on this project, we worked with the SAP assessor to find a viable solution that would work within the framework of the planning consent and the original footprint of the building. We considered fully electric hot water heat pump solutions and the system offered by Dimplex ticked all the boxes. We were able to design a Part L and [Part F](#) compliant solution using low-carbon electric technology from one manufacturer."

As the industry continues to move away from gas installations in new developments, in anticipation of the

[Future Homes Standard](#) coming into effect in 2025, we examine further what the specification of a hot water heat pump system meant for the design and installation of the heating system in this development. We will also consider the short and long-term benefits of switching to fully electric solutions.



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Why was a fully electric hot water heat pump system selected over gas for delivery of hot water and space heating in a build-to-rent development?

The decision to install fully electric [hot water heat pump](#) systems in modern projects is increasingly driven by compliance with the changing energy efficiency regulations and local planning restrictions. The early decision to switch away from gas in this project was underpinned by the need to comply with both the existing planning permission and the [Approved Document L](#) of the Building Regulations.

The selection of the Edel hot water heat pump ensured there was no need to include additional technology for increased renewables contribution, such as photovoltaic (PV) panels. The external gas service pipework would have been unsightly and relocation of gas pipework into the building would have required a ventilated gas riser. The client declined this due to the potential associated risks.

The Edel hot water heat pump is an air-source heat pump integrated within a hot water cylinder. The total footprint is only slightly bigger than that of a standard hot water cylinder. The Edel units, installed in a standard service cupboard in each apartment, renewably deliver the highest energy demand service of the dwellings - the hot water. In terms of efficiency, the coefficient of performance (CoP) of the compact air-source heat pump is above 3.0. For comparison, a gas boiler has a maximum CoP of 0.96. The Edel hot water heat pump is also listed in [Standard Assessment Procedure \(SAP\) Appendix Q](#).

The slimline PLXE direct acting panel heater, specified for Avenue Road, is 100% efficient at the point of use and offers a host of smart energy saving functions. The inclusion of NaturalAir 180 for each apartment

in SAP modelling resulted in an EPC rating of 80-88%, depending on the size of the apartment, ensuring Part F compliance and a healthy environment for the occupiers. The mechanical ventilation heat recovery (MVHR) system installed was more cost effective and practical to install than the energy performance improvement alternatives of photovoltaic panels, increasing the insulation of the building fabric or specifying triple glazing over double.

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The hot water heat pump's high energy efficiency and flexibility means it can be specified with a variety of space heating options.

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What were the implications of low-carbon technology specification for the installer?

Andy Cronin confirmed that the design of a fully electric hot water heat pump system, and its installation, were relatively simple: "I had my hands tied because of existing constraints, but the full Dimplex electrified solution for delivery of hot water, space heating and ventilation is no harder to design for than a system that uses a gas boiler. The full system came from Dimplex, which meant that every piece of technology and infrastructure, such as the ducted system for air supply and extraction that comes with the solution, is compatible. This made installation simpler and reduced the risk of on-site delays."

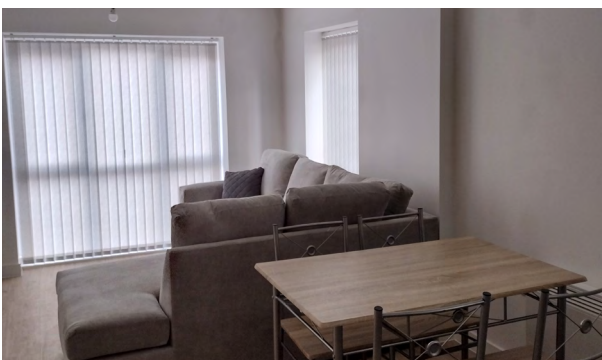
The [Edel hot water heat pump](#) was delivered to the site preplumbed and, unlike many renewable technologies, did not require a specialist installer. Andy continues, "Instead of having to run cold water pipes from a boiler to the cylinder and then back again, the installation only required a direct feed from the cylinder. Without gas, there was also no requirement for earth pipes or cables. This meant direct savings on the infrastructure and labour and, crucially, time on site. The commissioning of the full system was considerably quicker than that of a gas system."

The overall maintenance of the fully electric hot water heat pump based system is also less resource intensive than that of a wet system that runs a risk of leaks. A gas boiler also requires annual servicing in each apartment, a requirement the [Edel hot water heat pump](#) doesn't have. As the Edel hot water heat pump draws in external air, the filters must be kept clean, but this is far less time consuming and costly in comparison.



How does a hot water heat pump solution compare with a gas boiler system in terms of capital cost and future carbon footprint?

With a set budget, the project needed to be delivered at the forecasted cost. Andy adds, "I have over 35 years' experience in architectural design and although I have seen electric solutions at the start of my career, over the years, the legislation had driven the energy performance in buildings to be mainly fossil fuel. We have not had all the electric technology available in the past. That meant most of the heating systems had been fossil fuel based. The hot water heat pump system by Dimplex is now readily available and, overall, slightly cheaper than a traditional gas system. We installed one of the Edel hot water heat pumps at a cost that was less than what we would have paid for an 'A Rated' gas boiler."



Crucially, the system benefits the occupier too. The programmable controls are intuitive and easy to use and ensure maximum thermal and ventilation comfort in the apartments. The smart control option such as open window detection and the adaptive start further

increase the operational energy efficiency of the already very effective system, resulting in additional user control over energy costs and comfort.

As an investment for the future, hot water heat pump systems will decarbonise over the life of the building, in line with carbon reductions of the national electricity grid. The renewable energy sources used to supply the grid are projected to increase, leading to the eventual decarbonisation of the grid in 2035. This is in stark contrast to the carbon factor of gas and fossil fuels, which will remain at the same levels due to the source of the fuel not changing. This means that the carbon footprint of the fully electric Avenue Road development will continue to decrease in the future.





For more information on heating, hot water and ventilation solutions for new-build multi-occupancy residential buildings please visit:

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