ESOS-ENERGY
Energy efficient solutions

Energy Efficiency and Zero Carbon Advice

St Ambrose, Leyland
PCC of St Ambrose

THE DIOCESE OF BLACKBURN
THE CHURCH OF ENGLAND IN LANCASHIRE

Author	Reviewer	Date	Version
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Contents

1. Executive Summary

An energy survey of St Ambrose, Leyland was undertaken by ESOS Energy 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 Ambrose, Leyland is a large parish church located in a suburban area in Leyland, near Preston. The church was built in 1882 and is Grade II listed. The church is constructed of stone with green slate roofs and has a West tower. Internally the church utilises flexible seating and there are no fixed pews. The ceiling is exposed with fixed brace ceilings and windows are single glazed, leaded set into stone mullions. There is both gas and electricity supplied to the site.

The church has a number of ways in which it 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 and the route to net zero carbon are used as the action plan for the church in implementing these recommendations over the coming years.

Energy saving recommendation	Estimated Annual Energy Saving (kWh)	Estimated Annual Cost Saving (£)	Estimated capital cost (£)	Payback (years)	Permission needed	CO2 saving (tonnes of CO2e/year)
Consider install Electric Vehicle Charging Points	0	N/A	N/A	N/A	Faculty	
Fit timed fused spurs to hot water heaters	162	£65	£90	1.39	List A (None)	0.04
Install Draughtproofing to External Doors	3,093	£371	£1,600	4.31	List B	0.57
Change existing lighting for low energy lamps/fittings	183	£73	£420	5.74	Faculty	0.05
Install PIR motion sensors on selected lighting circuits	6	£2	£24	10.51	List B	0.00
Replace heating system for electrical based heating solution	27,966	£1,082	£12,699	11.74	Faculty	4.60
Install an Air Source Heat Pump into the building to replace existing heating system	46,913	£0	£56,000	N/A	Faculty	7.28

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

Based on recently announced protected energy cap prices, we have used representative rates of 40p/kWh and 12p/kWh for electricity and mains gas respectively.

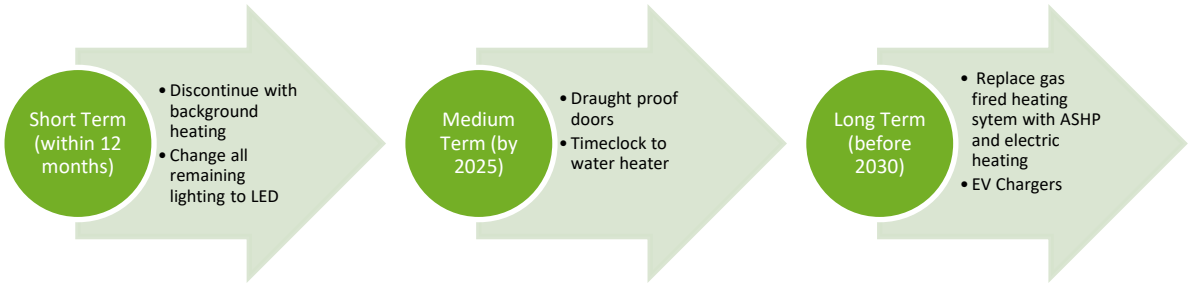
If all measures were implemented this would save the church £1,593 per year and reduce its carbon footprint by 12.54 tonnes (63%).

2. The Route to Net Zero Carbon

Our Government has committed to move towards Net Zero Carbon – the point at which we have reduced emissions as much as we can and then balanced any residual emissions through removal of carbon from the atmosphere. They have done this as part of a worldwide agreement which aims to limit global warming to well under 2 degrees Celsius, with an aim of keeping it below 1.5 degrees Celsius. This will help protect all of us from the impacts of climate change.

In February 2020, the Church of England's General Synod set its own Net Zero Carbon target. The first stage of this target covers energy used by churches, cathedrals, schools, vicarages, other church buildings, as well as emissions caused by reimbursed transport. The target date is 2030.

