ESOS-ENERGY
Energy efficient solutions

Energy Efficiency and Zero Carbon Advice

St Dunstan's Church, Acton
PCC of St Dunstan's Church

Author	Reviewer	Audit Date	Version
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Contents

1. Executive Summary

An energy survey of St Dunstan's Church, Acton 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.

St Dunstan's Church, Acton is a late Victorian era church Constructed of brick. The church was extensively re-ordered in 1983 to insert a mezzanine floor at the rear.

There is both gas and electricity supplied to the site.

The church has a number of ways in which it can become 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.

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)
SHORT TERM						
Repair or Replace the heating zone controller	Unknown	Unknown	Unknown		List B	
Fit a Magnetic Particle Filter to protect underfloor heating	None	Reduced maintenance	£500		List B	
Clean and Flush heating pipework	7% 11,340	£349	£500	1.5	List A	2.0
Install thermostatic radiator valves in first floor rooms	6% 9,700	£299	£500	2	List B	1.7
Insulate boiler pipework and valves	5% 8,100	£249	£300	1	List A	1.4
Purchase some heated cushions			Unknown		None / List B (seating)	
Fit instantaneous water heaters	2,000	£292	£500	2	List B	0.4
Completion of LED lighting	5,000	£731	£1,000	1.5	List A	1.0
Install secondary glazing in vestry	1,000	£31	£550	18	Faculty	0.2
Draughtproofing	3,000	£92	£200	2.5	List B	0.5
Fit toilet tap flow regulators	N/A		Unknown		List A	
MEDIUM TERM						
Replace gas boiler with Air Source Heat Pump	162,000 gas 54,000 electric use	Similar costs at present rates	£64,000		Faculty	29.1 gas
Install internal ceiling insulation	10% 16,000	£493	£5,700	11.5	Faculty	2.9
Install solar photovoltaic panels	21,000	£3,125	£35,000	11	Faculty	4.4

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

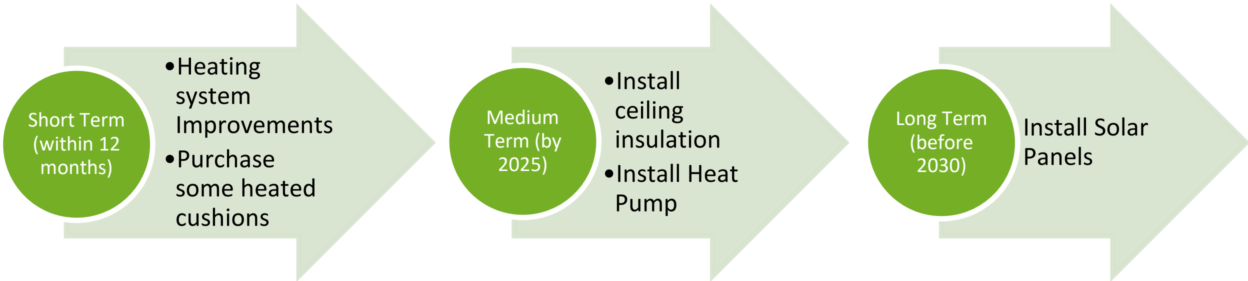
Based on current contracted prices of 14.62p/kWh and 3.08p/kWh for electricity and mains gas respectively.

If all measures were implemented this would save the church around £5,600 per year in operating costs.

2. The Route to Net Zero Carbon

The General Synod of the Church of England has indicated that the Church of England should be Net Zero Carbon by 2030. Every church, cathedral, church school and vicarage will therefore need to convert to be a net zero building in the next 10 years.

This church has a clear route to become net zero by 2035 by undertaking the following steps:



3. Introduction

This report is provided to the PCC of St Dunstan's Church, Acton 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 with improvements in 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 Dunstan's Church, Acton, Friar's Place, Acton W3 7AW was completed on the 31st October 2022 by Dr. Paul Hamley. Paul is an energy auditor with experience of advising churches and small businesses. He is part of the Church Energy Advisors Network developing advice for the Church of England and authored the "Assessing Energy Use in Churches" report for Historic England. He is a CIBSE affiliate member and a Chartered Scientist, with experience of the faculty process gained from chairing the building committee of a Grade I listed church and has been an assessor for EcoCongregation.

