Energy Audit and Survey Report

St Mary of Charity, Faversham

Version Control

Author	Reviewer	Date	Version
Paul Hamley	Matt Fulford	25th January 2020	1.0

Contents

1. Executive Summary

An energy survey of St Mary of Charity, Faversham 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 schemes principal energy suppliers.

St Mary of Charity, Faversham is a large parish church with Norman origins, the chancel and transepts date from 1327 with the nave rebuilt in 1754 and a west tower dating from 1790. 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
Change all lighting to LED	2,750	£360	£2,000	5.58	Faculty	0.84	£2,367.42
Colour Code lighting switches	Nil	Nil	Nil	N/A	None	N/A	N/A
Install presence detector controls for lighting for visitor access times	700	£91	£300	3.29	List B	0.22	£1,395.09
Install draught proofing measures	2,000	£150	£100	0.67	List A	0.37	£271.80
Recover VAT charged at 20%	None	15% where incorrect amount has been levied	Nil	N/A	None	N/A	N/A
Switch electricity (and gas) suppliers to ones which provide 100% renewable (or green gas) supplies	N/A	£3,000	Nil	Immediate	None	N/A	N/A

Investigate blocking of ventilation holes in nave ceiling (former gas light vents)	5,000	£375	£2,000	5.33	List B / Faculty	0.92	£2,174.39
Install solar panels on flat sections of south aisle roof	10,000	£1,300	£18,000	13.80	Faculty	3.07	£5,859.38
Boiler replacement plan – evaluate electric heating options against Air Source Heat Pump [taking age and condition of central heating installation into account]	Potentially 25% through less preheating 25,000	TBC	£15k under pew Plus £8k radiant	TBC	Faculty	4.5	TBC

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

Based on current contracted prices of 13.0452p/kWh and 7.5p/kWh for electricity and mains gas respectively.

If all measures were implemented this would save the church over £2,000 operating expenditure per year.

2. Introduction

This report is provided to the PCC of St Mary of Charity, Faversham 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 Mary of Charity, Faversham, CT1 1NH was completed on the 26th November 2019 by Dr. 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 Mary of Charity, Faversham	606126
Gross Internal Floor Area	1166 m^2
Listed Status	Grade I
Typical Congregation Size	90

The church typically used for 16 hours per week for the following activities

Services	4 hours per week Open 8 hours
Meetings and Church Groups	10 hours per week
Community Use	3 hours per week
Occasional Offices	1.5 hours per week

Church annual use = 1050 hours

Heating hours: Church = 612 hours (calculated from annual gas use and boiler power).

Estimated footfall (church only) = 18000 people based on details provided of all meetings and community uses summarised above.

3. Energy Procurement Review

Energy bills for gas and electricity have been supplied by St Mary of Charity, Faversham and have been reviewed against the current market rates for energy.

The current electricity rates are:

Single / Blended Rate	13.0452p/kWh	In line with current market rates
Standing Charge	30.7960p/day	N/A

The current gas rates are:

Single / Blended Rate	7.5p/kWh	Above current market rates
Standing Charge	Zero p/day	Included in cost

If the rate is adjusted by subtracting an average standing charge of 50p/day (£182 per year), this results in a rate of 7.28p/kWh, which is very high (around double typical market rates)

The above review has highlighted that there are opportunities to gain cost savings from improved procurement of the energy supplies at this site. We would therefore recommend that the church obtains a quotation for its gas and electricity supplies from the CofE parish buying scheme, https://www.parishbuying.org.uk/index.php/categories/energy/energy-basket. This scheme only offers 100% renewable energy sourced electricity and therefore it is an important part of the process of making churches more sustainable.

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

VAT	5% for Gas 20% for electricity prior to April 2019, and from 1st November 2019	The organization is understood to be a charity and therefore should be benefiting from only be charged a 5% VAT rate. A VAT declaration should be sent to the supplier to adjust this.
CCL	100% charged	As the organisation is being charged the wrong VAT rate, they are also being charged CCL which should not be applied as they are a charitable organisation, Sending the supplier a VAT declaration will remove this charge.

