

## Case Study – Air Source Heat Pump at Mungrisdale St Kentigerns



### The Context

- St Kentigerns is a Grade II\* listed building situated in the Lake District National Park.
- It was built in 1756 on a medieval site. It has low thick rubble stone walls typical of early Lakeland church buildings. The floor is stone flagged and the entrance porch retains a cobbled floor.
- It is typically used once a week on Sunday's. You can see the church's entry on the [Church Heritage Record](#).
- There is no gas connection to the church. The Church was previously heated by a 20kW under-pew heating system. These were put on a 2am every Sunday morning and the congregation said that they still never felt warm. In 2009 the annual electricity bill was £898.

### What was done?

- 2 x 10kw air source heat pumps (ASHPs) were fitted at the rear of the church (Fig 2). The National Park stipulated that they should be screened with a natural wall, so they would not be visible from the road (Fig 3).

Fig 2. Air Source Heat Pumps



Fig 3. With the wall for screening



- The units came with a 10-year guarantee; so far they've been installed for nearly 12 and do not require yearly maintenance.

- The church also has new single glazed, well sealed windows and LED lights installed throughout.
- Originally, the plan was to place the two heat emitters on the north and south aisle walls. The DAC recommended sitting the emitters either side of the door at the rear of the church, to minimise visual impact (Fig 4). A small, simple control unit is fitted near the church noticeboard (Fig 5).

**Fig 4 Looking to the west of the church with the two emitters to either side of the door**



**Fig 5 Control Unit**



#### How does the system work?

- Heat pumps act like a fridge in reverse- they move heat from a low-grade source (the air, ground or water nearby) and “upgrade” it to provide warm air, which is circulated around the church like a fan heater.
- You receive, on average, 3 times more heat energy in kWh than electrical energy put in.
- An alternative of an air to water heat pump (where heat is transferred into water for radiators or an underfloor heating system) was considered but decided against as it is more suited to continual running.

#### How well does it work?

- The unit is switched on when Churchwardens open the church for service and the church is a comfortable temperature (16-18°C) within 30 minutes. The heat circulates well around the whole of the church, albeit quite a small space (38x19ft).
- There has never been a need to use the under-pew heaters, which are still in place.
- There is a slight background noise from the emitters, but not so much that it would disturb the service.
- Although the heating is not running constantly the church is dry and shows no signs of damp or condensation.
- On warm days, there have been complaints the church is too warm!

#### What did it cost?

- In 2011 the total cost was just over £6,000 (this will have risen considerably!).
- In 2022 the total electricity cost for the church was £1,039; given the significant electricity price rises, the church considers this a significant saving.

To compare St Kentigern’s system to an air to water one, see the case study on [Ings St Anne’s](#).

St Kentigern’s is open every day for visitors, and a churchwarden is happy to demonstrate the system to anyone considering an ASHP.