Energy Audit Report for St. George's Church

Site Address	St. George's Church, Tyldesley, M29 8GX
Church Code	624109
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Contents

1 Executive Summary

An energy survey of St. George's Church, Elliott Street, Tyldesley, M29 8GX 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.

This energy audit has been undertaken by a suitably qualified and experienced energy auditor. Benefits of implementing the opportunities identified in this Report include a reduction in energy costs in the first instance, but could also reduce other costs, increase staff awareness and engagement, and improve comfort and staff satisfaction in the workplace.

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.

Energy Saving Measure	Annual Energy Savings (kWh)	Annual Cost Savings (£)	Estimated Capital Cost	Payback Period (Years)	Annual Carbon Savings (Tonnes CO_2e)
Utilise timer function on heating system.	4,200	£126	£0	Immediate	0.9
Church – replace 50W pendant halogen lamps with 7.5W LED alternatives.	495	£50	£140	2.8	0.2
Church – replace 200W halogen floodlights with 60W LED alternatives.	582	£58	£250	4.3	0.2
Vestry – replace 36W CFLs with 7.5W LED alternatives.	190	£19	£80	4.2	0.1
Kitchenette – replace 58W fluorescent with a 22W LED alternative.	30	£3	£10	3.3	<0.1
Entrance – replace 36W CFLs with 7.5W LED alternatives.	47	£5	£20	4.0	<0.1
WCs – replace 36W CFLs with 7.5W LED alternatives.	47	£5	£20	4.0	<0.1
TOTALS	**5,591**	**£265**	**£520**	**2.0**	**1.3**

The headline messages from the audit are:

- £520 investment in energy reduction measures would achieve an estimated annual saving of 5,591kWh (combined electric and gas).
- Based on current electricity and gas tariffs, this would result in an annual financial saving of £265.
- The simple payback period on this investment is 2.0 years.

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

2 Church Information

A site survey was undertaken by Tim Mawby on Thursday 5th December 2019. The survey was non-invasive (visual only) and entailed a general walk throughout the church areas, including back of house spaces and plant rooms.

Photograph 1: St. George's Church External View

General Information	
Site Address	St. George's Church, Elliott Street, Tyldesley, M29 8GX
Listed Status	Grade II Listed
Building Age	Built in 1824
Floor Area	Approximately 800m^2
Usage	Typically 16 hours per week

3 Energy Procurement Review

Energy bills for gas and electricity have not been supplied. Estimated rates for energy have been used to estimate consumption.

3.1 Electricity

Day Rate	10.00 p/kWh

3.2 Gas

Rate	3.00 p/kWh

The review has highlighted that there may be opportunities to gain environmental benefits 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/categories/energy/energy-basket). This scheme only offers renewably sourced energy and therefore it is an important part of the process of making Churches more sustainable.

4 Energy Usage Details

4.1 Cost & Consumption

Energy Type	Annual kWh
Gas	Not Provided
Electricity	Not Provided

If not already in place, 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 in use.

4.2 Energy Benchmarking (Based on CofE Shrinking the Footprint – Energy)

Energy Type	Size (Sqm)	Benchmark Energy Use (kWh/Sqm)	Actual Energy Use (kWh/Sqm)	Variance from Benchmark (%)
Gas	800	105	Not Provided	Not Provided
Electricity	800	20	Not Provided	Not Provided

5 Building Performance and Opportunities

The building is well run with proactive on-site team in terms of energy conversation with some areas of improvement already being identified. The following sections will highlight where further improvements could potentially be made.

5.1 Building Envelope

From visual inspection, the building envelope appears to be in a reasonable state of repair. Wall and roof insulation are not present.

5.2 Heating System – Boilers

Heating is provided to the church via 2no Alpha Pro Tec 90 Plus gas condensing boilers, installed in 2019. The boilers are located in the ground-floor plant room. This boiler serves all church heating and is programmed to be active for 24 hours a day, heating the church to 12^{o}C. Whilst the church is occupied, the temperature set point is raised to 18^{o}C. A control panel is located in the main body of the church, allowing the changing of the temperature set point. It is recommended that the timer on the control panel is utilised so that the risk of unintentionally leaving the heating system set to the higher set point is reduced.