This church has a clear route to become net zero by 2030 by undertaking the following steps:



3. Introduction

This report is provided to the PCC of St Ambrose, Leyland to give them 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 Ambrose, Leyland, Moss Lane, Leyland, Preston PR25 4XA was completed on the 6th July 2022 by David Legge. David is an experienced energy auditor with over 10 years' experience in sustainability and energy matters in the built environment. David is a fully qualified ESOS lead assessor with CIBSE and a CIBSE Low Carbon Consultant and a fully qualified ISO50001 lead auditor.

St Ambrose, Leyland	
Church Code	603121
Gross Internal Floor Area	495 m^2
Listed Status	Grade II

The church typically used for 9 hours per week for the following activities

Type of Use	**Hours Per Week (Typical)**	**Average Number of Attendees**
Services	6 hours per week	60
Meetings and Church Groups	2 hours per week	Varies
Community Use	1 hour per week	Varies

There is additional usage over and above these times for festivals, weddings, funerals and the like.

4. Energy Usage Details

St Ambrose, Leyland uses 3,373 kWh/year of electricity, costing in the region of £575 per year, and 103,105 kWh/year of gas, costing £12,373. The total carbon emissions associated with this energy use are 19.9 CO_2e tonnes/year. Due to recent price rises, costs are estimated to rise to £1,350 for electricity and £12,375 for gas when contracts renew.

This data has been taken from the annual energy invoices provided by the suppliers of the site. St Ambrose, Leyland has one main electricity meter, serial number E14UP00434. There is one gas meter serving the site.

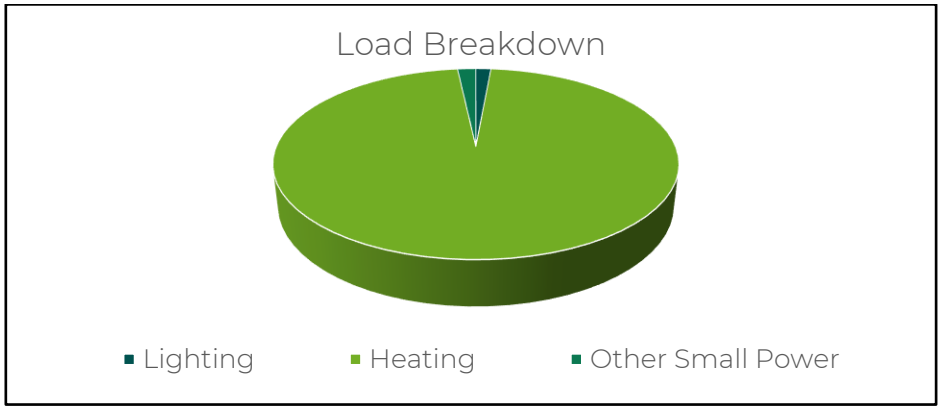
Utility	Meter Serial	Type	Pulsed output	Location
Electricity	E14UP00434	3 phase 100A	Yes but not fully AMR connected	Boiler room

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

4.1 Energy Profiling

The main energy consuming plant can be summarised as follows:

Service	Description	Estimated Proportion of Usage
Lighting	Predominantly LED throughout but some small areas which T8 and T12 fluorescent fittings	1%
Heating	Provided by gas fired boilers to perimeter panel and column radiators	97%
Other Small Power	Sound system, alarm and security systems and other plug loads	2%



As can been seen from this data, the heating makes up by far the largest proportion of the energy usage on site.

4.2 Energy Benchmarking

In comparison to national benchmarks for church energy use St Ambrose, Leyland uses 66% less electricity and 39% more heating energy than would be expected for a church of this size.

	Size (m^2 GIA)	Annual Energy Usage (kWh)	Actual kWh/m^2	Benchmark kWh/m^2	Variance from Benchmark
St Ambrose, Leyland (elec)	495	3,373	6.81	20.00	-66%
St Ambrose, Leyland (gas)	495	103,105	208.29	150.00	39%
TOTAL	495	106,478	215.11	170.00	27%

5. Efficient / Low Carbon Heating Strategy

The energy used for heating a church typically makes up around 80% to 90% of the overall energy consumption. Putting in place a heating strategy that is energy efficient and low carbon is, therefore, of the highest priority

The Church of England is in the process of reviewing its heating guidelines. The process has already established some principles for heating that can help churches as they seek an acceptable combination of comfort, conservation, affordability, and environmental care. The principles can be found at https://www.churchofengland.org/sites/default/files/2020-04/CBC%20Heating%20guidance%20principles%20FINAL%20issued.pdf

As the principles make clear, every church's strategy will be unique to it, informed by many factors, including the nature of its usage, the system it's starting from, the conservation needs of the building, and the resources available. The strategies in this audit are designed specifically for your church.