The above review has highlighted that VAT and CCL are being charged when the organisation is understood to be a charity and have VAT exemption status. As such the PCC of St Mary of Charity, Faversham should send the supplier at VAT declaration confirming this and check all supplies on other sites.

4. Energy Usage Details

4.1 Energy Consumption

St Mary of Charity, Faversham uses 15,600 kWh/year of electricity, costing in the region of £2,560 per year, and 104,000 kWh/year of gas, costing over £8,000.

This data has been taken from the annual energy invoices provided by the suppliers of the site.

Energy Usage Details – Utility Bills

Utility	Annual use/ kWh	from	to	Cost
Electricity - Church	15,605	1/1/19	31/12/19	£2,563
Gas – Church	103,894	1/1/19	31/12/19	£8,164

Meter Details

Utility	Meter Serial	Type	Pulsed output	Location
Electricity – Church	E11Z43738	EMDI Atlas Mk10D	Yes	West wall end of nave
Gas – Church	M025 A00665 13 D6			Meter box in churchyard next to gate

The gas meter cupboard in the churchyard beside the gate was found to be insecure, the door being fastened by a twig. A secure lock is required for this accessible location.

It is recommended that the church consider asking their suppliers to install a smart gas meter so that the usage can be monitored more closely and the patterns of usage reviewed against the times the building is used.

4.2 Energy Profiling

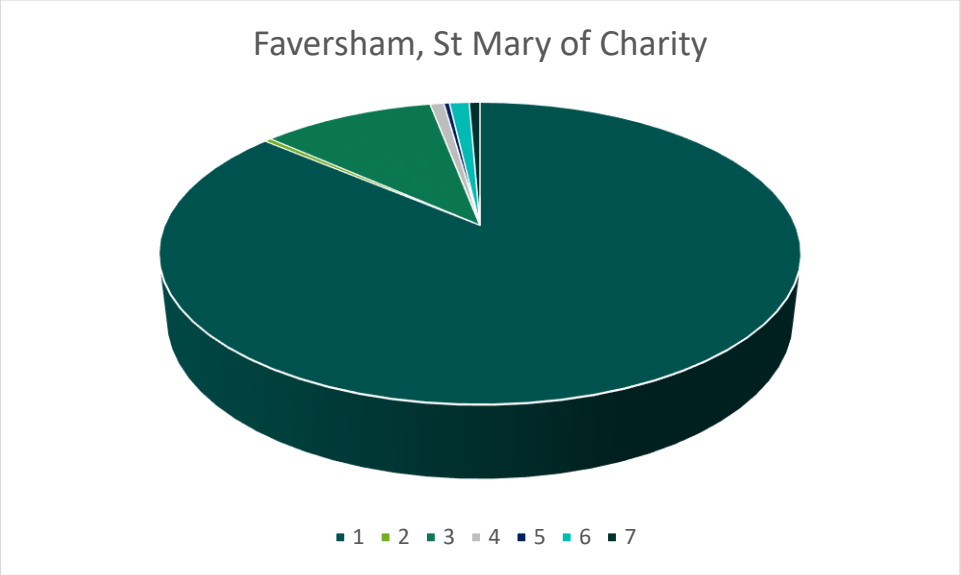
The main energy use within the church can be summarised as follows:

Service	Description	Power	Annual Use/ kWh	Estimated Proportion of Usage %
Gas heating	Two MHS Roca Regency G100/90 of 103kW Sadia water heater (est 2 hours/week)	**206kW** **2kW**	**103700** **~200 TOTAL 103,894**	87.8
Boiler pump	Two	400W	250	0.2
Lighting **Nave** **Crossing** **Chancel** **Aisles** **Vestry** **Kitchen** **Toilet** **Tower** **Ringing room** **Floodlight**	10 pendant lanterns with various types of CFL installed est 25W each 8 floodlights (small), est 80W each 8 floodlights est 250W each 4 spotlights est 100W each 2 x 4 downlights est 100W each **TOTAL** Use for services and meetings Background lighting for visitors when church open estimate 3 x CFL est 20W each 1 halogen, 77W 4 hours/week CFL Occasional use only 4 hours/week Dusk to midnight (average 5.5 hours), 2000 hours p.a.	 4.23kW 137W 50W 25W 100W 500W	 4440 7000 70 10 20 1000	 9.0 0.6
Heating [Electric]	Ringing room heater, on a timer, 6h per week x 40 weeks = 250 hours	2kW	500	0.4%
Hot Water	kettle– 30 boils of 3 minutes /week x 52 weeks.	3kW	78	