While the boilers appear to be in good order, and are not at the end of their expected lifetime the client may wish to explore the possibility of installing an air source heat pump heating system in order to move towards the goal of decarbonising energy consumption.

Photograph 2: Church Boilers

5.3 Heating System – Pipework and Distribution

The boiler's heating pipework is generally good, with insulating lagging well-maintained and in good condition. As such, no recommendations have been made in this area.

Photograph 3: Heating Pipework

5.4 Heating System – Heat Emitters

Heating is emitted via 23no. cast- iron radiators, supplied by pipes running in floor trenches covered with grilles. There are an additional 2no. cast-iron radiators in both the vestry and entrance area. Radiators are typically obstructed by furniture; it is recommended that the furniture is repositioned to allow better heat convection in the space. There are also 2no. wall-mounted electric heaters in the vestry and 2no. Dimplex electric curtain heaters over the main entrance.

A range of portable plug-in heaters are also present throughout the building and are used to provide additional heating to the smaller rooms when required. This can be an ineffective, inefficient and poorly controlled means of providing space heating, and can easily be left on when unoccupied. It is recommended that a more permanent heating solution be provided to these spaces if and when heating upgrades are undertaken.

Photographs 4, 5 & 6: Church Heat Emitters

5.5 Hot Water System

Hot water is provided to the kitchenette via a Burco electric point of use water heater. WCs are supplied with hot water by a Newlec electric water heater. Hot water consumption is considered to be minimal.

Photographs 7 & 8: Water Heaters

5.6 Lighting

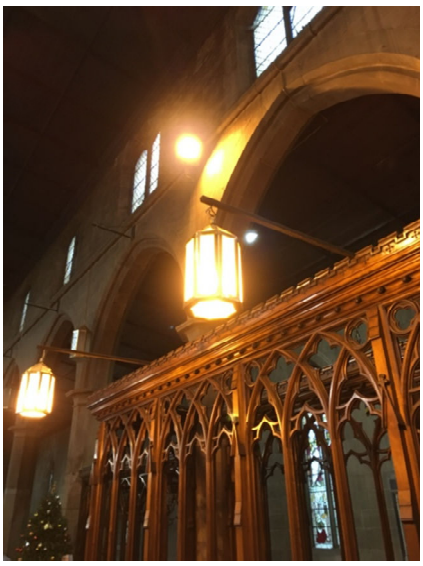
There is no lighting control system, motion detectors or daylight dimming controls. All light fittings are controlled via manual on/off switches.

The range of light fittings throughout the church areas are detailed below:

Church

- 14no. 50W pendant halogen lamps – recommended to be replaced with 7.5W LED alternatives.
- 5no. 200W halogen floodlights – recommended to be replaced with 60W LED alternatives.
- 2no. LED floodlights

Photographs 9, 10 & 11: Church Light Fittings



Vestry

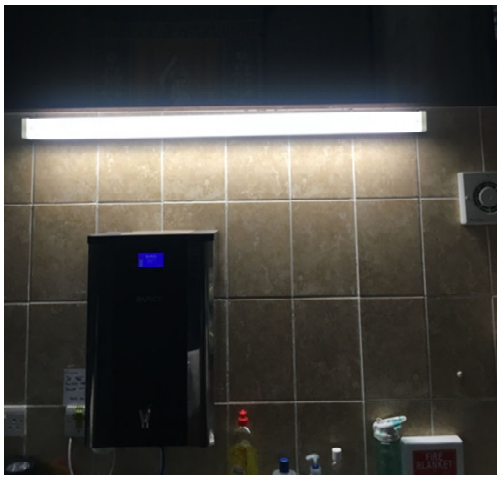
- 8no. 36W compact fluorescent lamps – recommended to be replaced with 7.5W LED alternatives.

Photograph 12: Compact Fluorescent Lamps

Kitchenette

- 1no. 58W T8 fluorescent tube – recommended to be replaced with a 22W LED alternative.

Photograph 13: Fluorescent Tube



Entrance

- 2no. 36W compact fluorescent lamps – recommended to be replaced with 7.5W LED alternatives.