The church was represented by Alison Wood.

St Dunstan's Church, Acton	CHURCH
Church Code	623438
Gross Internal Floor Area	725m^2
Volume	4,850m^3
Heat requirement	160kW
Listed Status	Unlisted

The church is typically used for 67 hours per week for the following activities:

Type of Use	Hours Per Week (Typical)	Average Number of Attendees
Services	11 hours per week	110 St Dunstan's congregations 120 Russian church
Church Meetings and Groups	14 hours per week	
Community Use	22 hours per week	
Occasional Offices	1 wedding 2 funerals	

Annual Occupancy Hours: 3,500

4. Energy Procurement Review

Energy bills for gas and electricity have been supplied by St Dunstan's Church, Acton and have been reviewed against the current market rates for energy.

The current electricity rates are:

Single / Blended Rate	14.62p/kWh
Standing Charge	22.6p/day

Supplier: British Gas

The current gas rates are:

Single / Blended Rate	3.08p/kWh
Standing Charge	89.137p/day

Supplier: Opus Energy

We recommend that the church looks into 100% renewable tariffs and obtains quotations for its gas and electricity supplies from group purchasing schemes such as the Big Church Switch scheme, Charities Buying Group and the Parish Buying scheme, http://www.parishbuying.org.uk/energy-basket.

These scheme offers 100% renewable electricity and a proportion of renewable gas and therefore are an important part of the process of making churches more sustainable.

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

VAT	20%	The organisation 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.

It is understood that the church is aware and addressing the issue. The building hosts a mobile phone mast, so VAT at 20% is levied on this portion of the bill.

Whenever monthly electricity consumption exceeds 1,000kWh, or gas consumption exceeds 4,397kWh (52,000kWh per annum), 20% VAT is charged unless the customer has submitted a VAT declaration form. This should always be done when changing supplier.

The church is a charity and therefore can claim VAT exemption status.

Excess VAT paid can be reclaimed for the past three years.

VAT declarations are available from the suppliers website and can usually be found by typing the suppliers name followed by "VAT Declaration Certificate" into most website search engines.

A detailed explanation is available here: https:// perfect-clarity.com/vat-on-church-utility-bills/#:~:text=There%20is%20no%20VAT%20chargeable%20on%20Church%20water%20bills

5. Energy Usage Details

5.1 Annual Consumption

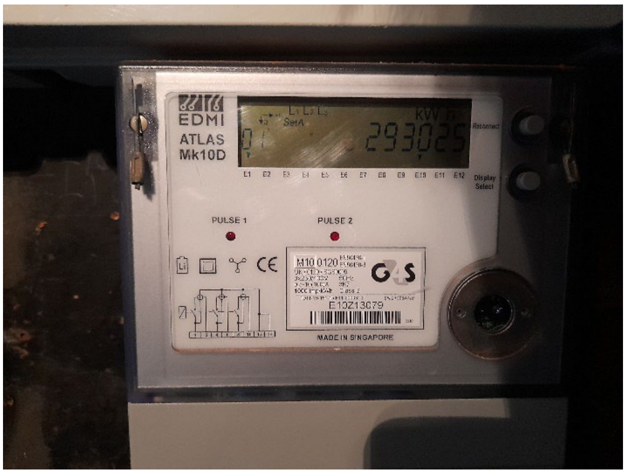
St Dunstan's Church, Acton used an estimated 40,000kWh/year of electricity over the year to 2 November 2021, costing around £6,200.   7,013kWh was used over a 4 week period in November 2021.

Gas use for the church was 162,871 for the year from 9 December 2020 to 9 December 2021, costing £7,186.

This data has been taken from recorded meter readings at 15/12/20, 02/11/21, 30/12/21 (electricity) and the Opus energy billing data.

Utility	Meter Serial	Type	Pulsed output	Location
Electricity - Church	E10Z 13079	EDMI Atlas Mk10D	Yes	Organ blower room
Electricity – Phone mast	EML 2127 560488	Omlite CTIL check meter	Yes	As above
Gas – Church	E016 K03954 15 D6	Elster Bk-G10E	Yes	Boiler room

All the meters are AMR connected and as such an annual energy use profile for the site could be obtained from the supplier.



