



**Energy Audit Report for
St Andrew's Church**

June 2019

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2 INFORMATION

ESOS Energy conducted an Energy Audit at St Andrew's Church in Cobham on 5th May 2019. The audit consisted of a site visit and data analysis during which all church areas were investigated.

This report summarises the audit findings and energy saving opportunities identified during the site visit and subsequent energy data analysis.

The headline messages from the audit are:

- £1,600 investment in energy reduction measures would achieve an estimated annual saving of 24,553 kWh (combined electric and gas)
- Based on today's tariffs, this would result in an annual financial saving of £660
- The simple payback period on this investment is 2.4 years

3 CHURCH INFORMATION

A site survey was undertaken by Harjit Thind on Monday 5th May 2019. The survey was non-invasive (visual only) and entailed a general walk throughout the church areas including back of house and plant rooms.

Address: **St Andrew's Church**
Churchgate House
Downside Bridge Road
Cobham
KT11 3EJ



GENERAL	
Listed Status	Grade 1
Building Age	Approx. 1150
Area	Approx. 700sqm
Usage	Typically 12 hours per week for Church

4 ENERGY DATA ANALYSIS

4.1 ENERGY CONSUMPTION:

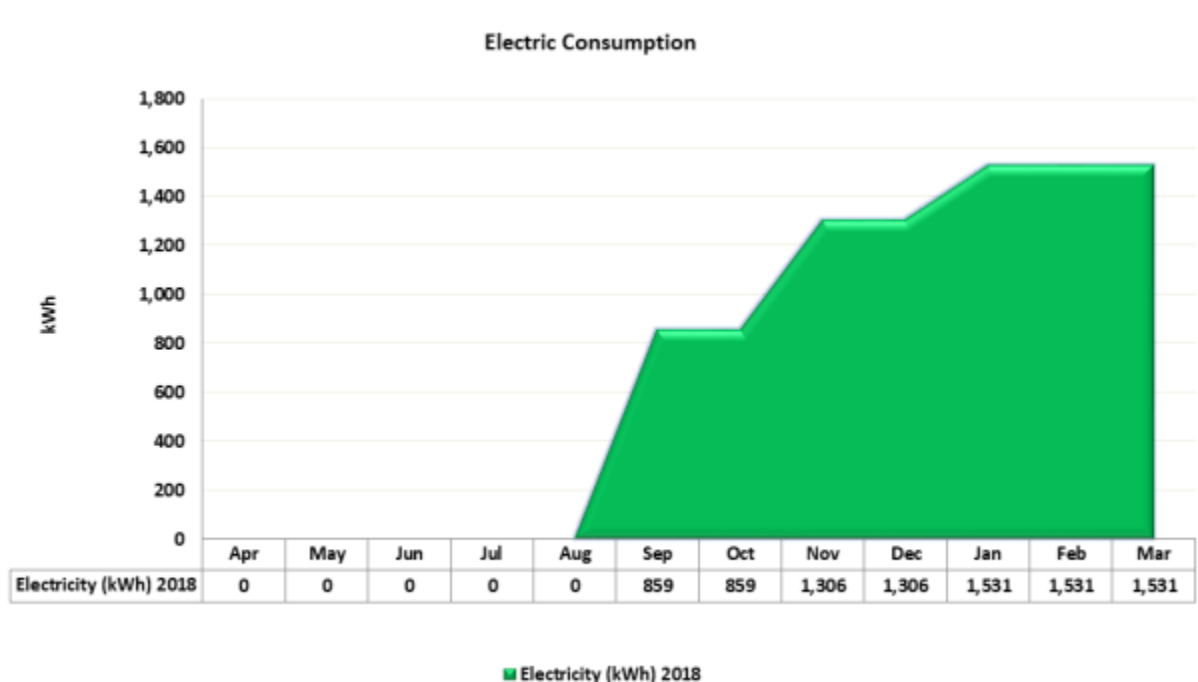
The energy consumption for the church during September 2018 to April 2019 is detailed below:

Utility	Energy Consumption		Energy Cost		CO ₂ Emissions
	kWh/year	%	£/year	%	tCO ₂
Electricity	8,920	8.4%	1,021	28%	5
Gas	96,855	91.6%	2,605	72%	18
Total Energy	105,775	100%	3,627	100%	23

Note: the costs exclude standing charge and VAT.

