

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

Key Points

- Installing a combination of electric pew, panel and overhead heating has allowed St Andrew's Chedworth to move away from oil-fired heating to fully electric heating. In combination with a switch to 100% renewable electricity, the church is now "net zero carbon".
- Three phase power needed to be installed, but this did not prove to be a barrier.
- Operating costs are lower, and church users are more comfortable.



1 Under pew heaters fitted on metal brackets to the underside of the pew seat, as pews had no solid backs. Positioned to allow toes of feet and kneelers to slide underneath without touching the heaters, and far enough back that heels do not bang against them when kneeling. Units are low surface temperature so do not require additional guarding.

2 The overhead electric far infra-red heating unit in the choir vestry, replaced a pendant light fitting. Lighting now provided by LED spots on the ceiling.

3 Thin electric far infra-red panel heaters replaced radiators to provide heat to areas without pews.

The context

St Andrews Chedworth is a Grade I listed Cotswold church in a village in the Diocese of Gloucester. It used to be heated via an oil fired boiler to radiators with underfloor pipework. It had no mains water supply and a single phase electrical connection. It is generally well maintained, and has no issues with damp.

The church is predominantly used for Sunday worship with typically one service. There are occasional mid week usage with bell ringers, school events, festival services and weddings, funerals and the like.

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

The need for change

The existing oil boiler had reached the end of its life and the underfloor pipework was corroding; the church had experienced three significant underfloor pipework leaks in the last 5 years. The existing heating system was only just adequate to provide thermal comfort to the church when running.

What were the options?

The oil boiler could have been replaced and extensive re-piping of the system would have been required to fix the underground leaks. This would have left the church on oil, which it was not keen on for the future. (In terms of environmental impact, oil is the highest carbon fuel, releasing more greenhouse gasses per unit of heat than gas or electric heating.)

Alternatively, there was the option of a new electric heating system, however this required a new three phase electrical connection to be installed.

What was done?

- A new three phase electrical supply was installed from a pole on the boundary of the churchyard in an excavated trench (with archaeological watching brief). At the same time, a water main was also laid into the church.
- Electric under-pew heaters were fixed to all pews, including the choir. Overhead heater units were used in the choir vestry and tower. Panel heaters were installed to heat open areas around the altar, pulpit, font and organ. Cabling was laid mainly under the floor using much of the old pipework routes.
- All existing radiators, the boiler and the oil tank were removed, creating more space in and around the church.

How well does it work?

The church reports that the heating works very well. The building is noticeably much warmer and more comfortable for occupants. The church has found that the warm-up time prior to a service can be limited to between twenty to thirty minutes from cold, but the temperature drops quickly after the heating is turned off.

There has been an expected increase in electricity bills but there are now no oil bills. When considering the shorter warm-up times, on balance operating costs have been reduced.

How much did it cost?

The heating project cost a total of £38k, with VAT being reclaimed through the Listed Places of Worship Scheme. The breakdown was as below:

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| • New three phase electrical connection | £2k |
| • Digging trench and archaeology | £6k |
| • 78 pew heaters and brackets | £7k |
| • 12 choir stall heaters | £1k |
| • Panel heaters for additional spaces | £2k |
| • Electrical installation (labour & ancillaries) | £18k |
| • Remove existing boiler, pipework, radiators | £2k |

An additional £2k was spent at the same time on the water connection, and £1k on lighting improvements.

This has been a successful heating scheme within this church, which has converted it from oil to electricity, improved the comfort, and reduced costs at the same time. The church now procures its electricity from 100% renewable sources and it is therefore net zero carbon because of this project. The project has deliberately included many forms of electrical heating in the church to allow others to come and see the various options for themselves, and we welcome visitors!

— Matt Fulford, Heating Project Manager at St Andrew's and
Sustainability / Energy Advisor to Gloucester DAC.