

# CASE STUDY HEAT PUMPS AND FABRIC IMPROVEMENTS MAKE A RURAL CHURCH WARM AND WELL USED



**N.B.** This case study considers only one possible approach, which will not be suitable for every church. Always seek professional advice.

## Key Points

- St Anne's, Ings (Diocese of Carlisle) is one of the first churches in Cumbria to move to fully renewable electric heating, using air source heat pumps connected to under-floor heating.
- The church has also improved energy efficiency, with secondary glazing, insulation, and LED lighting.
- The improved comfort of the church has helped it become significantly more used, and both financially and environmentally sustainable.



**1** The air source heat pump requires very little maintenance.

**2** Under-floor heating was installed. This allows a constant temperature to be kept throughout the church.

**3** Secondary glazing was added to the windows, improving energy efficiency.

## The context

St Anne's, Ings is a Grade II\*-listed Georgian building located within the Lake District National Park.

In a typical week it is used on Sunday, as well as on some evenings during the week.

For more information visit the church's [website](#) or its entry on the [Church Heritage Record](#).

## The need for change

With falling congregation numbers, due in part to the cold and damp conditions, the church faced potential closure. The decision was taken to re-order it with a view to creating a space which was more welcoming and flexible enough to host additional activities. This reordering presented the opportunity to modernise the ineffective heating system.

## What were the options?

Several methods of heating were considered as having potential for the new system, including:

- A gas boiler: Rejected as environmentally unsustainable.
- A wood pellet 'biomass' boiler: Although a reasonably sustainable solution, this would require consistent maintenance and attention.

- Pew heaters: To create a more flexible space, the church took the decision to remove the pews, making this option unviable.
- Heat pump: An air source heat pump was eventually chosen as a sustainable and low maintenance option. This was combined with underfloor heating, which combine well, since ASHPs work best at a lower output water temperature than boilers.

### Watch the case study videos

To find the case study videos of St Anne's Ings, [click here](#), or go to [www.churchofengland.org/environment](http://www.churchofengland.org/environment)

### What was done?

- An air source heat pump was installed, connected up to the new under-floor heating.
- Four electric heating panels were also added to the walls, to serve as a back-up system, should the underfloor heating prove insufficient during the coldest parts of the year.
- In order to make the building generally more energy efficient during the re-ordering process, additional steps were taken including better insulating the floor and roof, applying a second layer of glazing to the windows, adding a spring-loaded door closer, and installing LED lights throughout the church.

### How well does it work?

The combination of new installations has made St Anne's a unique space, capable of remaining at a constant temperature. Alongside the choice of a breathable limecrete on top of the floor insulation, this has helped the church remain free of condensation, aiding in the conservation of its historic fabric.

Working far more efficiently than its predecessor, the heating system can generate three times the heat for the same energy cost. This also reflects the fact that the church can now be used significantly more often, with a financially and environmentally sustainable model of operation now in place.

### How much did it cost?

The project in its totality cost £110,000. While parishioners were able to raise approximately half of this, the rest was covered by grants, the largest of which came from the Lake District National Park Authority.

*"The air source heat pump requires very little attention. In ten years we've had two service visits, and that's all. It's never failed us, it's never stopped working."*

John Hiley, Project Manager