

CASE STUDY BIOMASS BOILER WARMING THE HEART OF AN URBAN COMMUNITY



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

Key Points

- This large church in Bradford needed a new heating system to keep their growing congregation warm.
- Community projects and a proactive approach helped them to secure a new biomass boiler and underfloor heating in 2017.
- The boiler house is designed to support the biodiversity of the church grounds.



1 The eco-friendly boiler house sports insect hotel cladding, climbing plants, and a living roof. Planning permission for the boiler house proved one of the biggest challenges for St Stephen's.

2 The boiler house contains a wood-pellet hopper and a machine room. Wood-pellets are pumped into the biomass boiler (right), which heats the 3000-litre water tank (centre).

3 The extensive grounds around St Stephen's seemed ideal for a ground source heat pump installation, but the size of the building and its poor insulation required a more powerful heating solution.

The context

St Stephen's Bowling is a Grade II-listed Victorian church in the diocese of Leeds. It is a large building with a footprint of 625m². The parish itself is in the 2% most deprived in the country, and two decades ago it faced closure due to falling attendance.

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

The need for change

The previous heating consisted of a disused air-blown gas system in the nave and sanctuary, and a gas boiler heating the back of the church. The poor conditions meant that the congregation worshipped with patio heaters, blankets and hot water bottles during the winter.

St Stephen's engages in significant community work; for example, its wellbeing charity SHINE supports more than 200 people every week. This work helped enlarge the congregation, which highlighted the need for a better heating solution.

What were the options?

The church approached their energy supplier with a community plan involving St Stephen's, the mosque and the local school.

Unfortunately that project was assessed to be unfeasible for practical reasons. However, the energy company were impressed with the community work carried out and offered to fund a heating system for the church.

Heat pumps were considered, with the extensive grounds well-suited for a ground source heat pump. Similarly, it was thought that solar PV panels could have powered an air source heat pump. However, the size of the building dictated that a more powerful system would be required.

What was done?

- A 99kW thermal output biomass boiler was installed, with underfloor heating and nine fan-assisted radiators in the nave and chancel.
- A back-up gas boiler was also included.
- A purpose-built boiler house was used to contain the new boilers, as well as a 3000-litre water tank and a hopper for the wood-pellet fuel.

How well does it work?

As the boiler house is located close to the road, wood pellets can be easily delivered. They are an affordable fuel, meaning that running costs remain relatively low.

The boiler is adjusted to heat the church as appropriate. It can be set to meet the needs of different seasons.

Every few months, the tray of biomass ash requires emptying, and an annual service is also a necessity.

Despite its poor insulation, the church is no longer cold for services and has benefitted the community that use it. Future improvements to the insulation could enhance the efficiency of the system.

How much did it cost?

The heating system cost roughly £250,000, which was paid for by the energy supplier. However, the church was required to raise an additional £60,000 within 90 days to pay for a new floor, in order to have the underfloor heating installed. This was clearly a significant challenge for the congregation, which they met with a fundraising campaign.

“Installing a gas boiler would have been so much cheaper and easier, but it was never an option for us, because we wanted to ensure that we were taking seriously this opportunity to put words into action in our commitment to reduce our carbon footprint.”

Sarah Hinton, CEO of St Stephen's wellbeing charity SHINE