



Energy Audit Report for St. John's Church



Site Address	St. John's Church, Flixton, M41 6AP
Church Code	624154
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Contents

1	Executive Summary	3
2	Church Information.....	4
3	Energy Procurement Review.....	5
3.1	Electricity	5
3.2	Gas.....	5
4	Energy Usage Details	5
4.1	Cost & Consumption	5
4.2	Energy Benchmarking (Based on CofE Shrinking the Footprint – Energy)	5
5	Building Performance and Opportunities.....	6
5.1	Building Envelope	6
5.2	Heating System – Boilers.....	6
5.3	Heating System – Pipework and Distribution.....	6
5.4	Heating System – Heat Emitters	7
5.5	Hot Water System	7
5.6	Lighting.....	8
5.7	Renewables.....	11
6	Potential Saving Opportunities	12
7	Assumptions.....	12
7.1	Assumptions.....	12
7.2	Economic Life.....	12
7.3	Implementation.....	13
7.4	Cumulative Savings and Double Counting	13
8	Funding Sources	13
9	Faculty Requirements	13
10	Limitations	13

1 Executive Summary

An energy survey of St. John's Church, Flixton, M41 6AP 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 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 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 ₂ e)
Utilise the timer on the church hall heating system.	5,352	£161	£0	Immediate	1.1
Church – replace fluorescent lamps with LED alternatives.	129	£13	£115	8.8	<0.1
Vestry – replace fluorescent tube with a LED alternative.	13	£1	£10	10.0	<0.1
Entrance/Corridor – replace CFLs with LED alternatives.	200	£20	£30	1.5	0.1
Small Hall – replace fluorescent tubes with LED alternatives.	449	£45	£40	0.9	0.1
Kitchen – replace twin fluorescent tubes with LED alternatives.	449	£45	£40	0.9	0.1
Storage Rooms – replace fluorescent tubes with LED alternatives.	25	£3	£20	6.7	<0.1
TOTAL	6,617	£288	£255	0.9	1.5

The headline messages from the audit are:

- ▲ £255 investment in energy reduction measures would achieve an estimated annual saving of 6,617kWh (combined electric and gas).
- ▲ Based on current electricity and gas tariffs, this would result in an annual financial saving of £288.
- ▲ The simple payback period on this investment is 0.9 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 16th January 2020. 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. John's Church External View



General Information	
Site Address	St. John's Church Flixton M41 6AP
Listed Status	Not Listed
Building Age	Hall built in 1930 Church built in 1968
Floor Area	Approximately 850m ²
Usage	Hall – typically 45 hours per week Church – typically 5 hours per week

3 Energy Procurement Review

Energy consumption & costs for gas and electricity have been supplied.

3.1 Electricity

Rate	14.0 p/kWh
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3.2 Gas

Rate	4.6 p/kWh
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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	40,942
Electricity	9,653

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	850	105	48	-55%
Electricity	850	20	11	-45%

The Church is using less Gas and Electricity than expected.

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 hall via a Keston Heat 55 gas condensing boiler (installed in 2018) located in the basement plant room. The heating system is currently manually controlled. It is recommended that the timer is used in the hall areas to avoid the heating system being left on when the spaces is unoccupied.

As the boiler is considered to be a new efficient model suitable for the heating demand of the church, no recommendations are made for the replacement of alternative technologies. However, it is recommended that the controls are reviewed regularly to prevent unnecessary usage.

Photograph 2: Church Boiler



5.3 Heating System – Pipework and Distribution

The heating system pipework is in good repair, with well-maintained insulating lagging in good condition. As such, no recommendations have been made in this area.

Photograph 3: Heating Pipework



5.4 Heating System – Heat Emitters

Heating to the church is provided by 10no. gas storage heaters. These are located in the main body of the church (6no.), the chapel (2no.), the vestry (1no.) and the entrance area (1no.). These heaters are controlled using a timer, programmed to operate the heaters for 3 hours per week. There is also an electric curtain heater situated over the main entrance. It is understood that this is operational for 3 hours per week.

Heating to the hall is provided by 10no. cased iron radiators, supplied by underground pipes. Another radiator is located in the corridor connecting the church and hall, and there are also 2no. radiators found in ground floor storage rooms. A wall-mounted electric heater is also present in the hall space to provide additional heating.