	Urn – monthly use 4h x 12 Toilet heater Handwash HW3	3kW 3kW	144 minimal	0.3%
Other Small Power **Kitchen**	Sound system Vacuum cleaner 2h/week Fridge Lec Fridge Beko Microwave	1kW 2kW 50W 60W 1kW	156 208 125 140 10	 1.1%
Organ	Organ, est 3 hours per week	5kW	780	0.6%

Total Annual Consumption 2019: 15,605kWh

Closure of the energy use is obtained by estimating for lighting left on whilst the church is unlocked.



KEY 1 Heating, gas 2 Heating, electric and boiler pumps 3 Lighting

4 Floodlighting 5 Hot water 6 Small power 7 Organ

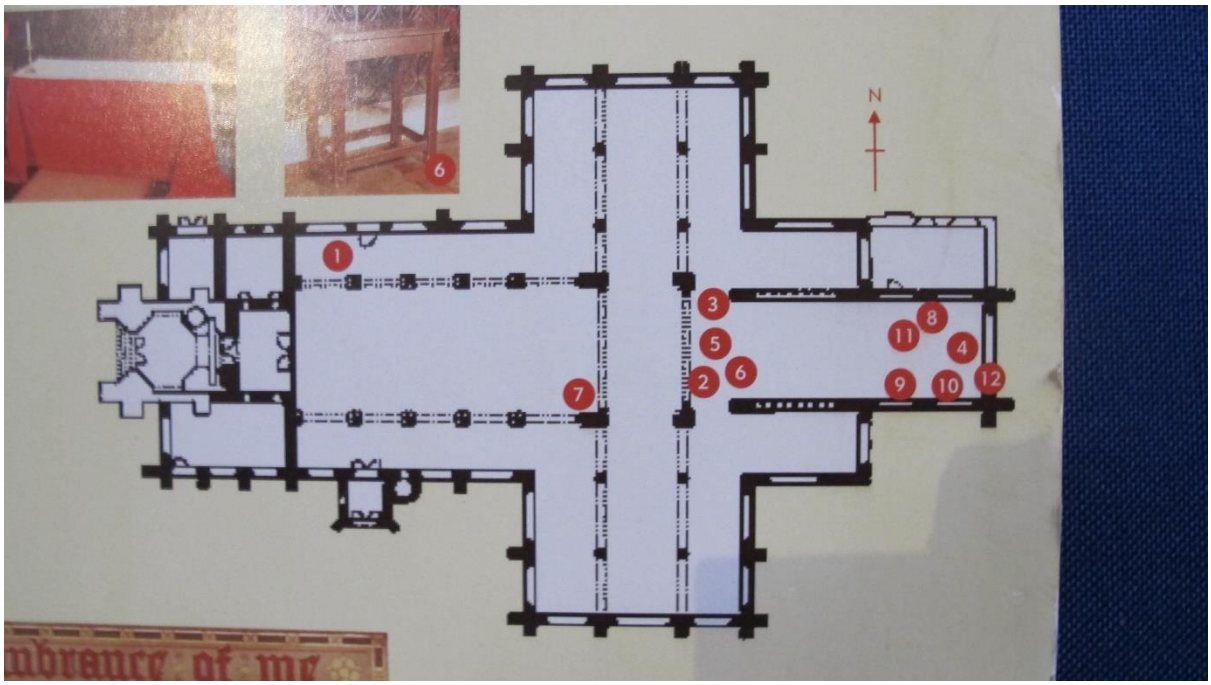
As can be seen from this data, the heating makes up by far the largest proportion of the energy usage on site. The other significant load is lighting.

4.3 Energy Benchmarking

In comparison to national benchmarks[1] for Church energy use, St Mary of Charity, Faversham uses 67% of electricity and 59% of heating energy than would be expected for a church of this size.