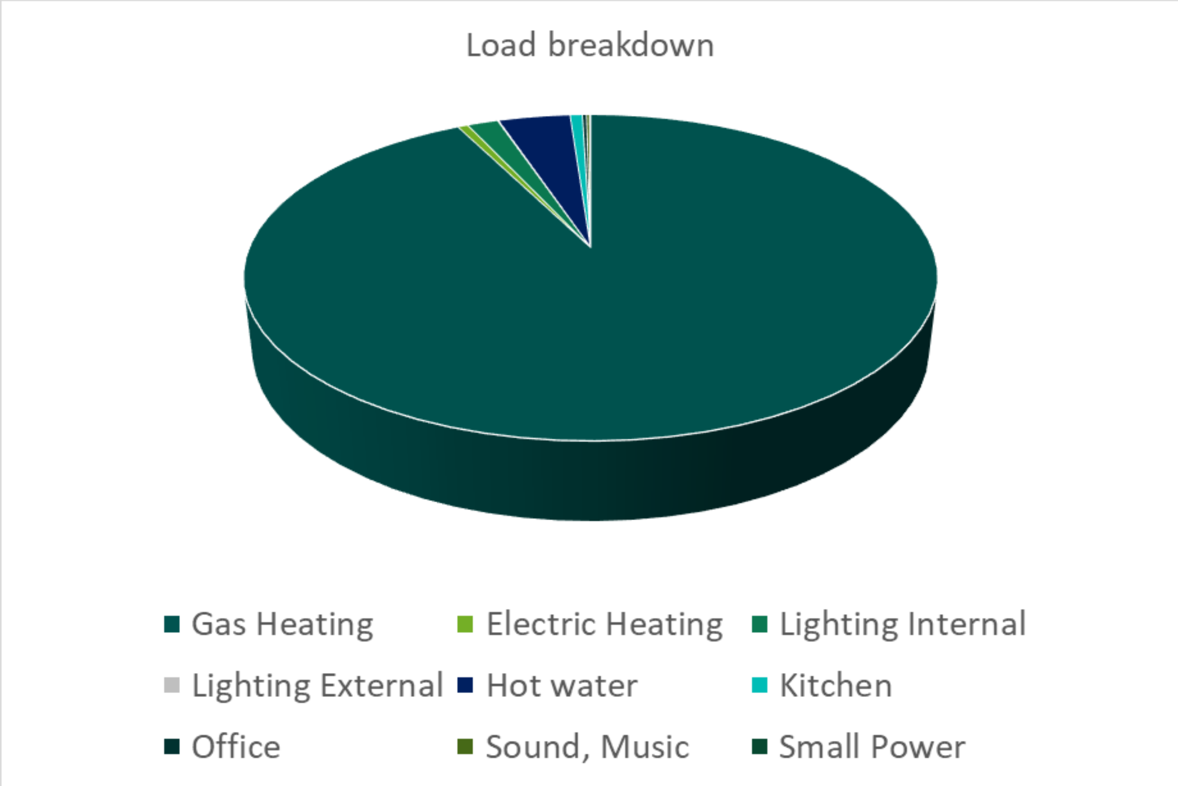
5.2 Energy Profiling

The main energy consuming plant can be summarised as follows:

	Equipment	Power kW	Annual Consumption kWh	Portion
Heating [Gas]	2 x Clyde Combustion 045.7 boilers, each 80kW input, 64.5kW output (1000 hours)	160	162,000	92%
Heating [Electric]	Boiler circulation pumps including underfloor heating	1	1,000	0.6%
Lighting [Internal]	CHURCH 3,500 hours use Mixture of 80 spotlights and floodlights 40 recessed lamps 6 bulkhead 2 x 7m LED strips 2 X F40W fluorescent	 4,000W 1,000W 250W 150W 80W	TOTAL 3,000	1.7%
Lighting [External]	Security lights, PIR control	100W	100	0.06%
Hot Water	2 Fixed water heaters ~ 100 Litre tanks, timer controlled High hours of building use, potentially 50 per week Kettles	2 x 3	6,000 1,000 TOTAL 7,000	4.0%
Kitchen	Microwave Fridge, full height Freezer, full height	1 0.2 0.2	TOTAL 1,200	0.7%
Office	1 workstation, 25 hours/week Printer Photocopier	200W 200W 500W	TOTAL 400	0.2%
Sound, Music	Sound system Organ / music	500W 1	200 100	0.17%
Small Power	Vacuum cleaner	1.5	100	0.06%

Sum of electricity estimates: 13,100kWh

Annual site electricity consumption: 13,100kWh



As can been seen from this data, the heating makes up by far the largest proportion of the energy usage on site. The other significant loads are lighting and hot water.