Our recommendations on heating generally fall within three major areas. Firstly, for all churches we make recommendations that will help to reduce energy wastage and, as a starting point, to optimise the system that you already have

Secondly, we recommend options for many churches that focus on heating people rather than the full volume of the church. Some of the changes that can help with this will be 'soft' changes – others will relate to the heating system itself.

Finally, we make recommendations about moving away from fossil fuels. Moves away from fossil fuels are key to cutting emissions. For most churches, this will involve moving from gas, oil or LPG to electricity. Electricity currently creates carbon emissions around the same level as mains gas, but the carbon emissions associated with it are reducing rapidly as the UK builds more renewable energy and decommissions its remaining oil and coal fired power stations. Mains gas does have some potential to reduce its carbon content through the use of bio gas and hydrogen but these are less developed solutions and will be unable to deliver 'zero carbon mains gas'. Some local areas may also be considering the option of district heating networks.

While moving away from fossil fuels may not always be possible, as the principles state, "churches should be expected to have at least carefully considered the option of moving away from fossil-fuel based heating (gas and oil boilers) towards electric-based heating." And if such options are not viable now, the churches "can try to be ready for a future retro-fit when technology and the grid has progressed."

The church is currently heated by gas fired boilers to perimeter column and panel radiators to all areas of the church. There are no fixed pews within the church as these have been removed in favour of flexible seating. The existing boiler still has 10 years' of serviceable life and therefore the boiler should be retained until the end of its lifecycle in around 2033. However, the church is used intermittently during the week and much of the usage is for smaller groups than the typical Sunday congregation. Therefore, it is proposed that a phased approach to decarbonise the heating is made for the church.

The first phase would involve the introduction of electric heating to allow smaller services and events in the week to take place with good thermal comfort levels but not to have to heat the entire air volume of the church in order to do so.

The second phase would occur at the end of the boiler life in around 10 years' time and at this stage, an air to air source heat pump could be installed to provide heating to the main body of the church to provide heating for larger services and events.

5.1 Phase 1 - Install Electric Panel Heaters

The 8am Sunday service has typical congregation numbers around 15, whilst Thursday attracts 30 people and choir practice on a Tuesday is for a small group. The choir stalls could be used for both choir practice and the Sunday 8am service. These currently require the entire air volume of the church to be heated by the gas boilers whereas only a small area is needed to be heated for these times. It is recommended that the PCC consider installing electrical panel heaters in the following areas on a time delay switch and remove the existing radiators.

Area	Type/ Size	Length (mm)	Watts	Number (or m) Required
Choir stalls	Electric Under Pew 650W	948	650	12
Organ heater	Electric Under Pew 450W	702	450	1
Altar	Electric Far IR Wall Panel 1200W	1200	1200	1
Lady chapel	Electric Far IR Wall Panel 1200W	1200	1200	2
Vicar vestry	Overhead Far IR Bar Heater 1kW	1080	1000	2
WC	Electric Far IR Wall Panel 350W	600	350	1
Corridor	Electric Far IR Wall Panel 900W	1200	900	1
Church office	Electric Far IR Wall Panel 1200W	1200	1200	2
Choir vestry	Overhead Far IR Bar Heater 1.5kW	1580	1500	2
Conference room	Electric Far IR Wall Panel 1200W	1200	1200	3

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 cannot be left on accidently after use.

These heaters have a strong radiative effect (where heat is reflected to people from the surface) as well as a light convective effect (where air is warmed and moves around to heat the general space). As such these heaters tend to provide a relative instant sense of heat and comfort within the space and only need to be on for short periods of time.

For replacement, two most popular under pew heaters within churches are BN Thermic PH65 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 should run along the along the existing routes (all cabling should be in armoured cable or FP200 Gold when above ground) to the both rows of pews. Each pew heater to be switched with a neon indicated fused spur located underneath the pew seat.