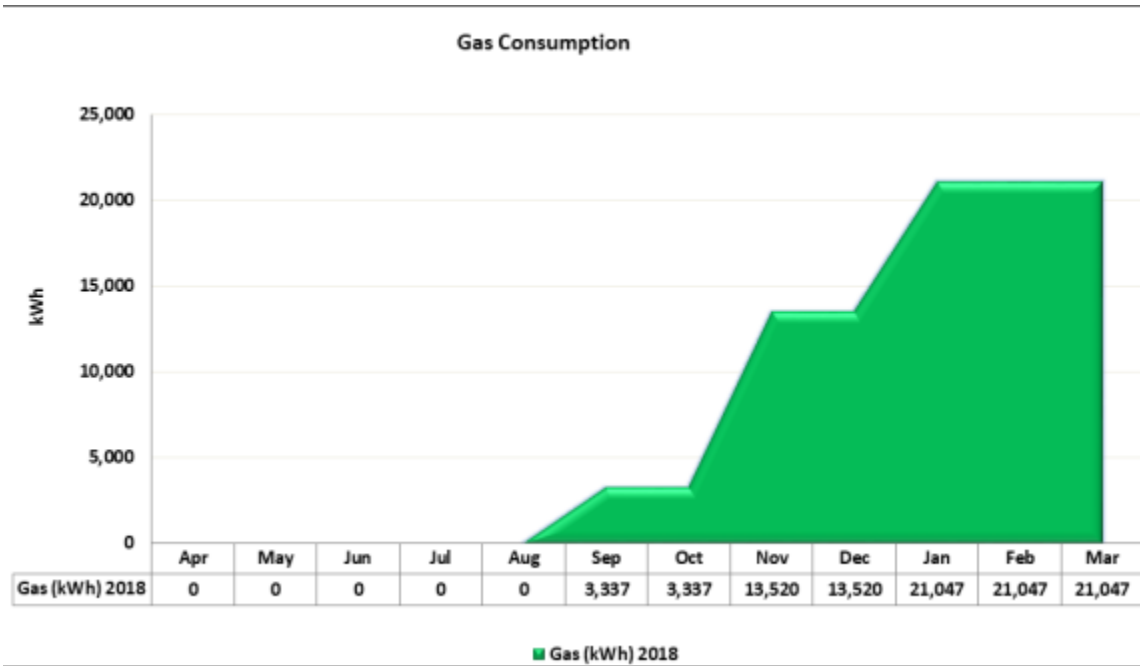
4.2 MONTHLY DEMAND PROFILE - ELECTRICITY

The electric consumption profile below shows the annual trend for the period of September 2018 to early April 2019. Consumption data is missing for other months so unable to accurately comment on annual trend.



4.3 MONTHLY DEMAND PROFILE - GAS

The gas consumption profile below shows the annual trend for the period of September 2018 to early April 2019. Consumption data is missing for other months so unable to accurately comment on annual trend.



5 BUILDING PERFORMANCE & OPPORTUNITIES

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

5.1 BUILDING ENVELOPE

The building envelope is in good repair and no recommendations in this area.

5.2 HEATING SYSTEM – CHURCH

Church heating is provided by two floor standing condensing boilers (Wessex Modu MAX 120) located in the external plant room. The boilers are in very good condition and maintained well, boilers were installed approximately 3-4 years ago part of a major upgrade due to flooding. As such no recommendations on boilers however it is recommended to improve the boiler controls in particular install weather compensation and boiler optimisation controls to fully utilise current control methods and get the most form the new boilers.

Heating to the church area is via trench heaters across the church floor which are supplied from heating pipes running in floor trenches covered with grilles with a mix of perimeter radiators. It is recommended to install thermal insulation foil below the pipework to reduced heat loss into exposed concrete floor, which can be reflected upwards into the church area. The pipework is generally well lagged in the plant room however some pipe insulation is incomplete and valves are exposed. It is recommended to install additional lagging to exposed pipe and install valve jackets to reduced heat loss into plant room.

Heating system is currently controlled by internal thermostat and time clock as detailed below. Set back temperature is at 12deg and run temperature is at 16deg. It is recommend to review heating times in line with occupancy and where possible ensure heating is switched of 30mins before occupancy finishes.

DAY	CURRENT TIMER
Monday	19:15 – 20:30
Tuesday	08:30 – 13:00 & 19:00 – 21:00
Wednesday	08:30 – 13:00
Thursday	08:30 – 13:00 & 19:15 – 20:30
Friday	08:30 – 13:00 & 18:30 – 21:30
Saturday	10:00 – 15:00
Sunday	07:00 – 13:00



5.3 HOT WATER SYSTEM

No hot water use in the church.

5.4 LIGHTING

There is a mix of lighting fittings throughout the church areas as largely low voltage PAR 38 and LED lighting which was part of the upgrade works to the church approx. 3-4 years ago consisting of £130,000 worth of upgrades and repairs. It has been advised no further lighting projects will be considered at the present time.

5.5 RENEWABLES

There is currently no renewables on site. Further investigation rules out any potential renewables taking into account usage and roof suitability.

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 savings			Investment (£)	Simple payback (yrs.)
			Elec/Gas KWh/yr.	Cost £/yr.	tCO2/yr.		
Heating	1	Install weather compensation and boiler optimisation controls	14,528	£391	2.7	£800	2.0
Heating	2	Install additional lagging to exposed heating pipes and valve jackets	3,729	£100	0.7	£200	2.0
Heating	3	Install Thermal Insulation Foil under heating pipework in trenches	6,296	£169	1.2	£600	3.5
TOTAL ELECTRICITY SAVINGS			0	£0	0	£0	0
TOTAL GAS SAVINGS			24,553	£660	4.5	£1,600	2.4
GRAND TOTAL			24,553	£660	5	£1,600	2.4

7 ASSUMPTIONS

7.1 ASSUMPTIONS

- Average cost of electricity at 10 p/kWh
- Average cost of gas at 2.7 p/kWh
- Electricity carbon emission rate of 0.541 kgCO₂/kWh
- Natural Gas carbon emission rate of 0.1836 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 & 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 are generating 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.