5.3 Energy Benchmarking

In comparison to national benchmarks for church energy use St Dunstan's Church, Acton uses 33% less electricity and 43% more heating energy than is average for a church of this size.

The high hours of use are the major factor, but the water heating method contributes.

	Size (m^2 GIA)	Annual Energy Usage (kWh)	Actual kWh/m^2	Benchmark [1] kWh/m^2	Variance from Benchmark
St Dunstan's Church, Acton (electricity)	725	13,100	18	27	-33%
St Dunstan's Church, Acton (gas)	725	162,000	223	156	+43%
TOTAL	725	175,100	241	183	+32%

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

[1] CofE Shrinking the Footprint – Energy Audit 2013.

6. Efficient / Low Carbon Heating Strategy

6.1 Reducing Environmental Impact

The energy used for heating a church typically makes up around 80% to 90% of the overall energy consumption. Heating also often uses gas or oil as its primary fuel, these are fossil fuels with high carbon emissions and little opportunity to decarbonise in the future. Electricity currently has carbon emissions of around the same level as mains gas but the carbon emissions associated with electricity are reducing rapidly as the UK builds more renewable energy and decommissions its remaining 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'.

Whilst there are plans to add hydrogen to the network, and "green" gas from anaerobic digestion; some suppliers offering up to 20% "green gas" tariffs, the majority of the gas supply will continue to be fossil fuel for the next decade. The economics of hydrogen production and the need to replace some pipework make full decarbonisation of gas unlikely.

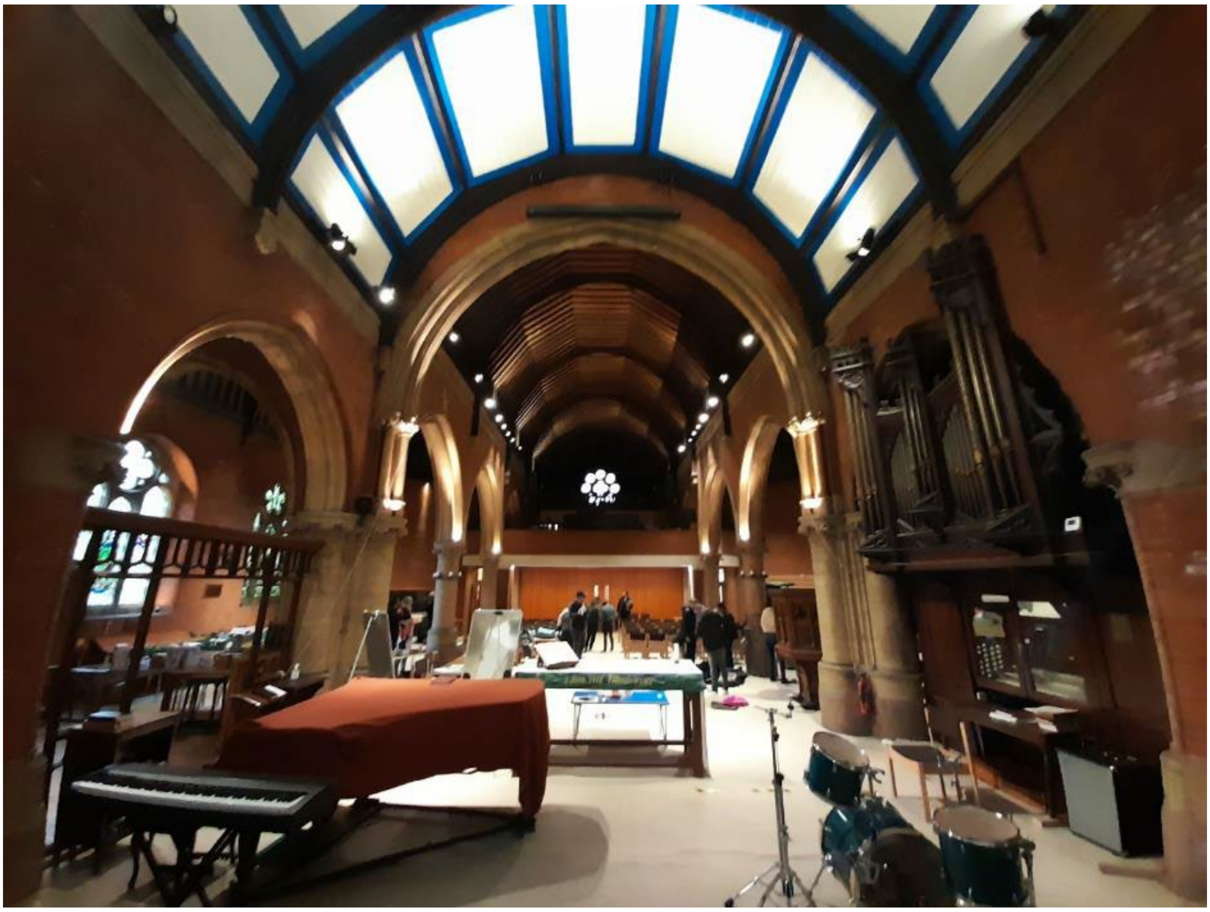
It is therefore important to review and plan to increase building efficiency and become less carbon intensive. One way to achieve this is to consider a transition to electrical heating where this also represents a more efficient and comfortable solution for churches.