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.

5.2 Phase 2 - Replace the Existing Boiler for an Air Source Heat Pump

The building is currently heated from a gas boiler which provides hot water into the heating system. The use of fossil fuels for heating means that it will not be possible for the building to become zero carbon without changing the heating system. A boiler also has heat and other efficiency losses within it, which means that the efficiency of a boiler in converting the gas into the heat is typically around 80 to 95% (depending on the age and type of boiler). Air source heat pumps use electricity to power the heat pump which takes heat from the air and puts this into water which can then go into the heating system. An air to air source heat pump can create around 4.5 units of heat for every one unit of electricity.

The existing boiler is not yet approaching the end of its serviceable life and it is therefore recommended that the replacement of the existing boiler for an air source heat pump is considered in around 8-10 years' time.

A new air source heat pump is likely to need a heating capacity of around 100kW. As heat pumps operate on a low temperature basis some of the radiators and other heat emitters around the site may require upgrading. 3 phase electrical power may also be required to power the units.

Good local renewable companies can be contacted for further detailed assessment of heat pumps and quotes or contact www.yourfutureenergy.co.uk

6. Improve the Existing Heating System

In the years before the replacement of the existing heating system it is recommended that measures are taken to improve the efficiency of the existing heating system, this should include:

6.1 Discontinue with Background Heating Strategy

Most traditional churches were constructed 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. At the very least we would recommend that this background level is reduced to a maximum of 12°C and ideally avoided all together.

6.2 Improve Heating Control Settings

The churches heating is controlled by a Honeywell controller which is poorly understood.

The controller is lacking in terms of its usability and it is recommended that a user friendly controlled is installed that two or three members of the site team are fully trained in using and are confident in being able to set timings and settings on this to ensure that the heating system is effectively used prior to its replacement, to provide more efficient energy usage of the building and to provide a more comfortable environment for the congregation.

There are two important principles in setting efficient heating settings to support a comfortable church. The first is that most historic buildings survive very well without being heated and that in a number of cases the later addition of heating has actually cause fabric issues (such as the drying out of timbers, drawing damp through walls into a warmer and drier environment or causing issues beneath metal roof covings where warmer moist air becomes trapped). In most cases the fabric of a historic building would prefer not to be heated and the constant 'yo-yo' up and down of the heating is the most damaging. The second principle is that to provide comfort to occupants one either needs to provide an immediate injection of heat close to where the congregation are heaters (i.e. under pew heaters or radiant heaters) that warm the air around the people but makes not attempt to heat the entire air volume of the church or has a long slow building up of heat within the church building. Having the heating switch on for an hour or two once or twice a day in the mis-conceived idea that it will 'take the cold off the building' is the most damaging heating strategy for the fabric and does very little to provide comfort as the heat is lost before the next heating session. It is better to leave the building unheated when it is not occupied and then have a longer period of heating before the time when there are services or the like.

The adjustment of the heating system should be above to be carried out by any member of the church that is competent in using the controls.

7. Energy Saving Recommendations

In addition to having a revise heating strategy there are also a number of other measures that can be taken to reduce the amount of energy used within the church.

7.1 New LED Lighting

The lighting makes up a relatively large overall energy proportion of the electricity used within the church. Most areas of the building have had efficient LED lights installed but there still remains a small number of inefficient halogen fittings within the corridor and vestry areas.

It is recommended that the fittings scheduled in Appendix 1 are all changed for LED. There are a vast number of specifications of LED lights on the market but it is recommended that any LED light should come with branded chips and drivers and offer a 5 year warranty. An example of such a range of fittings is available from http://www.qvisled.com/

If all the lights were changed on a simple "like for like" the total capital cost (supplied and fitted) would be £420. The annual cost saving would be £73 resulting in a payback of around 5.7 years.

This estimate includes for the supply of the lights, the labour to install them and the access required. It does not include for any upgrade to the wiring or a new lighting design both of which the church may wish to consider. Guidance on lighting, produced by Historic England for churches, can be found at https://historicengland.org.uk/advice/caring-for-heritage/places-of-worship/making-changes-to-your-place-of-worship/advice-by-topic/lighting/

These existing fitting can also be made more efficient by simply changing the bulb/lamp within the existing fitting to w new LED bulb/lamp. This could be carried out by competent members of the churches internal team, very cost effectively and would be a List A item so no permissions would be required.