	Size (m^2 GIA)	St Mary of Charity, Faversham use kWh/m^2	Typical Church use kWh/m^2	Efficient Church Use kWh/m^2	Variance from Typical
St Mary of Charity, Faversham (electricity)	1166	13.4	20	10	67%
St Mary of Charity, Faversham (heating fuel)	1166	89.1	150	80	59%
TOTAL	1166	102	170	90	60%

There is currently no benchmark data which takes hours of use and footfall into account.



[1] CofE Shrinking the Footprint – Energy Audit 2013

5. Energy Saving Recommendations (Electricity)

5.1 Lighting (fittings)

The pendant lanterns in the nave are lit by CFL bulbs of various kinds of 20-30W.

Replacement of these by LED lights of equivalent light output will reduce the power requirement to around 10-15W each. Floodlights should be changed for LED (there are a variety of powers available, your architect or a lighting contractor should be approached for advice on the necessary lumen value.

For the calculations, it has been assumed that 250W floodlights will be replaced by 100W LEDs, and 100W spotlights by 25W LEDs.

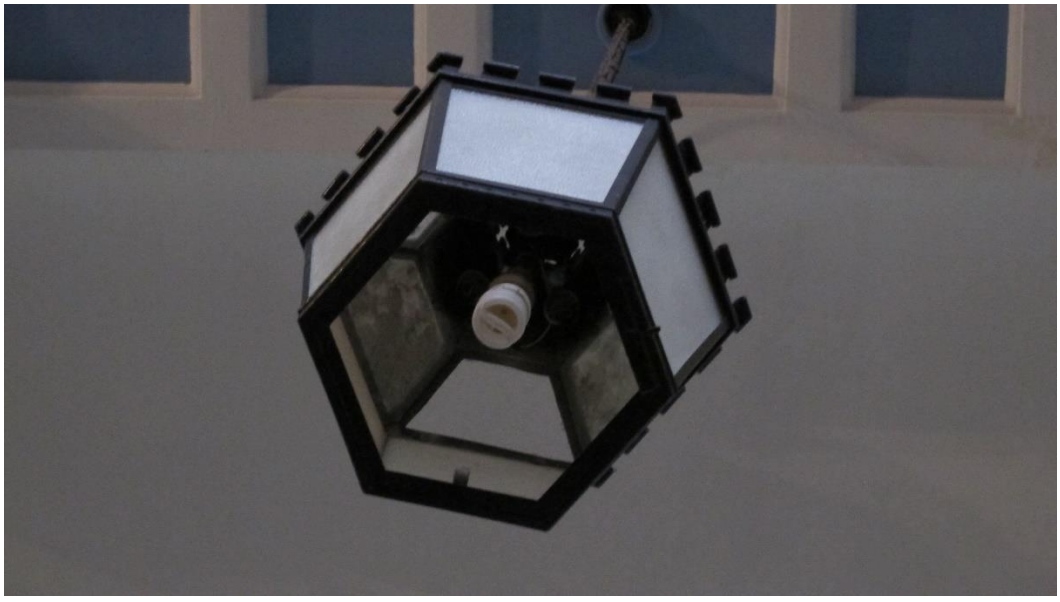
Any new LED fittings will have a much longer life and hence reduce the frequency of replacement of lamps.

For the spot lights the Megaman range of LED spot (reflector) lights https://www.megamanuk.com/products/led-lamps/reflector/ provides some very suitable substitutes to the current lamps.

It is recommended that all of the fittings, scheduled in Appendix 1, are changed for LED.

An estimated 4.2kW of lighting would be replaced by 1.6kW.

If all the lights were changed the total capital cost (supplied and fitted) would be around £2,000. The annual cost saving would be £360 resulting in a payback of around 6 years.



5.2 Lighting (control for internal lights)

The lighting control panels should be colour coded.

For periods when the church is opened, but not in use for meetings or services, it is suggested that presence detector controlled lighting should be installed with timers, so that lights turn off automatically when there is no-one in each section of the building. It should probably be divided nave, crossing and north transept, south transept/chapel, chancel. This will reduce the electricity bill for periods when the church is not in use but open for visitors.