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 & 7: Heat Emitters



5.5 Hot Water System

Hot water is provided to the kitchen and WCs via a Main Multipoint BF condensing gas boiler (approximately 10 years old), located in the basement plant room. There are also 2no. electric point of use water heater in the kitchen. Hot water consumption is considered to be minimal.

Photograph 8: Condensing Boiler



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

- ▲ 23no. 25W fluorescent pendant lamps – recommended to be replaced with 3.5W LED alternatives.
- ▲ 8no. dimmable LED spotlights

Photographs 9 & 10:



Chapel

- ▲ 17no. LED spotlights

Photograph 11:



Vestry

- ▲ 1no. 70W T8 fluorescent tube – recommended to be replaced with a 22W LED alternative.

Photograph 12: T8 Fluorescent Tube



Entrance/Corridor

- ▲ 3no. 36W compact fluorescent lamps – recommended to be replaced with 7.5W LED alternatives.
- ▲ 4no. LED strip lights

Photographs 13 & 14: Entrance/Corridor Light Fittings



Large Hall

- ▲ 24no. 30W LED ceiling panels.

Photograph 15: LED Panels



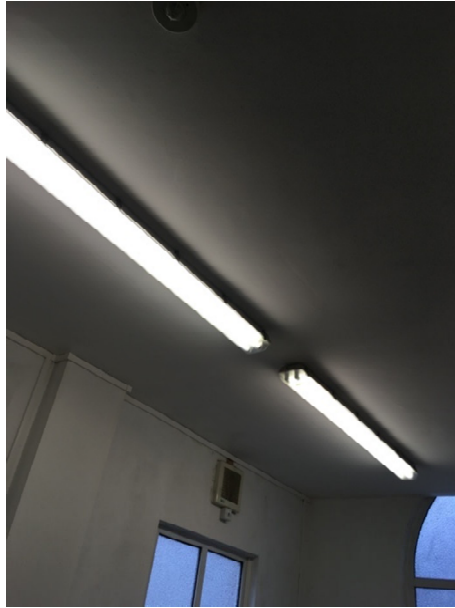
Small Hall

- ▲ 4no. 70W T8 fluorescent tubes – recommended to be replaced with 22W LED alternatives.

Kitchen

- ▲ 2no. twin 70W T8 fluorescent tubes – recommended to be replaced with 22W LED alternatives.

Photograph 16: Twin Fluorescent Tubes



Storage Rooms

- ▲ 2no. 70W T8 fluorescent tubes – recommended to be replaced with 22W 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 on church hall heating system. (estimated 5% saving)	5,352	£161	1.1	£0	Immediate
Lighting	Church – replace 25W fluorescent lamps with 3.5W LED alternatives.	129	£13	<0.1	£115	8.8
Lighting	Vestry – replace 70W fluorescent tube with a 22W LED alternative.	13	£1	<0.1	£10	10.0
Lighting	Entrance/Corridor – replace 36W CFLs with 7.5W LED alternatives.	200	£20	0.1	£30	1.5
Lighting	Small Hall – replace 70W fluorescent tubes with 22W LEDs.	449	£45	0.1	£40	0.9
Lighting	Kitchen – replace twin 70W fluorescent tubes with 22W LED alternatives.	449	£45	0.1	£40	0.9
Lighting	Storage Rooms – replace 70W fluorescent tubes with 22W LED alternatives.	25	£3	<0.1	£20	6.7
TOTAL ELECTRICITY SAVINGS		1,265	£127	0.4	£255	2.0
TOTAL GAS SAVINGS		5,352	£161	1.1	£0	Immediate
GRAND TOTAL		6,617	£288	1.5	£255	0.9

7 Assumptions

7.1 Assumptions

- ▲ Costs excludes labour, installation and access which will require the confirmation of a specialist contractor.
- ▲ Average cost of electricity at 14.0/kWh.
- ▲ Average cost of gas at 4.6/kWh.
- ▲ Electricity carbon emission rate of 0.31598 kgCO₂/kWh.
- ▲ Natural Gas carbon emission rate of 0.20776 kgCO₂/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 as 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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