ESOS-ENERGY
Energy efficient solutions

Energy Audit and Survey Report

St Gregory & Martyn's Church, Wye

Version Control

Author	Reviewer	Date	Version
Paul Hamley	Matt Fulford	12th December 2019	1.0

Contents

1. Executive Summary

An energy survey of St Gregory & Martyn's Church, Wye was undertaken by ESOS Energy Ltd to provide advice to the church on how it can be more energy efficient and provide a sustainable and comfortable environment to support its continued use. This audit has been provided in conjunction with 2buy2, the Church of England's Parish Buying scheme provider and is subsidised from Total Gas & Power, the Parish Buying scheme's principal energy supplier.

St Gregory & Martyn's Church, Wye consists of a mediaeval nave with mid to late 13th century columns and arches surmounted by 15th century work. The chancel and apse date from 1706 together with a massive tower on the site of the original south transept which houses useable rooms.

There is both gas and electricity supplied to the site.

The church has a number of ways in which is can be more energy efficient. Our key recommendations have been summarised in the table below and are described in more detail later in this report. It is recommended that this table is used as the action plan for the church in implementing these recommendations over the coming years.

Short Term: Energy saving recommendation	Estimated Annual Energy Saving (kWh)	Estimated Annual Cost Saving (£)	Estimated capital cost (£)	Simple Payback (years)	Permission needed	CO2 saving (tonnes of CO2e/year)	£/tonne of CO2
Datalogger – Temperature and humidity. Use to optimise heating	5% 2500	£100	£50	6 months	None	0.6	£83.33
Floodlights - change to LED, IP65 rated	2500	£325	£650	2	None	0.64	£1,016
Switch electricity (and gas) suppliers to ones which provide 100% renewable (or green gas) supplies	None	None	Nil	N/A	None	-	N/A
Internal double glazing in vestry	100	£13	£6,000	--	Faculty	0.02	£300,000

Install 4kWp PV array on tower roof	3,200	£415	£5,500	13.25	Faculty	0.98	£5,594.89
Air Source Heat Pump {only if location suitable)	34,000	N/A as gas to elec	£20,000	N/A	Faculty	8.7	-

Other works to improve the comfort of the church have been suggested within this report but as they will not provide an energy saving they have not been listed in the table above.

The Church should check any faculty requirements with the DAC Secretary at the Diocese before commencing any works.

Based on current contracted prices of 12.99p/kWh and 3.72p/kWh for electricity and mains gas respectively.

If all measures were implemented this would save the church over £853 per year.

2. Introduction

This report is provided to the PCC of St Gregory & Martyn's Church, Wye to provide them with advice and guidance as to how the church can be improved to be more energy efficient. In doing so the church will also become more cost effective to run and seek to improve the levels of comfort. Where future church development and reordering plans are known, the recommendations in this report have been aligned with them.

An energy survey of the St Gregory & Martyn's Church, Wye , Churchfield Way, Wye, was completed on the 8th November 2019 by Paul Hamley. Paul is an energy auditor with experience of advising churches and small businesses. He is part of the Diocesan Environment Officers Energy Group developing advice for the Church of England and authored the "Assessing Energy Use in Churches" report for Historic England. He is a CIBSE Associate member and a Chartered Scientist, with experience of the faculty process gained from chairing the building committee of a Grade I listed church.

St Gregory & Martyn's Church, Wye	606043
Gross Internal Floor Area	575 m^2
Listed Status	Grade I Mid-13th century
Typical Congregation Size	90

The church typically used for 21 hours per week for the following activities

Services	7 hours per week
Meetings and Church Groups	5 hours per week
Community Use	7 hours per week
Occasional Offices	2 hours per week

The church is used for an estimated 1100 hours annually.

The annual footfall is in the region of 18,000 (based on regular events and estimated number of attendees – the church can calculate a more detailed estimate!)

3. Energy Procurement Review

Energy bills for gas and electricity have been supplied by St Gregory & Martyn's Church, Wye and have been reviewed against the current market rates for energy.

The current electricity rates are:

Single / Blended Rate	12.99p/kWh	In line with current market rates
Standing Charge	20.00p/day	N/A

The current gas rates are:

Single / Blended Rate	3.72p/kWh	In line with current market rates as it includes a daily charge
Standing Charge (current) **(until 31/08/2018)**	Zero 169p/day	N/A

The above review has highlighted that the current rates being paid are in line or below current market levels and the organisation can be confident it is receiving good rates and should continue with their current procurement practices.

A review has also been carried out of the taxation and other levies which are being applied to the bills. These are:

VAT	5%	The correct VAT rate is being applied
CCL	not charged	The correct CCL rate is being applied.

The above review confirmed that the correct taxation and levy rates are being charged.

