

Heat pumps

Overview

As the region's distribution network operator we are playing a key role in preparing the electricity network for the challenges of a net zero future. We are also working to reduce our own carbon footprint and we are helping our customers and stakeholders to do the same.

Our role in the energy industry and our own journey to become a net zero organisation means we have a good understanding of the actions that businesses need to take to help the region reach net zero.

If you are looking to take the next step on your net zero journey, you could switch your heating system to a heat pump, a device which uses a small amount of electricity to absorb the natural heat from the air or the ground and pump it around the heating system of your property.

Heat pumps are an extremely reliable and efficient method of heating, using only a quarter of the electricity used by conventional electric heaters to produce the same amount of heat.

Although the initial cost of installation is higher than a traditional gas central heating boiler, there are a number of benefits such as lower fuel bills and reduced carbon emissions. Fuel bills can be reduced by a massive 50%.

This case study focuses on projects to install or upgrade heat pumps at two of our depots.

Why we took action

We installed heat pumps at our sites for a number of reasons:

- We are aiming to become a leader in the reduction of carbon emissions and achieve net zero by 2038.
- Protecting the environment is central to our plans, and a key step forward is to power our offices and depots using low carbon technologies.
- We want to lead by example and inspire businesses, our people, our shareholders and our customers to reduce their own carbon footprints.
- We can save money on our energy bills by using more energy-efficient ways of heating our sites.



Our approach

In October 2019, we changed our electricity supply to 100% renewable energy. Electricity for our operational substations and most of our offices and depots is generated from a mix of wind and hydro, which saved 5,492 tonnes of CO₂ equivalent in the first 12 months.

But our aim is to achieve net zero carbon by transforming our estate to be as energy efficient as possible, and to review all aspects of our energy usage.

Starting with two zero carbon exemplar depots, our training academy in Blackburn and our depot in Oldham, we are testing and demonstrating a number of solutions to assess their suitability and relative benefits which will help other businesses in the North West understand what's achievable.

These include: ground-mounted solar panels; car port solar panels; upgraded insulation, windows and ventilation; air source or ground source heat pumps; new radiators and LED lighting.



What we did

To help reduce CO₂ emissions and cut energy bills we have upgraded the air source heat pump controls at our Blackburn training academy and installed a new ground source heat pump at our Oldham depot.

Training academy

In 2019 we carried out a survey of the ventilation, heating and cooling systems at our training academy. As a result of the survey findings we decided to retain the existing air source heat pump system to minimise embodied carbon emissions from new materials.

But the site survey also showed that there was a risk of some of the rooms being over-cooled. So in 2020 we installed window and motion sensors and a new control system to ensure that optimum temperatures are maintained throughout the building.

An air source heat pump extracts heat from the outside air in the same way that a fridge extracts heat from its inside. Heat from the air is absorbed at low temperature into a fluid. This fluid then passes through a compressor where its temperature is increased, and transfers its higher temperature heat to the heating and hot water circuits of your property.

An air source heat pump can get heat from the air even when the temperature is as low as -15°C.

Combined with other energy efficiency measures, the upgrade has led to a 31% reduction in energy use.

Oldham

In October 2021, we installed a [Daikin](#) water-cooled ground source heat pump air conditioning system at our Oldham depot which now heats and cools the depot's two-storey office building and maintains year-round stable and comfortable temperatures.

Ground source heat pumps use pipes that are buried underground to extract heat, which is then further heated and moved to the heating and hot water circuits of your property.

A mixture of water and antifreeze is circulated around a loop of pipe which is buried outside. Heat from the ground is absorbed into the fluid and then passes through a heat exchanger into the heat pump. Since the earth absorbs energy released from the sun, underground temperatures are constant. In the UK, the temperature of the earth a few metres below our feet remains at around 11°C.

The length of the pipe in the ground depends on the size of your property and the amount of heat you need. Longer loops can draw more heat from the ground, but need more space to be buried in. If space is limited, a vertical borehole can be drilled instead.

The condensing unit at Oldham is cooled through a water loop in two 150-metre boreholes near the building.

Since the heat pump was installed in October 2021 the heat pump has contributed to a 25% reduction in energy use.

Results

	Annual energy consumption before upgrade	Annual energy consumption after upgrade	Percentage reduction	CO ₂ equivalent saving
Training academy	162,357kWh	111,425kWh	31%	9.8 tonnes
Oldham depot	186,030kWh	140,000kWh	25%	8.9 tonnes

Help and support

As the region's distribution network operator, one of our roles is to provide information, advice and guidance to customers and businesses to help them take action to reduce their energy bills and carbon emissions. We provide free advice, information and signposting to other available help - all of which will enable you to make the right decisions about energy efficiency and low carbon technologies for your business. Drop us a line at gonetzero@enwl.co.uk or find out more about how to go net zero on our website at www.enwl.co.uk/gonetzero.