7.2 Lighting Controls (Internal)

There are several lights which currently remain on all the time in areas such as corridor and vestry areas and the like. Some of these areas are only used occasionally and for a short amount of time and as such, the light does not need to remain on constantly. There are also spaces which benefit from a good amount of natural daylight coming in through the windows where artificial lighting is not required for much of the year during the day.

It is recommended that a motion sensor is installed on these specific lighting circuits so that the lights come on only when movement is detected in the space and turn off approximately two to five minutes after the last movement has been detected (note that the duration of the time lag after which the light goes off needs to be consider alongside the type of light that is fitted. LED lights are much more suited to being switched off after only a short duration than some fluorescent lights). These movement sensors (commonly called PIRs) also have light sensors integrated into them so they can be used to make sure that the light does not come on if there is already sufficient daylight in the space.

Your existing electrician or any NICEIC registered electrical contractor can install PIR sensors onto existing lighting circuits. This can be carried out without significant disruption to the use of the space.

7.3 Timers on Fuse Spurs to Water Heaters

There is an electric point of use water heater to provide hot water for hand washing. This only needs to heat the water to the required temperature when the building is in occupation but at the moment this heater is directly wired in without any form of time control and therefore maintains it set temperature 24/7.

It is recommended that the heater is fitted with a 24 hour/7 day timeclock to replace the fused spur switch. An example of such a unit would be a TimeGuard FST77. They should be set up with times to match the times that the building is occupied and this will prevent the standing losses from the unit wasting energy during periods when the building is not occupied.

Such units can be purchased at any electrical wholesaler and fitted by your existing electrician or any NICEIC registered electrical contractor.

7.4 Draught Proof External Doors

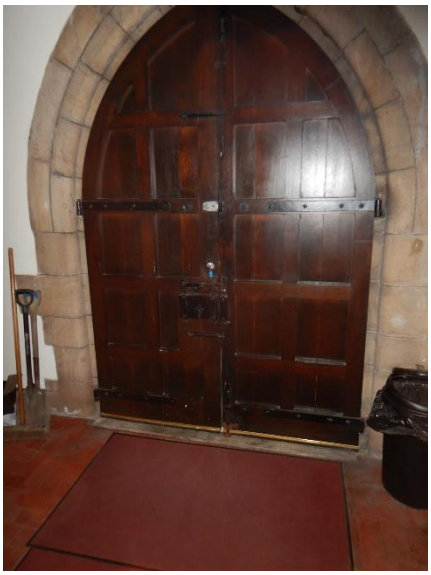
There are a number of external doors in the church. These have the original historic timber doors on them, but these do not close tightly against the stone surround and hence a large amount of cold air is coming into the church around the side and base of these doors.

It is recommended that the draughtproofing around the door is improved and draught strips are added. This could be achieved in a number of ways.

For timber doors that close onto a timber frame 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

For timber doors that close onto a stone surround more traditional solutions such brush draught strips rebated into the edge of the door by a skilled joiner. Other traditional methods such as using hessian or felt pads tacked to the door could be us ed and keeping the door maintained in a good condition is important.

Simple measures such as having a 'sausage dog' style draught excluder laid along the base of a door, using plasticine of the right colour to fill gaps where daylight can be seen and putting painted fridge magnetic over large keyholes can all be simple DIY measures which are effective.



8. Other Recommendations

8.1 Electric Vehicle Charging Points

The church has a car park to the side of it which serves the church and also the frequently used church hall. In order to make a visible statement on the churches mission of stewardship and to facilitate more sustainable transport choices by those both visiting the church and using the hall, the church may wish to consider installing an electric vehicle charging point, probably on the side of the church hall to allow visitors to charge their electric car.

Installing a unit such as a Rolec Securi-Charge http://www.rolecserv.com/ev-charging/news/view/Robust-EV-Charging-With-Rolecs-SecuriCharge-EV-Wall-Unit-Coin-Token-PAYG would allow the organisation control over who is allowed to use the unit with a key operated system. Or given the type of use of the building and control over the usage of the car park as a whole a simple 32 amp type 2 wall pod type charger may be most suitable and these are widely available through many suppliers such as http://www.rolecserv.com/ev-charging/product/EV-Charging-Points-For-The-Home.

