



SHRINKING THE
FOOTPRINT

CASE STUDY

Wood pellet boiler at St Paul, Gulworthy



Summary

The parish of St Paul, Gulworthy is situated in the Tamar Valley Area of Outstanding Natural Beauty in the far west of the Exeter Diocese, bounded by the Tamar Valley on the west, with Tavistock 2 miles to the east. The church is Grade II listed, and part of the World Heritage Miners' Site. It is stone-built and was licensed in 1856.

The church replaced worn out storage heaters and portable radiant heaters with a new radiator system and 50 kW wood pellet boiler in free-standing 'pod' against the church.



Description of the project

St Paul's primary purpose of improving its heating system was prevention of damp and condensation in the building. The first step in the process was a feasibility study, commissioned in late 2005 by Working the Woods, to explore the possibility of installing a wood chip boiler to heat Gulworthy Primary School, church and parish hall. The feasibility study was one of the first projects to be supported by the Tamar Valley AONB's Sustainable Development Fund (SDF).

The original plan was to supply piped hot water to the school and church from a central boiler, fuelled by wood chips as the village is surrounded by woodlands. The school

grounds would provide the site, as the boiler required a lot of space and good access. However, the joint plan foundered in April 2008, a week before work was to begin. The church had already invested in a new radiator system, funded by legacies, to use the planned hot water, and therefore still needed to upgrade its heating system. One option was to install an oil furnace in the existing boiler house, but almost the entire cost would have fallen on the church which it could ill afford. The second option, encouraged by the Tamar Valley, was to install a biomass boiler, shrink the carbon footprint and be a pioneer. Grants and donations were available to fund 100% of the biomass boiler, and it was thought that running costs would be lower, given that the oil price was rocketing.

Two installers conducted site surveys. The first found that storage of wood chips, the preferred fuel in the parish's heavily-forested area, would require too much space and tractor access, and even a wood pellet boiler would be too big for the boiler house. The second proposed a more expensive but feasible solution: a freestanding wooden shed, or 'pod', housing the boiler and hopper. This was designed specifically for the church, so as not to interfere with the architecture of the building, and was situated adjacent to the east wall of the church, out of sight of the entrance.

The works required a Faculty and planning permission from West Devon Borough Council, as the pod was close to a listed building. The church worked with their architect and the Secretary to the Diocesan Advisory Committee to obtain first the DAC Certificate then the Faculty.

Some of the grant money was already available from the joint project. A further application, to the Building Research Establishment's Community Sustainable Energy Programme (BRE CSEP), required considerable detail, and was held up slightly as the installer needed to obtain accreditation under this grant scheme.

The new boiler was installed and functioning by mid-November 2008. It now runs for about two hours each day and all morning on Sundays. It was formally opened, blessed and duly celebrated at the Carol Service that Christmas. A plaque was also erected in the porch to acknowledge the grantors.



Technical details

Pod:

- TRECOPod Special 4.5 x 2.5 x 2.2m, sited 1m away from the rear east wall of the church.

Wood pellet boiler:

- Biocom 50 (kW) manufactured by Guntamatic, Austria.
- Installed by TRECO.
- Fuel injection is automatic, ash needs emptying about every 3 months.

Fuel storage:

- Canvas 3 tonne store. The fuel is augered into the hopper, which is part of and feeds the boiler.

Fuel supply:

- G30 (6mm diameter) and W30 (maximum 30% water content) wood pellets
- Pellets blown 30m from lorry to fuel store. This is the furthest practicable, and the church is working on reducing the distance.
- Currently supplied by Brookridge Timber.

Running costs:

- Wood pellet costs are currently £215 per tonne, £85 per delivery, VAT 5%.
- Consumption was estimated at 5-6 tonnes over the whole winter 2008/09.
- 2 kg pellets = 1 litre oil in terms of heat produced, and running costs are similar.

Carbon emissions:

- Biomass boilers are almost carbon neutral, excepting emissions from fuel processing and transport.

Installation costs and funding

Approximate investment cost:

- Design, including Faculty, planning permission, etc – £3,750
- Boiler – £16,000
- Pod etc – £3,250
- Installation – £4,500
- Total – £27,500

Funding sources:

- BRE, CSEP – £10,000
- EDF Energy, Green Fund – £10,000
- Tamar Valley AONB, Sustainable Development Fund – £5,000
- Devon Historic Churches Trust, Allchurches Trust, private individuals with an environmental interest – £2,500.

Follow-up

As of November 2009, the boiler continues to provide heating with no problems. There have been occasional problems with fuel supply, as currently there are few suppliers of wood pellets within a reasonable distance. This is expected to change as the government is encouraging wood chip and pellet production.

Publicity:

- Press release on the Church of England's Shrinking the Footprint website.
- Article in Exeter Diocesan News.
- Articles in the Tamar Valley AONB Newsletter.

Local engagement:

- More use of church for community activities such as primary school services and Christmas play, and concerts.
- Questions about the boiler, and enquiries about tours, but no actual visits yet.

Further actions planned

- The next idea is planning and fund raising to re-slate and insulate the roof, possibly with sheep's wool.

Considerations for other projects

Lessons from this project:

- Co-operation between a good builder/heating engineer and the installer is vital, as there was a considerable amount of work laying foundation and trenching and connecting to radiators, outside the installer's remit.
- Don't expect to save on running costs, and allow for the servicing cost. As there are more installations, fuel supply and costs should improve.
- A facility for topping up with sacks of fuel would be useful, e.g. near the end of winter when the delivery charges make the cost of a part load prohibitive.
- The auger conveying pellets from the fuel store to boiler can be noisy.
- Although the fuel burns cleanly, there are some visible emissions from the flue, so keep away from windows, especially the east window behind the altar!

General questions when considering installation of a wood pellet boiler:

- Heat requirements of the building and its level of insulation. Ideally the insulation should be improved first.
- Location of the boiler, and the flue required by the boiler.
- Any extra works, e.g. piping water to the boiler, electrical work.
- Access for the delivery of fuel.
- Fuel storage, and a means of measuring the fuel level.
- Faculties and planning permission.

See also the DAC guidance on renewable technologies at www.exeterstf.org.uk. The DAC consider every installation independently depending on its particular circumstances and design.

Contacts for more information

St Paul's would be delighted to show the system to anyone who is interested. For further details contact Mary Ann Furze on mafurze@sheepridge.freeserve.co.uk or 01822 832396.

Installer

- Treco – 6 Millennium Place, Tiverton Business Park, Tiverton EX16 6SB, 08451 309012, www.treco.co.uk.

Fuel supplier

- Brookridge Timber – Hemyock, Cullompton EX15 3PF, 01823 680546, www.brookridge.co.uk.

Funding bodies

- Tamar Valley AONB – 01822 835030, www.tamarvalley.org.uk
- BRE CSEP – www.communitysustainable.org.uk
- EDF Energy Green Fund – www.edfenergy.com/greenfund



© Copyright Tony Atkin and licensed for reuse under this [Creative Commons Licence](https://creativecommons.org/licenses/by/4.0/).