4. Energy Usage Details

4.1 Headline Figures

St Gregory & Martyn's Church, Wye uses 15,500 kWh/year of electricity, costing in the region of £2,400 per year, and 51,300kWh/year of gas, costing £2000. This data has been taken from the annual energy invoices provided by the suppliers of the site. St Gregory & Martyn's Church, Wye has one main electricity meter, and a submeter for the floodlights. There is one gas meter serving the site.

NB: floodlighting meter data was only available for August to October 2018, which is estimated to be 10% of annual use – the extra has been calculated and added to produce the figures above.

Utility	Meter Serial	Type	Pulsed output	Location
Electricity – Church	E18UP09352	EDMI Atlas Mk7B	2 pulses	Choir vestry
Electricity submeter	D0472616	Type 5196A Single phase watt hour meter	no	Choir vestry
Electricity Floodlights	D0472617	Type 5077A Single phase watt hour meter		Choir vestry
Gas – Church	M016K0825014D6			

All the electric meters are AMR connected and as such energy profile for the entire energy usage should be possible.

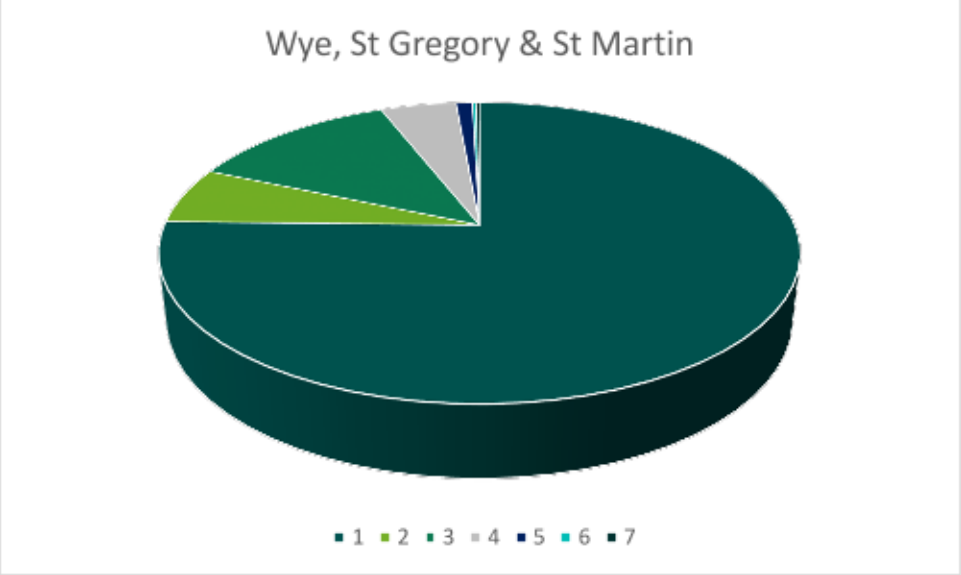
4.2 Energy Profiling

The main energy use within the church can be summarised as follows:

Service	Description	Power	Annual Use/ kWh	Estimated Proportion of Usage
Lighting	Nave, chancel, aisle 1100 service hours 26 Spotlights 12 Candle shaped Pre LED (10 months of year= 0.83x1100) LED (2 months =0.17x1100) 3000 visitor hrs (313days x 9.5hr)@1/2 on Pre LED (10 months of year= 0.83x3000) LED (2 months =0.17x3000) Vestry, 2 Tower rooms, Porch, Porch rooms, cloakroom. (7 rooms) Choir vestry (10 hrs/ week) Floodlights non LED (to be changed) 1350h Annual use reported as 3094kWh	 3.8kW 380W 1.9kW 190W 500W 100W 2.2kW	 3480 70 4700 96 150 52 3094	12.6%
Heating	Gas, Worcester kW boiler Unknown model Est. 1000 heating hours	c.50kW	 TOTAL 51300	75.5%
Heating (electric)	**Vestry (est 14 hpw x 30 weeks)** Dimplex Radiant bar heater Portable convector **Porch meeting room (est 3 hpw x 40 weeks)** Oil radiator Fan heater **Choir vestry (est 10 hpw x 30 weeks)** Radiant bar heater 2 portable convectors **Ringing room (est 6 hpw x 30 weeks)** 2 radiant bar heaters Fixed convector heater	 1kW 2kW 1kW 3kW 1kW 4kW 2kW 3kW	 1260 480 1500 900	6.1%
Hot Water	Kettles, 2 20 boils of 3 minutes/ week x 52 weeks used Water heater in kitchen area (rarely used) Coffee machines (2) = 1hrs per Sunday x 52 + 1 hrs x3 events/month x 12 = 88hrs	 2.5kW 3kW 6kW	 130 12 528	1.0%
Other Small Power	PA System est 300h use annually	500W	150	0.2%