WCs

- 2no. 36W compact fluorescent lamps – recommended to be replaced with 7.5W LED alternatives.

5.7 Renewables

There are currently no renewables on-site. A free desktop survey can be carried out by a specialist solar installer to identify the possibility of installing solar PV panels.

6 Potential Saving Opportunities

As part of the assessment, we carry out a close inspection of M&E plant and their associated controls, with the aim of identifying any issues that have significant impact on energy consumption and correct building operation. We have reviewed the building and associated HVAC and lighting operations and identified the following potential energy conservation opportunities (ECOs), which should be investigated:

Category	Actions	Potential Annual Savings			Investment (£)	Simple payback (yrs.)
		Elec/Gas (kWh)	Cost (£)	(tCO_2)		
Heating	Utilise timer function on heating system (estimated 5% saving)	4,200	£126	0.9	£0	Immediate
Lighting	Church – replace 50W pendant halogen lamps with 7.5W LED alternatives.	495	£50	0.2	£140	2.8
Lighting	Church – replace 200W halogen floodlights with 60W LED alternatives.	582	£58	0.2	£250	4.3
Lighting	Vestry – replace 36W CFLs with 7.5W LED alternatives.	190	£19	0.1	£80	4.2
Lighting	Kitchenette – replace 58W fluorescent tubes with a 22W LED alternative.	30	£3	<0.1	£10	3.3
Lighting	Entrance – replace 36W CFLs with 7.5W LED alternatives.	47	£5	<0.1	£20	4.0
Lighting	WCs – replace 36W CFLs with 7.5W LED alternatives.	47	£5	<0.1	£20	4.0
TOTAL ELECTRICITY SAVINGS		**1,391**	**£139**	**0.4**	**£520**	**3.7**
TOTAL GAS SAVINGS		**4,200**	**£126**	**0.9**	**£0**	**Immediate**
GRAND TOTAL		**5,591**	**£265**	**1.3**	**£520**	**2.0**

7 Assumptions

7.1 Assumptions

- Costs exclude labour, installation and access which will require the confirmation of a specialist contractor.
- Average cost of electricity at 10.00p/kWh.
- Average cost of gas at 3.00p/kWh.
- Electricity carbon emission rate of 0.31598 $kgCO_2$/kWh.
- Natural Gas carbon emission rate of 0.20776 $kgCO_2$/kWh.

7.2 Economic Life

CIBSE Guide M Appendix 12.A1 gives the economic life of plant common plant items. After this time the maintenance and repair make it economic to replace the asset. There will be energy savings inherent in the new equipment and the need to meet the minimum requirements of the Building Regulations. Some capital plant has long payback periods, when based on energy efficiency alone, but these should be part of an asset replacement

programme with only the 'additional' cost of higher than minimum required energy standards being used to calculate ROI.

7.3 Implementation

Reviews of Energy Projects and Initiatives are designed to provide a high-level indication of options available clients and will not constitute a recommendation for implementation. Pricing and potential savings are indicative values and will not constitute an offer.

7.4 Cumulative Savings and Double Counting

It should be noted that further investigation may rule out some measures as impractical, either physically or financially. Some measures are mutually exclusive and provide diminishing returns if implemented together. For example, if the lighting load is reduced through more efficient lighting, there will be an increase in the heat demand on boilers, as the new lights generate less heat.

Each energy conservation measure is assessed independently at this stage so that they can be fairly compared. An assessment of any overlap will be undertaken once any projects are selected for implementation.

8 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

9 Faculty Requirements

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

Minor works 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.

Major 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,

10 Limitations

The recommendations contained in this Report represent ESOS Energy's professional opinions, based upon the information listed in the Report, exercising the duty of care required of an experienced Sustainability Consultant.

ESOS Energy obtained, reviewed and evaluated information in preparing this Report from the Client and others. ESOS Energy conclusions, opinions and recommendations has been determined using this information. ESOS Energy does not warrant the accuracy of the information provided to it and will not be responsible for any opinions which ESOS Energy has expressed, or conclusions which it has reached in reliance upon information which is subsequently proven to be inaccurate.

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