Because of the parish office within the building the church as be considered as a place of work and as such installation grants are available through the work place charging scheme https://www.gov.uk/government/publications/workplace-charging-scheme-guidance-for-applicants-installers-and-manufacturers which will fund 75% of the installation cost up to £500.

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	No – visible roof on listed building
Wind	No – no suitable land away from buildings
Battery Storage	No – no viable PV
Micro-Hydro	No – no water course
Solar Thermal	No – insufficient hot water need
Biomass	No – not enough heating load as well as air quality issues
Air Source Heat Pump	No – insufficient electricity supply
Ground Source Heat Pump	No – archaeology in ground and radiator system

Now that the Feed in Tariff scheme has come to an end the installation of solar PV panels in situations where there is not almost full usage of the electricity generated on site is not really viable.

Having reviewed the site it is not considered that there is good viability for any renewables and instead a good clear focus on reducing the energy demand of the building should continue with a targeted approach on reducing the heating energy.

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.

Wind turbines require highly exposed sites and should be located 250m way from buildings as such this site is not suitable for a wind turbine to be installed.

Hydro electricity is a highly efficient source of renewable energy but requires a body of flowing water with a differential height which is not present on this site.

Solar thermal installations are best suited to heat water for use in washing up, hand washing and bathing. There is minimal hot water demand at this church so such an installation would not be viable.

Heat Pumps are a low carbon method of creating heat, their use and suitability for this church have been review in the section earlier on in this report on Efficient and Low Carbon Heating Strategies.

Biomass is an alternative boiler and fuel to oil or gas. It requires wood chips or pellets to be delivered on site, stored and then fed into a large boiler for burning. While the fuel is not a fossil fuel there are emissions from the burning of wood and these can be detrimental to local air quality particularly in more built up areas for all these reasons it is not considered a viable recommendation for this site.

10. Funding Sources

There are a variety of charitable grants for churches undertaking works and a comprehensive list of available grants is available on this Parish Resources page:
https://www.parishresources.org.uk/resources-for-treasurers/funding/

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. Offsetting

As you take action to reduce your emissions, you may also wish to offset those that you cannot yet reduce. If you would like to engage in offsetting, it is important to use a reputable scheme. The Church of England recommends Climate Stewards, which has a simple calculator that can help you to work out how much you would need to offset. https://www.climatestewards.org/

Climate Stewards encourages people to 'reduce what you can and offset the rest' as part of your journey to Net Zero carbon emissions. They provide training and resources to help you understand climate change and its impacts, and to calculate the carbon footprint from your activities including travel, energy, expenditure, and food. Their online carbon calculators for individuals and smaller organisations are free to use, and they provide bespoke carbon footprint audits for larger organisations.

Having reduced as much of your organisation's carbon footprint as you can, there will always be unavoidable emissions from your work and travel. Carbon offsetting allows you to compensate for the negative impact of your carbon emissions by funding projects which take an equivalent amount of CO_2 out of the atmosphere. These either involve locking up ('sequestrating') CO_2 as trees grow, or reducing emissions by using low-carbon technology such as fuel-efficient cookstoves or water filters.

Climate Stewards has a close relationship with all their project partners in Ghana, Uganda, Kenya, Tanzania, Nepal and Peru. They work closely with them to design, develop, implement and monitor projects which will not only mitigate carbon, but also bring tangible benefits to the local community - including improved health, savings in time and money previously spent on buying or collecting fuel, and improvements in local biodiversity. Each project is assessed using their Seal of Approval protocol which enables us to assess and monitor carbon mitigation and ensure robust, sustainable and transparent partnerships.

Appendix 1 – Schedule of Lighting to be Replaced or Upgraded

Room/Location	Number of Fittings	Recommended Upgrade	Annual Saving (£)	Total Cost (£)	Payback
Corridor	2	5ft Single LED	£49	£176	3.59
Vestry	2	5ft Single LED	£24	£176	7.27