Organ	Organ, pipe est 300h use annually	500W	150	0.2%

TOTAL Electricity 15,500kWh; Total not including floodlighting 13,500kWh



KEY 1 Gas heating (underfloor, 75% of total) 2 Electric Heating 6.1%

3 Internal lighting (12.6%, would have been 15% before LED installed and estimated at 1-5 to 2% of total from now on 4 Floodlighting, 4.6% current non LED

5 Hot water (1%) 6 Small power 7 Organ

As can be seen from this data, the heating makes up by far the largest proportion of the energy usage on site. Installation of underfloor heating will have made the church more comfortable during the week and prevent the church cooling significantly. This is suitable for a church in regular community use. The other significant load is lighting; whose consumption has been reduced by around 90% by installing LED lighting in the body of the church.

4.3 Energy Benchmarking

In comparison to national benchmarks[1] for Church energy use, St Gregory & Martyn's Church, Wye uses 44% more electricity and 26% less heating energy than would be expected for a church of this size. The figures are not adjusted for hours of use as this data is not readily available yet, but it reflects a church in regular use.

	Size (m^2 GIA)	St Gregory & Martyn's Church, Wye use kWh/m^2	Typical Church use kWh/m^2	Efficient Church Use kWh/m^2	Variance from Typical
St Gregory & Martyn's Church, Wye (elec)	575	28.9	20	10	144%
St Gregory & Martyn's Church, Wye (underfloor heating gas)	460	111	150	80	74%
TOTAL	575	118	170	90	69%

NB: The figure of 460m^2 for the church not including the tower rooms and porch room areas has been used to calculate the gas use per m^2 since this reflects the area actually heated by gas.

[1] CofE Shrinking the Footprint – Energy Audit 2013

5. Energy Saving Recommendations (Electricity)

5.1 Lighting (fittings)

All lights in the church were stated to be LED and installed in August 2019; 18 fittings in the nave and 8 in the chancel.

The lighting was due to be assessed by a contractor.

The nave and chancel are well lit. Lux readings at 15:15 on a dull November afternoon were 160-170 in the seated area, 90-100 around the walls and 150-270 in the chancel.

5.2 Lighting - external floodlights

Floodlighting was discussed. The church was awaiting a quotation to change the external floodlights to LED installations in 2020.

Floodlighting is normally switched on at dusk and off at 22:30 but are sometimes left on longer if there is an event. If it is switched on by a light sensor, then by looking at the local dusk times, the lights will run for approximately 1360 hours per year – estimate 1400 hours with events. The annual usage reported is 3094kWh.

6. Energy Saving Recommendation (Heating)

6.1 Heating System and Strategy

The church currently uses gas to heat the church, with electric heaters in the rooms in occasional use. This is reported to work well and provides adequate thermal comfort into the church. Given that the system is successful and not overly wasteful of energy we would recommend that this system is continued with and consideration is given to the following improvements.

Section 13 looks at the option of installing Air Source Heat Pumps.