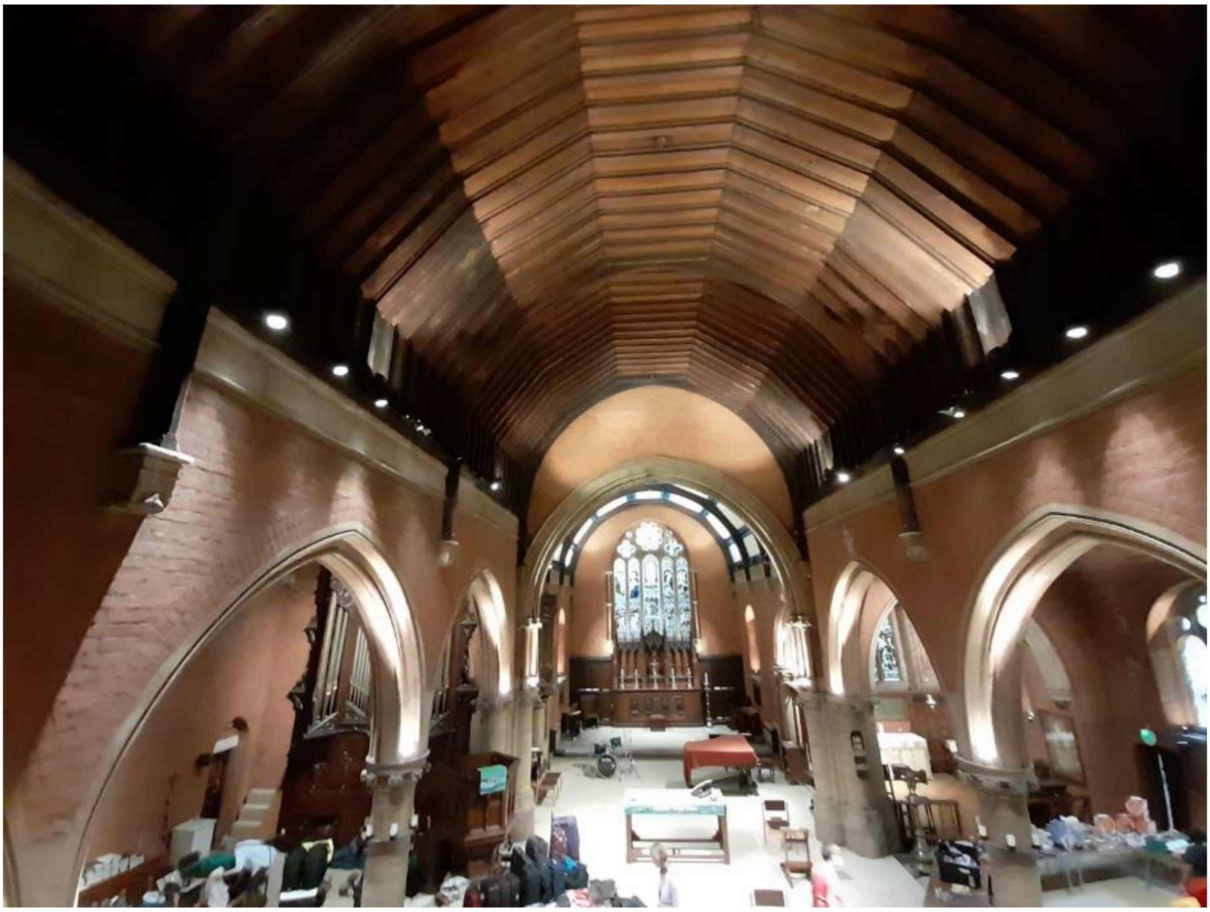
6.2 Forward Planning

This is a heavily used church building which was re-ordered in 1983 to create a hall at ground floor level by dividing the rear bays, and meeting rooms above by inserting a mezzanine floor.

The ground floor is fitted with underfloor heating which is described as effective, giving a rapid heating time for the hall area (2.9m ceiling height). The chancel also has fan assisted radiators and there are pressed steel radiators in the first floor meeting rooms.

With almost 70 hours use per week, a heating system providing a constant / semi constant heat input as provided by underfloor heating is appropriate. The church is recommended to look into use of an Air (to water) Source Heat Pump system to replace the gas boiler. A Ground Source to water heat pump system is technically feasible, but would incur high capital costs and require boreholes.





Above, Goldsmith’s Room, first floor (north side)

Below, hall, rear of ground floor.

7. Improve the Existing Heating System

It is recommended that measures are taken to improve the efficiency of the existing heating system, this should include:

7.1 Management of Heating System

The heating control system is broken. This should be repaired or replaced by a system which both has a thermostat setting to limit the maximum temperature to 19oC, and timer controls. Ideally there should be separate heating zones for the church, hall (which has a much smaller volume and heats more quickly) and the first floor meeting rooms.

7.2 Insulation of Pipework and Fittings

Insulate exposed pipework and fittings around boilers and tanks

The pipework within the boiler room has been left uninsulated. These exposed areas of pipework contribute significantly to wasted heat loss from the system and make the plant room unnecessarily warm.

It is recommended that these areas of exposed pipework are fitted with insulation sleeves and valves and pumps are insulated with bespoke made flexible insulation jackets. These wrap around the various elements but can be removed and then replaced for any servicing activities.

