Anglesey Abbey Water Source Heat Pump FAQs

How is the National Trust reducing its carbon emissions?

We've made a commitment that by 2020 50% of the energy we use will come from renewable sources and that we will have reduced our energy usage by 20%. Our Renewable Energy Investment Programme was started to action the renewable energy part of this commitment.

This ensures a long-term sustainable approach to managing our environmental impacts, but also removes the risks associated with usage and storage of oil at our properties.

We've already successfully completed a number of renewable energy installations in the East of England, including wood chip boilers at Felbrigg Hall, Ickworth, Dunstable and Sheringham; wood pellet boilers at Sutton Hoo and Dunstable Downs; solar panels at Sutton Hoo and Anglesey Abbey; and a lake source heat pump at Blickling.

Why are we installing a water source heat pump at Anglesey?

Switching to a water source heat pump system removes the risk of an environmentally damaging oil leak. The system will use around one third of the energy used by the oil boilers and together with the solar panels we installed in early 2017 will, reduce carbon emissions by 48 tonnes per year[i] and will save around £12,000 a year in fuel costs. That's nearly quarter of a million pounds saved over a 20 year life of the heat pumps.

The low temperature background heat provided by heat pumps is better for sensitive collections at our properties like Anglesey than the fluctuating high temperature heat from a fossil fuel boiler.

How does a heat pump work?

A heat pump is a device that uses a small amount of energy, in the form of electricity, to move heat from one location (the ground, the air or water) to another (e.g. a building). Heat pumps work in a similar way to a fridge, but instead of moving heat out of your fridge they move heat into our buildings.

At Anglesey, we will be extracting water from Quy water, absorbing around three to five degrees of heat from it and returning it to the river further downstream.

Inside the heat pump this heat is transferred via a heat exchanger to a refrigerant which has a very low boiling point and evaporates. This gas is then compressed which increases its temperature (you might notice a similar effect when you use a bicycle pump and it gets warmer). The temperature is increased through these compression cycles to a point where it can be used to heat the house. The heat is then transferred via a second heat exchanger to be pumped round the existing radiator system in the House. The cooled gas passes through an expansion valve and condenses to start the cycle again.

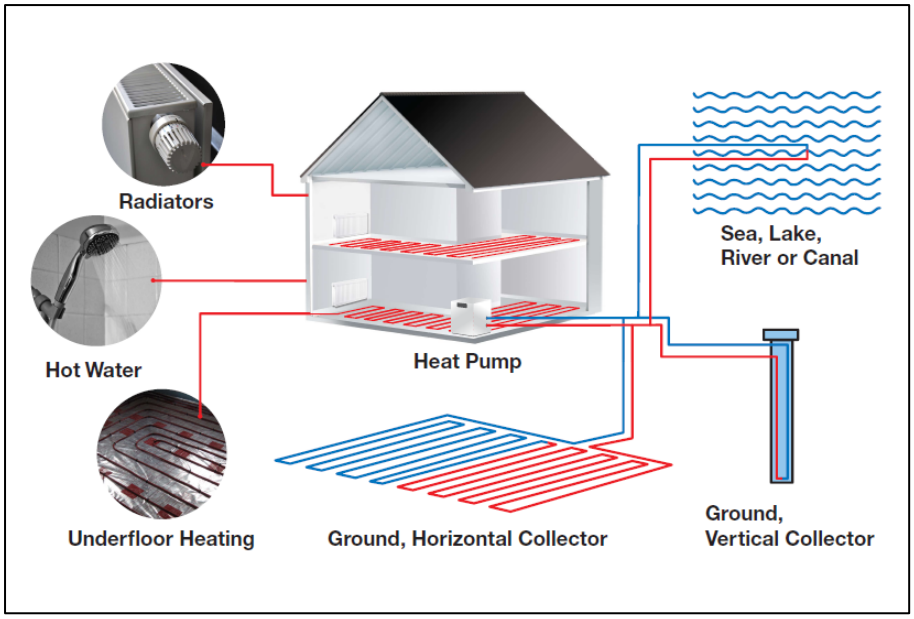

Figure 1: How a heat pump works. Diagram courtesy of the Ground Source Heat Pump Association (GSHPA)

What will it look like?

Once installed, the pipework bringing the heat from the river water to the Abbey will not be visible as it will be buried underground. A small kiosk will be installed on the river bank to house a heat exchanger which will be screened with planting.

When will the ground source heat pump be installed?

Planning permission and Listed Building Consent for the project has been received from East Cambridgshire District Council. Hopefully installation should commence towards the middle of 2018.

How are the solar panels at Anglesey performing?

The solar panels on the redwoods visitor centre roof have a total capacity of 41.69kW and were commissioned in December 2016. As of November 2017 they had generated 37MWh of electricity – the same amount used by 11 average UK homes in a year[ii] or used to make two million cups of tea![iii] This has saved around 17 tonnes of carbon dioxide being emitted into the atmosphere by power stations – that's around the amount the average UK person's activities causes in a year and a half.[iv]

Where can I find out more?

For more information on renewable energy see the national trust's energy pages and the energy saving trust

If you have any comments please contact us at: dee.nunn@nationaltrust.org.uk

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[i] [i] Average UK carbon footprint is about 10 tonnes (Carbon Trust 2006)

[ii] Typical electricity use per year for typical medium intensity UK home in 2016 was around 3,100kWh

[iii] Based on around 0.02kWh per cup of tea