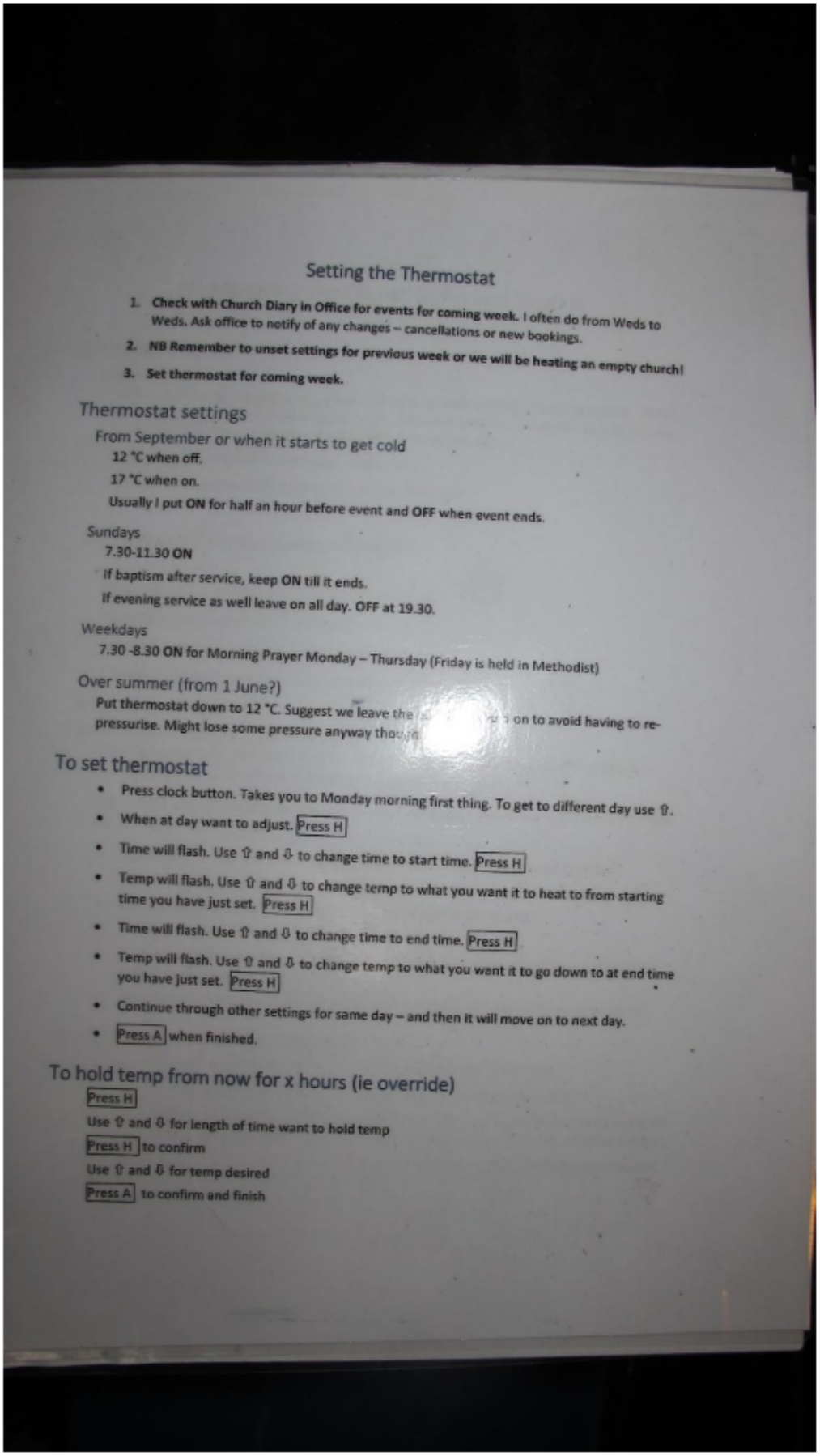
If it is decided to continue using gas as heating fuel, the next boiler should be a hydrogen ready model. The Parish Buying group tariff includes 20% renewable gas (from Anaerobic Digestion), and it is expected that as AD expands and hydrogen is introduced into the gas mix that gas will slowly reduce its carbon footprint.

6.2 Optimising Underfloor Heating

As with most medieval churches, this church would have survived most of its life without any form of heating. The modern additional of heating is not needed to preserve the fabric but only to provide thermal comfort to occupants. The previous trend of 'conservation heating' for fabric issues is now largely considered to be unnecessary and is being avoided by the likes of National Trust and English Heritage. The only times when background heating may be required is if there are historic wall paintings or to for the preservation of large artefacts such as tapestries. The fabric is often subject to the greatest damage by humidity (which is naturally higher when the air is warmer as warmer air has greater capacity for holding more moisture), as a result of large temperature swings (from central heating systems turning on and off) and from the excessive drying out/baking of timbers where high temperature heating units have been fixed to them (such as overhead heaters fixed to timber wall plates).

Installation of underfloor heating will have reduced the large temperature swings associated with heating a church once or twice a week. It is noted that the thermostat instructions keep the temperature between 12°C and 17°C. Use of a temperature datalogger will enhance understanding of the temperature profile in the church (are the pews at the "right" temperature using these settings?). Can the temperature be let to drop to 10°C overnight rather than 12°C when the church is empty and heated gently in the mornings – does this save energy? Running for alternating periods of two weeks, reading the gas meter at the end of each period and temperature obtaining the temperature profile from the datalogger would be a worthwhile experiment.

6.3 Space Temperature Set Point



Setting the Thermostat

1. **Check with Church Diary in Office for events for coming week.** I often do from Weds to Weds. Ask office to notify of any changes – cancellations or new bookings.
2. **NB Remember to unset settings for previous week or we will be heating an empty church!**
3. **Set thermostat for coming week.**

Thermostat settings

From September or when it starts to get cold

12 °C when off.

17 °C when on.

Usually I put **ON** for half an hour before event and **OFF** when event ends.

Sundays

7.30-11.30 **ON**

If baptism after service, keep **ON** till it ends.

If evening service as well leave on all day. **OFF** at 19.30.

Weekdays

7.30 -8.30 **ON** for Morning Prayer Monday – Thursday (Friday is held in Methodist)

Over summer (from 1 June?)

Put thermostat down to 12 °C. Suggest we leave the [illegible] on to avoid having to re-pressurise. Might lose some pressure anyway though.