6. Energy Saving Recommendation (Heating)

6.1 Heating System and Strategy

The church currently uses gas central heating with cast iron radiators to heat the church with further contributions from the pipework laid in grilled trenches.

The twin boilers are reported to be 37 years old, so a boiler replacement plan should be agreed by the church.

This requires more detailed investigation, which should include:

- The future use of the church spaces, where and when heating is required
- A survey of the condition of the central heating system (what is its lifetime and replacement cost?)
- Feasibility of installing an Air Source Heat Pump in the current boiler room to run the CH system
- Assessment of how areas of the church could be heated electrically (where there are not pews)
- Feasibility of installing solar panels, which would enhance viability of electrical heating methods.

If a gas boiler is to be retained long term, a replacement boiler will need to be made hydrogen ready. Hydrogen is due to be added to the gas grid over the next five year period. If plans to decarbonise the gas grid are implemented; the hydrogen mix will eventually exceed 20% and a hydrogen compatible boiler (and piping) will be required. The transition will be overseen by the regulatory bodies in a similar way to that between town gas and North Sea gas.

Alternative heating methods could include replacing the boilers with Air Source Heat Pumps or replacing the radiator system completely with electrical heating. These are considered in more detail in Sections 7 and 10.

ASHPs require an external location, and it is unclear whether the current boiler room would be suitably ventilated to allow installation.

Areas with pews can be heated with under pew heaters. However, the transepts, chancel and crossing would then be unheated; heating the seated area in the South Transept, below, would require a radiant heating method.

The convector heating in the ringing room is adequate providing that it's use is managed.

The room in the south west of the church (which is used for toddler groups and other meetings) should be provided with independent heating so it can be used without having to heat the whole church.

6.2 Reduce / Discontinue Background 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 organ (and other sensitive areas such as historic papers stored in the vestry) may require some local background heating specific to that area. In general, sensitive paper records should be removed for storage in the county archive and organs can be installed with a local background tube heater such as https://www.dimplex.co.uk/product/ecot-4ft-tubular-heater-thermostat within the organ casing in order to provide the heat where it is required. 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)

Providing constant background heating to the church building as a whole is excessive and wasteful of energy.

6.3 Boiler Timing Optimisation

Experiments in the Diocese of Lichfield at over 50 churches have established that hot water radiator heating can be optimised by being switched off 45 minutes before the end of the service.

Purchasing of a temperature datalogger will allow the time for the church to heat (in different weather conditions) to be understood, as well as the time to switch off to be optimised. This would require someone with a computer to plug in the device and download the readings.

A suitable model retailing for around £40 is https://www.lascarelectronics.com/easylog-data-logger-el-usb-1/

6.4 Space Temperature Set Point

To assist in optimising and understanding the temperatures in the church, a datalogger such as an Easylog USB or Mindsets mini temperature datalogger could be purchased. This can then be used to inform adjustment of the thermostat setting.

It is unclear whether normal Sunday operation raises the temperature above 18°C at pew level – but you may find that if the temperature is measured at the ceiling it is above 20°C.

It is worth the church logging how low the temperature falls in winter, which will inform heating timings.

7. Alternative Heating Systems

A church with low hours of use per week will always fall back to “base” temperature between heating events (it may take around 24 hours for the temperature to fall). A system which can heat rapidly, without sending most of the heat to the ceiling first, and in addition can be configured to heat small areas independently for small services or midweek meetings will be more efficient than one which seeks to heat up the whole volume.

7.1 Under Pew heating

A future option is to install under pew electric heating. Although electricity is currently more expensive that gas per kWh, this form of heating requires little preheating time and delivers heat directly to the congregation, so the total heating requirement in kWh would be cut (perhaps by half). There are eleven sets of pews each side of the nave.

Heaters with an output of 300-400W seem to be more suitable than 500W models according to reports from different churches. Installed costs of £180 per heater are quoted. Long pews such as these would probably require three heaters each.

11 x 2 x 3 = 66 heaters for the nave. Plus heaters for the pews in the crossing and chancel areas.