7.3 Clean the Existing Heating System

Magnetic sludge circulates in central heating systems, and this prevents the proper and efficient operation of the system by reducing the ability of the boiler to heat up the water and reducing the output of the radiators. It is similar to how scale build up can adversely affect kettles and showers.

It is strongly recommended that the heating system is cleaned to remove this sludge from the system, this is done by using a chemical clean and/or power flush procedure where cleaning chemicals are put into the system which is then turned on and run through a filter consisting of high power magnetics to remove the sludge.

The cleaning of a heating system can be carried out by any competent heating engineer and typically increases the efficiency of a system by between 10 to 15%. This can dramatically improve comfort for the congregation.

7.4 Magnetic Particle Filter

These devices catch magnetic sludge and protect boilers and radiator valves   They will also prevent fouling of the underfloor heating pipework.

7.5 Thermostatic Radiator Valves

The first floor rooms are heated by radiators which are not fitted with thermostatic radiator valves (TRVs). TRV's can be installed on the existing radiator and allow the users of the room to have some element of control over the temperature in the room and prevent over-heating. It also allows un-used spaces to have the heating in them turned down.

It is recommended that TRVs are installed on all radiators and users advised as to the best way to operate these once they have been installed. TRV's can be supplied and installed by any good heating engineer.

8. Heat Pumps

8.1 Heat Pumps: delivering more kWh of heat than electricity used

The efficiency advantages of heat pumps mean that in some circumstances they can work out at equivalent or cheaper operating cost than gas despite the higher cost of electricity per kWh. This effect is increased if electricity is generated on site by solar power.