To set thermostat

- Press clock button. Takes you to Monday morning first thing. To get to different day use ⇧.
- When at day want to adjust. Press H
- Time will flash. Use ⇧ and ⇩ to change time to start time. Press H
- Temp will flash. Use ⇧ and ⇩ to change temp to what you want it to heat to from starting time you have just set. Press H
- Time will flash. Use ⇧ and ⇩ to change time to end time. Press H
- Temp will flash. Use ⇧ and ⇩ to change temp to what you want it to go down to at end time you have just set. Press H
- Continue through other settings for same day – and then it will move on to next day.
- Press A when finished.

To hold temp from now for x hours (ie override)

Press H

Use ⇧ and ⇩ for length of time want to hold temp

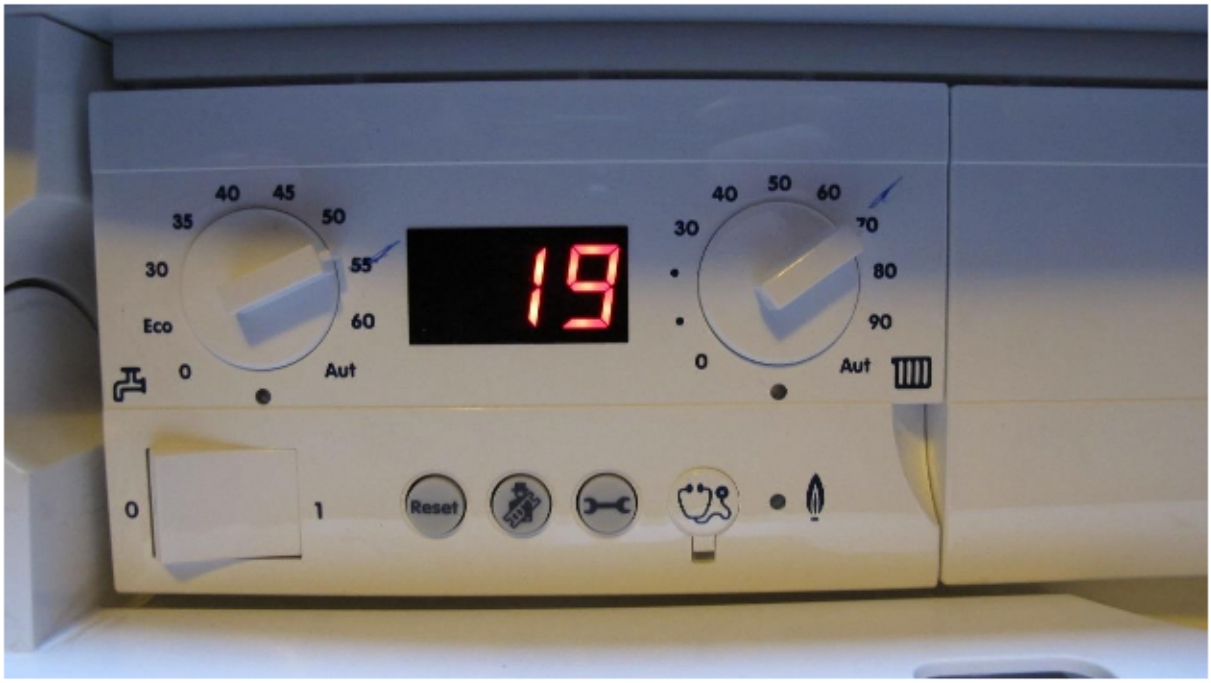
Press H to confirm

Use ⇧ and ⇩ for temp desired

Press A to confirm and finish

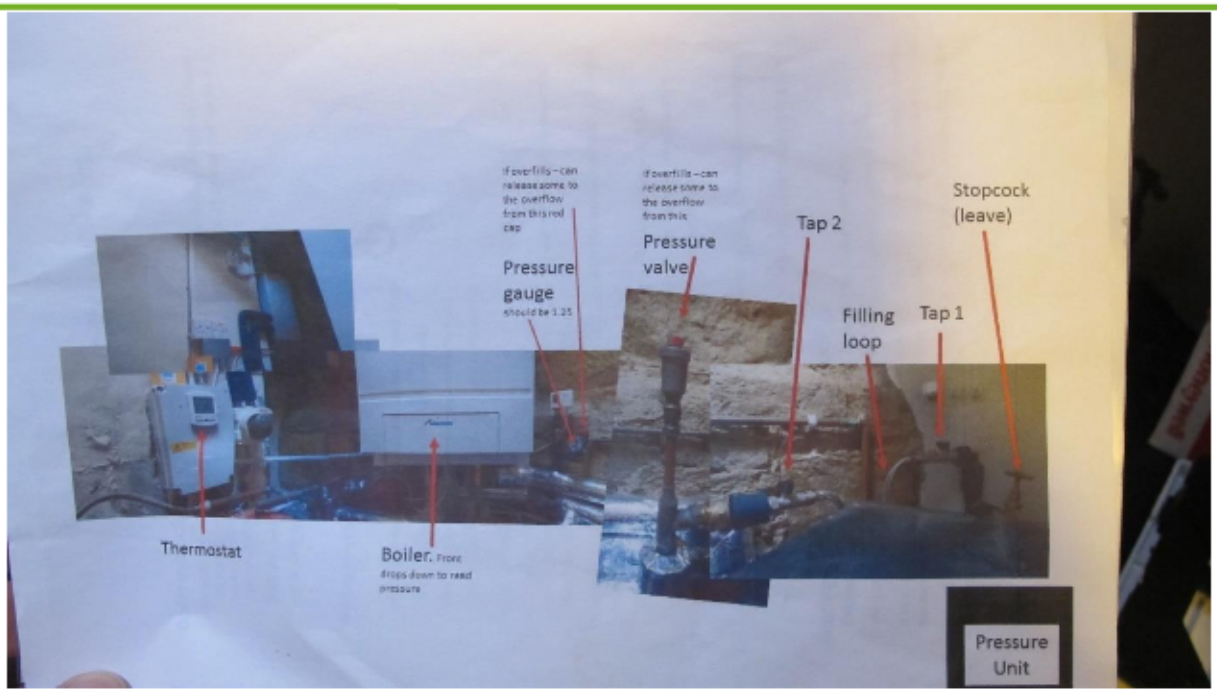
The current minimum setting of 12°C could be lowered to 10°C as the church will take several hours for the temperature inside to fall from 12 to 10. Use of a temperature datalogger will help gain understanding of how the building behaves and when to switch the heating on and off.

6.4 Boiler Controls



The water temperature is set to 70°C, which may be too high for it to act as a condensing boiler. It is unclear whether the boiler circuit includes the choir vestry radiators and the underfloor heating, or if the UFH has a separate heat exchanged on the circuit.

Legionella regulations state that water at the tap must be at 55°C within one minute of turning on – this is unlikely to be achieved if the boiler is set to deliver 53°C.



This church is to be commended for clearly setting out boiler control, and user performed maintenance tasks.

6.5 Endotherm Advanced Heating Fluid

In order to improve the efficiency of the heating system further it is recommended that an advanced heating fluid (http://www.endotherm.co.uk/) is added to the heating system.

This fluid in in addition to, and complements any existing inhibitors in the heating system and is added in a similar way. The fluid works to improve the ability of the boiler to transfer heat into the heating system and for the radiators and other heating elements to give out their heat into the rooms. It does this by reducing the surface tension of the water and increasing its capacity to transfer and hold heat. Case studies have demonstrated that the addition of this fluid into heating systems reduces heating energy consumptions by over 10% as well as helping the building heat up quicker.