For replacement, two most popular under pew heaters within churches are BN Thermic PH30 heaters (http://www.bnthermic.co.uk/products/convection-heaters/ph/) or similar from http://www.electricheatingsolutions.co.uk/Content/PewHeating. Cable runs to the pew heaters could run along the North and South walls (all cabling should be in armoured cable or FP200 Gold when above ground) to the both rows of pews quite easily.

Further pews are located in the crossing area, above.

The under pew (see photo below) and panel heaters have been recently installed at St Andrews Church, Chedworth, Gloucestershire, GL54 4AJ. The church is open in daylight hours so can be viewed at any time.

A further option is “Cooltouch” fabric covered heating panels.
https://www.cooltouchheaters.co.uk/

7.2 Use of Electric Radiant Heating for Heating Specific Areas only

To avoid having to heat up the entire church building for small mid-week services it is recommended that the PCC consider installing radiant electrical heating in areas which cannot be heated by under pew heaters.

The seated area in the south transept, below could potentially be heated by overhead radiant chandelier mounted heaters. The heaters could be suspended from the ceiling or a suitable beam. There is no apparent room for wall mounted radiant panels in the south transept.

This heating method has been installed at St Catherine's, Faversham as the sole form of heating, below, with the heating chandeliers suspended from the midpoints of arches.

Costs are in the order of £500 per kW heater installed.

7.3 Far Infra-red radiant panels

These panels are rectangular and do not emit any visible radiation. They come in low, medium and high temperature versions (low being suited for ground level use near people, such as in schools and hospitals. High temperature panels, with a 150°C surface temperature are installed under high ceilings).

Churches have used these panels suspended under (often) aisle ceilings between the beams.

Some companies offer coloured panels to match stonework, or with a printed image.

At St Mary of Charity, this might be an option for heating the choir vestry, vestry or kitchen/ tower areas.

Suitable electric panel heaters would be far infrared panels such as https://www.warm4less.com/product/63/1200-watt-platinum-white- . These 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.

8. Energy Saving Measures (Building Fabric)

8.1 Ventilation holes in the nave ceiling

These holes are believed to be former gas light vents. The church architect should be consulted to investigate whether they can safely be blocked up to prevent draughts from above.

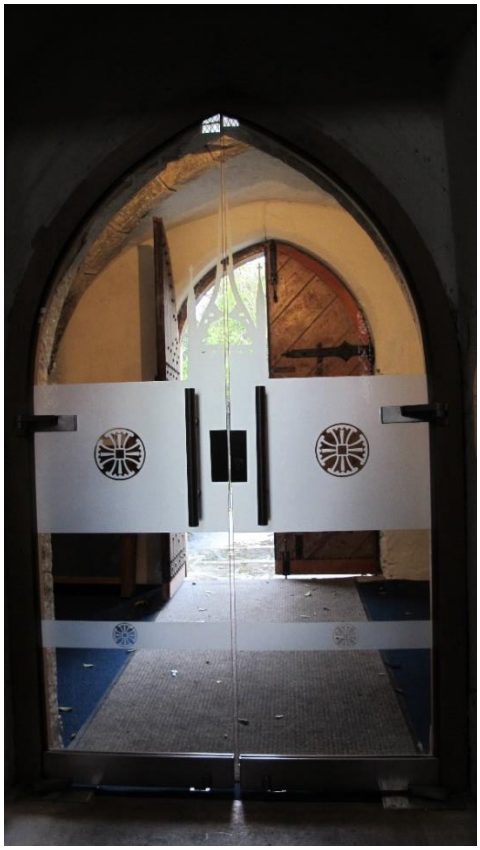
8.2 Roof Insulation

Fit 270mm of insulation into the loft

As the nave has a ceiling below the roof, it may be possible to install insulation if access is possible and safe.

The ceiling/roof of a building is the largest contributing area to heat loss from a building as heat rises. The insulation of such spaces can therefore have a dramatic impact on both the efficiency of the heating system and the temperature of the space below. Insulation measures such as this also need to be combined with control measures such as TRV's or room sensors to ensure that the space does not overheat because of the additional insulation.

8.3 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. There is a clear gap below the porch outer door (left). The tower west door (right) suffers from ingress of moisture and leaves underneath.

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 large key holes 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.