Ground Source Heat Pumps are compatible with underfloor heating systems and offer the lowest operating cost, but are at a high capital cost (around £1,000 per kW output compared to £400 per kW output for Air Source).

8.2 Air to Water Source Heat Pumps

Air-to-Water Source Heat Pumps (AWSHPs) work by having an external unit which sucks air in and extracts the heat from it. It concentrates this heat and puts it directly into water that can then flow through the heating system. They work most efficiently when trying to produce water temperatures in the heating system between 40°C and 50°C. They tend to warm up slowly and steadily and are therefore well suited to situations where the heating is required for long periods of the day, and with heating systems that have a low temperature requirement such as underfloor heating systems. As they warm up spaces slowly, it is important that the warmth being slowly emitted is retained within the building so that the overall heat levels build up. This requires good levels of insulation and air tightness to ensure that the heat loss is lower than the heat being emitted. AWSHPs provide around 3 units of heat for every 1 unit of electricity used in the heat pump; they therefore have a Coefficient of Performance (CoP) of 3.

The Centre for Sustainable Energy model[2] can be used to estimate heat load for the building.

Heat Load (kW) = Volume V (m^3) x Insulation Factor

Insulation Factors

Condition	Factor kW/m^3
Poorly insulated with open or broken windows, draughty doors (add 5%)	0.034
Poorly insulated (assume no interventions)	0.033
Some insulating features	Estimate value
Well insulated	0.022
Insulated to 2010 regulations	0.013

Area	Volume m^3	Insulation Factor kW/m^3	Heat Required (Space heating) kW
Church	4,850	0.033	160

[2] www.cse.org.uk/local-energy/download/estimating-the-heat-demand-of-a-hypothetical-community-building-79

Therefore, a heat pump of 160kW would be required.   The current boilers provide 130kW output in total.

AWSHPs require the installation of external units, which look like air conditioning modules in well ventilated external locations. These external units will need an electricity supply and pipework running from them to the heating system. They will also need a drain nearby as the back of the units can build up moisture, which condenses and sometimes freezes on the coils. The larger units do create some low-level noise and therefore the location and baffling of the units may need to be considered carefully.

Examples of external units for ASHP comprising of three smaller 3kW units and two larger 10kW units which supply 37.5kW of heat each.

A case study of a church which has installed this solution is available at [Heat pumps and fabric improvements make a rural church warm and well used : St Anne in Ings | The Church of England]

There are potential locations for heat pump external units on the north side of the building.

8.3 Air to Water Source Heat Pumps Costs

Pumps to supply 160kW of heat (with capital cost estimated at £400 per kW output: £64,000) would deliver the same amount of heat annually as the current system.

Operating at a Coefficient of Performance of 3, an 160kW heat output requires 54kW of electricity supply.

54kW x 1,000 hours = 54,000kWh electricity used annually.

At current costs of 14.62p/kWh, annual cost = £7,895 which is comparable to the current gas price of £7,100. Gas prices have been rising faster than electricity.

9. Energy Saving Recommendations - Equipment

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

9.1 Water Heating

Currently there are two fixed water heating tanks which supply the kitchen and toilets.

These are heavily used and controlled by timers. Standing losses, often from uninsulated pipework when units are left on can be significant (around £150 annually with electricity at 15p/kWh). One tank is located high in the roof area above the first floor rooms, resulting in a long pipework run to the taps on the ground floor and losses of heat, and delay in obtaining hot water.

Note that a 100 litre tank will only deliver half this volume of hot water. As the water is drawn, it is replaced by cold, so the second half of the tank will be lukewarm.

It is recommended that:

- i) The timer controls are optimised to building use.
- ii) Pipes are insulated.
- iii) If a tank is only feeding a few hot taps, it is replaced by point of use instantaneous water heaters (with no tank.)
- iv) When tanks require replacement, instantaneous water heaters are installed.

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

9.2 Completion of LED Lighting

The lighting makes up a relatively large overall energy proportion of the electricity used within the church. It is unclear how much of the lighting has been changed to LED lamps.

It is recommended that this process is completed.

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/

There are some fittings such as the lower level lamps in the hall where the existing fitting can be made more efficient by simply changing the bulb/lamp within the existing fitting to a 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.