Endotherm can be self-installed.

7. Energy Saving Measures (Building Fabric)

7.1 Draught Proofing to Doors

There are a number of external doors in the building. These have the original historic timber doors on them, but these do not close tightly against the stone surround and hence a large amount of cold air is coming into the church around the side and base of these doors.

Where a timber door closes against a timber frame it is recommended that draught proofing is fitted. A product called QuattroSeal (see link below) is often used in heritage environments to provide appropriate draught proofing. http://www.theenergysavers.co.uk/application/files/1714/7197/4194/National_Trust_Case_Study.pdf. Note this cannot be used where the timber door closes directly against a stone surround.

Other simple measures such as using a small fridge magnet painted black over the large keyhole or the use of 'sausage dog' type draught excluders at the base of little used doors can prove to be very effective. Doors should be reviewed in daylight and gaps where the light shines through sealed or filled in whatever the most appropriate way is for the specific door.

8 Vestry – heating and windows

The vestry windows are very large, one being covered in condensation and the other in black mould. This is not good for any vestments, papers or books stored therein.
The lower walls are completely covered by furniture or artworks and the higher external walls are mostly window. There is no option for installing any convector heater.

8.1 Phase 1: Heating

The vestry is currently heated by a portable electric heater and a Dimplex radiant bar heater on the wall, which is reported as being ineffective (it is probably of too low output for the distance from occupants). Temperature datalogging can inform the decision of if any change to the heating requirement for the vestry is needed.

Installing radiant infrared panels could be done at a high level, although as this room appears to be used by people sitting, heat from below may be more suitable.

Instead of using a portable electric heater in the vestry when it is occupied, an under carpet heated mat may be found more practical (for example, it won't be in the way in the confined space). It could be run from a timer.