9. 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	Yes - on south aisle roof
Battery Storage	Yes
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 boiler room location is suitable
Biomass	No –uneven heating load as well as air quality issues

9.1 Solar Photovoltaic potential

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.

For St Mary of Charity church, the relatively flat roof of the south aisle, behind a parapet offers a potential location – this would have to be confirmed with your architect as to suitability for extra weight and wind loading on the roof structure.

The flat aisle and chancel roof sections offer a usable area of around 100m^2. This could generate 0.15kWpeak/m^2 giving a 15kWpeak system. A 1kWpeak system can generate 800kWh annually, 15kWpeak giving a total annual generation of 12,000kWh. This is in the same region as the church's annual electricity use (15,600kWh) – although much of that use will be during the evening and night.

It is assumed that panels would have to be laid directly onto the roof surface so they are not visible, i.e. not at the optimum angle to the sun which is around 30 degrees.

Costs for a 15kW peak system, (estimated at £1,200 per kW peak for large installations including scaffolding) are £18k with cabling and inverter).

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 therefore investment into this may be worth delaying at this stage.

The viability of a solar PV system would be increased further if the heating was to be changed to either a direct electrical system, or to a heat pump.

9.2 Heat Pump comparison with Electric heating

Air source heat pumps require externally mounted units of similar appearance to air conditioning units in well ventilated places. Given the size of the church, it is not considered that there is any location on the exterior of the building where these units could be accommodated unless it could be inserted into the boiler room in the tower (blue doors). This would require adequate ventilation to be arranged, with extra louvres in the doors and probably a ventilation duct.

ASHPs consume electricity, but deliver between 2.5 and 4 times the amount of heat in kWh that they consume. Replacement of the boiler, using around 100,000kWh of gas per year would require an electricity input of 33,000kWh to run an ASHP operating at an average Coefficient of Performance of 3.

This would cost around £4300 in electricity (at the current rate of £13.0452 p/kWh), compared to the current gas cost of £8,163 – the current tariff of 7.5p/kWh for gas is extremely high.

If installation of an ASHP is technically feasible, *then it offers a cheaper alternative to the current gas tariff,* whilst retaining space heating for the whole building.

Change to group procurement through Parish Buying should considerably lower gas expenditure, perhaps by half.

The advantage of changing to ASHP is that the existing internal heating infrastructure could be retained – if the condition of the cast iron radiators and pipes is good enough.

If the central heating hardware requires replacement, it is probably better to opt for a flexible electrical heating option, combining under pew and radiant heaters for different zones of the church.

10. 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

11. 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.

12. Report Circulation

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

1. Your DAC secretary and your DEO, 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.

Appendix 1 – Schedule of Lighting to be Replaced or Upgraded

Room/Location	Number of Fittings	Recommended Upgrade	Annual Saving (£)	Total Cost (£)	Payback
		All replaced by LED Presence detectors fitted to control a portion of lighting for visitors.			
NAVE	10	From CFL to LED			
AISLE North	4				
AISLE South	4				
CHANCEL	8 floodlights 4 spotlights	To LED			
CROSSING	8 floodlights				
	TOTAL 38		£360	£2000	
	From 4.2kW	To 1.6kW			
Kitchen		Replacement by church with LED as required			
Toilets		As above			

The lighting fixed at high level will need to be changed by a lighting contractor. It is recommended that both bulb and their fittings (luminaires) of the spotlights are changed to ensure compatibility.

Further expenditure would be needed for any rewiring or enhanced controls.

There are a variety of LED floodlights on the market ranging from those around 10-25W retailing at £25 to powerful 12000 Lumen lamps (150W replacing 1200W non LED) at around £75, such as the V-Tac Slimline LED Floodlight 150w Daylight. There is no need to purchase outdoor IP65 rated moisture resistant models.

Parish Buying may offer an economic route to bulk buying of LED light bulbs.

Note that LED lamps also offer savings from 3-4 times longer lifetimes in addition to lower operating costs.

As there are so many different items on the market, it is suggested that you contact your inspecting architect (or a diocese / architect recommended lighting contractor) for advice on the appropriate lamps / lumen value / colour temperature and luminaire.