9.3 Lighting Controls (Internal)

Lights in areas which are frequented sporadically such as corridors and toilets may be used for a short amount of time and as such, the lights do not need to remain on constantly.

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.

10. Energy Saving Recommendations – Building Fabric

10.1 Draught Proof External Doors

There are a number of external doors in the church. These have the original timber doors on them. Often these do not close tightly against the stone surround and hence a large amount of cold air can enter the church around the side and base of these doors.

It is recommended that the draughtproofing around doors are 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 as brush draught strips rebated into the edge of the door by a skilled joiner could be used. Other traditional methods such as using hessian or felt pads tacked to the door could be used 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 a painted fridge magnetic over large keyholes can all be simple DIY measures which are effective.

10.2 Secondary Glazing

The vestry is fitted with windows with opening louvres. These are very difficult to close in an air tight manner. It is recommended that these are either replaced by double glazed units incorporating trickle vents, or that secondary glazing is installed inside.

10.3 Insulation to Roof

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.

Normally for churches, the low hours of use and heating for around 6 hours only mean that the effects are minimal. In this case, use of up to 70 hours per week would make insulation worthwhile.

Ceiling insulation for an area of approximately 600m^2 would cost approximately £5,700.

Cost £9.50/m^2

11. Saving Recommendations (Water)

11.1 Tap Flow Regulators

A tap was found to be running in a toilet. With regular use by children and community groups, it is recommended that tap flow regulators are fitted.

The over provision of water for hand washing is not only a source of excessive water use, but in the case of hot water, it is also a source of wasted energy in the heating that has to go into providing the hot water.

The flow rate of the taps can be easily regulated by fitting flow regulators within the taps. It is recommended that flow regulators such as those manufactured by neoperl (http://www.neoperl.net/en/) are fitted into all the viable hand wash basin taps to save on both water and heating of the hot water.

These regulators can be self-installed or by any good facilities staff.

12. 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
Battery Storage	Future potential
Wind	No – no suitable land away from buildings
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	Yes
Ground Source Heat Pump	Yes but expensive
Air to Air Source Heat Pump	Incompatible with underfloor heating

12.1 Solar Photovoltaic Panels

Most of the roof is visible from the ground. The building is unlisted but the local authority should be consulted. Details are given within the Diocese of London guidance: Solar panels - Diocese of London (anglican.org)

The nave and south aisle roofs offer an area of around 160m^2. This could generate 0.15kWpeak/m^2 giving a 24kWpeak system. A 1kWpeak system can generate up to 1000kWh annually.

Assuming that the maximum amount of roof space could be, and was used for panels, the following formula calculates annual generation.

Annual Generation (kWh) = Area x 0.15kWp/m^2 x 1000kWh/kWp x Orientation Factor x Overshading Factor.

Roof Section	Useable area / m^2	System Size / kW peak	Orientation factor	Shading factor	Annual Generation, kWh
nave	80	12	175 degrees / 40^0 0.99	0.8	9,500
aisle	80	12	175 degrees / 40^0 0.99	1	11,880
					Total 21,380

This is the maximum likely figure, which may be reduced by factors such as the weight of panels (due to roof strength), and access space between panels. The ability of the roof structures to support the extra loads should be discussed with the church's inspecting architect.

The maximum potential generation is around half of the church's annual recent electricity use.

If heat pumps are installed, consumption will increase.

The system should be specified for future addition of a battery, when battery costs reduce as this would extend system usefulness into the evening.

Battery Storage is not strictly a renewable energy solution but provides 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. This is a new but fast-growing technology.

Using average 2019 installation costs (£1,450 per kWpeak); a 34 kWpeak system would cost £34,800.

13. Funding Sources

There are a variety of charitable grants for churches undertaking works and a comprehensive list of available grants is available at www.parishresources.org.uk/resources-for-treasurers/funding/

This includes a 77 page guide to funders and their criteria:

https://www.parishresources.org.uk/wp-content/uploads/Charitable-Grants-for-Churches-Jan-2020.pdf .

14. 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 includes the installation of under pew heaters to pews which are made in or after 1850 and are not of historic interest.

All other works, including the like for like replacement of gas and oil boilers 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. This includes items such as solar PV installations.