The carpet area is approximately 10m^2. One company produces 0.5m wide mats, length being determined by the room dimensions to be covered. The 110W/m^2 or 160W/m^2 products are suitable.

https://www.heatmat.co.uk/product-range/underfloor-heating-mats/160w-heating-mats.html

Another company produces the "sticky mat" system: https://www.warmup.co.uk/underfloor-heating/electric/matsher

8.2 Phase 2: Windows – Secondary double glazing

Installation of secondary double glazing in this non-public area may be possible.
The church should decide based on how often it is intended to use the room – and also after considering the effect of adding a dehumidifier and experimenting with heating.

9 Porch Room – Insulation, heating and window

This room is used for Junior Church – it felt extremely cold during the audit (surface temperatures were 14°C) – this may indicate the presence of damp, as well as being close to cold walls accepting radiant heat from the person.

9.1 Insulation / soft furnishings

It is not economically viable to line the inside of this room with internal insulation if it is only used very occasionally – however, anything placed between the cold walls and people will insulate them; so poster boards (such as Sundeala board), and soft furnishings hung over the walls would bring benefit.

Permission may not be granted for internal insulation of the above porch door wall above which includes a blocked arch – but it could be covered by temporary soft furnishings.

9.2 Heating

This oil filled radiator has a long heat up time and will be ineffective at heating the space.

Using the datalogger will inform the church how long the room takes to warm up using present methods, and also indicate any problems with humidity (ideally kept between 45-65% relative humidity).

For rapid heating of an occasionally used room, installation of one or two far infrared panels would improve comfort levels. [Perhaps one of the decorated versions could be sourced, examples include

https://www.suryaheating.co.uk/custom-image-heating-panels.html]

9.3 Windows

Secondary double glazing can be achieved by using "seasonal" double glazing plastic film (which will also reveal if there is a draught through the window). Any gaps can be filled with black plasticine, which is easily removable. Permanent secondary glazing would require faculty permission given the listed status of the building.

10 Tower Rooms

As with the other occasionally used rooms, decisions must be led by the planned use pattern of the rooms. The tower meeting room is reported to be used for one hour, three times per month.

The tower meeting room has one very large south facing window with an opening panel. Any gaps which introduce draughts should be filled with black plasticine.

Use of the Temperature & Relative Humidity datalogger will inform is this room also needs a dehumidifier.

10.1 Heating – Tower Meeting Room

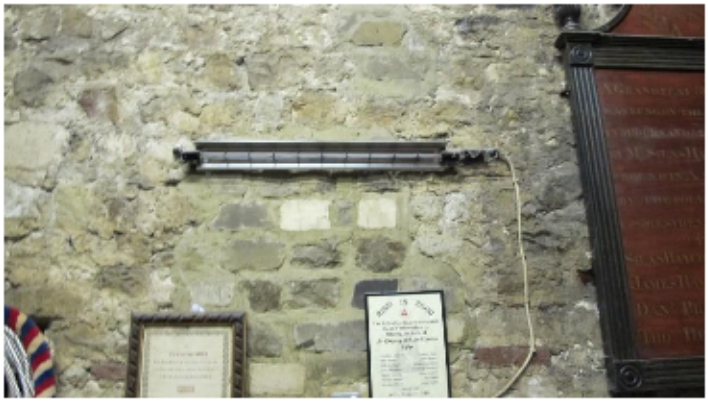
Replacement of the portable convector heaters, and radiant bar heaters on the wall with modern far infrared panel heaters would provide a rapid heating system.
If this room is used by small children, playing on the floor, an underfloor heating mat may be an option.
In both cases it is expected the heating would only be operative for a short period – so it could be controlled by a timer button (e.g. press for one hors operation).

10.2 Heating – Ringing Chamber

This room is another occasionally used space. The church should consult with the ringers to understand if the present radiant bar heaters are sufficient.

The convector heater is probably ineffective as the heat will rise and running it for a long enough time to warm the room (5m high ceiling, 150m^3) will be uneconomic, so it is a candidate for replacement with a radiant far infrared panel. These may offer an advantage – and should be done if the present heaters require replacement.

If removed, the heater above might be of use in the above porch room.



The ringing chamber would benefit from more efficient far infrared panel heaters which could replace radiant bar heaters.

10.3 Window – Ringing Chamber

It was noted that this window , which opens inwards, has a large gap to the bottom right of its frame (not visible in the photo below). This should be filled properly (possibly with lime mortar – consult your architect). In the short term it can be filled with plasticine.

10.4 Radiant Infrared wall mounted panels

Several companies offering similar far infrared panels for wall or ceiling mounting. Standard panels have a white finish, but some companies offer a range with pictures pre-printed.

Panels come in three families; (i) low surface temperature for low wall mounting (42°C for use with elderly and very young children, 55°C for schools – these are large to give enough area). (ii) medium temperature, often used on higher walls. (iii) high temperature designed for under-roof application in warehouses or similar; surface temperature can reach 150°C. These are unsuitable for installation directly onto wooden supports.

Suitable electric panel heaters would be far infrared panels such as https://www.warm4less.com/product/63/1200-watt-platinum-white- . can be purchased widely and fitted by any competent electrician. It is recommended that they are fitted with a time delay switch such as https://www.danlers.co.uk/time-lag-switches/77-products/time-lag-switches/multi-selectable-time-lag-switch/159-tlsw-ms so they can not be left on accidently after use.

11 Renewable Energy Potential

The potential for the generation of renewable energy on site has been reviewed and the viability noted.

Renewable Energy Type	Viable
Solar PV	Small system possible
Battery Storage	Future option
Wind	No – no suitable land away from buildings
Micro-Hydro	No – no water course
Solar Thermal	No – insufficient hot water need
Ground Source Heat Pump	No – archaeology in ground and radiator system
Air Source Heat Pump	Only if location suitable
Biomass	No – not enough heating load as well as air quality issues

11.1 Solar Photovoltaic power

There are only small areas of roof which are suitable for installation of PV: the tower roof 25-30m^2 and possibly the south aisle roof behind the parapet. A small system would be viable if the church uses sufficient electricity during the day. However, moving to a 100% renewable electricity tariff will contribute to lowering the church's carbon footprint without expenditure.

The government has advertised a "Smart Export Guarantee" to begin in 2020 which would pay for electricity generated and exported to the grid (the Feed in Tariff having ended). One of the issues for churches is that most lighting use is at periods when the electricity is not being generated, so any implementation of an SPV system must wait until the SEG terms are guaranteed to assist financial viability.

The tower or aisle roofs may offer a site, although the aisle it will often be shaded by either the tower in the early morning, or the parapet at low sun angles.

The relatively flat nave roof offers an area of around 25m^2. This could generate 0.15kWpeak/m^2 giving a 4kWpeak system. A 1kWpeak system can generate 800kWh annually, giving a total annual generation of 3200kWh. This is about one quarter of the church's annual electricity use (16,618kWh) so it would cover daytime lighting and other needs.

Battery Storage is not strictly a renewable energy solution, but battery storage does however provide a means of storing energy generated from solar PV on site to be able to be used at peak times or later into the day when the PV is no longer generating. It therefore extends the usefulness of the existing PV system particularly in this sort of church. This is a new but fast-growing technology with prices expected to fall substantial over the next 2 to 3 years.

The viability of a solar PV system would be increased only marginally if the heating system was to be run from a heat pump, as part of heating needs occur after dark.

11.2 Air Source Heat Pump potential locations

Air source heat pumps are compatible with underfloor heating when (as normal) it operates with fairly low water temperatures. The drawback is the need to locate the units in a well ventilated area, but they cannot be visible from normal viewing angles.

There are two possible locations identified

1 South Aisle roof behind parapet – only feasible if the parapet is high enough to hide the units

2 Chancel roof south side, next to tower – only if invisible from ground. Difficult access and interference with gutter maintenance.

A renewable heat incentive payment may be gained but this is dependent on the incentives available at the time of installation.

12 Funding Sources

There are a variety of charitable grants for churches undertaking works and a comprehensive list of available grants is available at https://www.parishresources.org.uk/wp-content/uploads/Charitable-Grants-for-Churches-Nov-2019.pdf

13 Faculty Requirements

It must be noted that all works intended to be undertaken should be discussed with the DAC at the Diocese.

Throughout this report we have indicated our view on what category of permission may be needed to undertake the work. This is for guidance only and must be checked prior to proceeding as views of different DACs can differ.

Under the new faculty rules;

List A is for more minor work which can be undertaken without the need for consultation and would include changing of light bulbs within existing fittings, repair and maintenance works to heating and electrical systems and repairs to the building which do not affect the historic fabric.

List B is for works which can be undertaken without a faculty but must be consulted on with permission sought from the Archdeacon through the DAC. This includes works of adaptation (but not substantial addition or replacement) of heating and electrical systems and also the replacement of existing boilers so long at the same pipe work, fuel source and flues are used. It can also be used to replace heating controls.

All other works will be subject to a full faculty.

Works which affect the external appearance of the church will also require planning permission (but not listed building consent) from the local authority and this will be required for items such as PV installations.

14 Report Circulation

In addition to the PCC, this report is also sent to:

1. Your DAC secretary and your Diocesan Environment Officer, Teresa Redfern, because
    - They maybe be able to offer you help and support with implementing your audit
    - They want to look across all the audits in your diocese to learn what the most common recommendations are.
2. Catherine Ross, the officer in the Cathedral and Church Buildings team centrally who leads on the environment, who wants to learn from all the audits across the country. She will be identifying cost-effective actions churches like yours might be able to make.