



Energy Audit and Survey Report
St Peter and St Andrew, Old Windsor
Diocese of Oxford



"There is a plan to reduce global carbon emissions to net zero by 2050. The plan will work. It involves all of us. We need to begin now, in our homes and workplaces and churches"

Revd Dr Stephen Croft, Bishop of Oxford

Version Control

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Contents

1. Executive Summary.....	3
2. Introduction	4
3. Energy Procurement Review.....	5
4. Energy Usage Details.....	5
4.1 Energy Profiling	5
5. Energy Saving Recommendations.....	6
5.1 Lighting (fittings)	6
5.2 Use of Electric Panels for Heating Specific Areas only.....	6
5.3 Quattro Seal	8
6. Renewable Energy Potential	9
7. Funding Sources	9
8. Faculty Requirements	10



1. Executive Summary

An energy survey of St Peter and St Andrew, Old Windsor was undertaken by Inspired Efficiency 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 Peter and St Andrew, Old Windsor is Grade II listed church which dates back to the 13th Century but was largely remodelled in the Victorian age. There is only 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 is used as the action plan for the church in implementing these recommendations over the coming years.

Short Term: Energy saving recommendation	Estimated Annual Energy Saving (kWh)	Estimated Annual Cost Saving (£)	Estimated capital cost (£)	Simple Payback (years)	Permission needed	To be actioned by who / when?
Remove overhead infrared heaters and install under pew heating throughout	N/A	N/A	N/A	N/A	List B /Faculty	
Purchase temporary tripod heaters to provide spot heat for specific events	N/A	N/A	N/A	N/A	None	

Medium Term: Energy saving recommendation	Estimated Annual Energy Saving (kWh)	Estimated Annual Cost Saving (£)	Estimated capital cost (£)	Simple Payback (years)	Permission needed	To be actioned by who / when?
Fit Quattro seal draft proofing to historic doors	N/A	N/A	N/A	N/A	List B	
Consider installing an overdoor air heater to improve comfort	N/A	N/A	N/A	N/A	List B /Faculty	

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

It has not been possible for the church to provide any energy bills so that energy and cost savings have not been able to be calculated.



2. Introduction

This report is provided to the PCC of St Peter and St Andrew, Old Windsor to provide them with 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.

St Peter and St Andrew, Old Windsor is a Grade II listed church which dates back to the 13th Century but was largely remodelled in the Victorian age and is used for Sunday worship by the local community.

An energy survey of the St Peter and St Andrew, Old Windsor, Church Lane, Old Windsor, SL4 2JW was completed on the 5th December 2018 by Matt Fulford. Matt is a highly experienced energy auditor with over 15 years' experience in sustainability and energy matters in the built environment. He is a chartered surveyor with RICS and a CIBSE Low Carbon Energy Assessor. He is a Member of the DAC in the Diocese of Gloucester and advises hundreds of churches on energy matters.

St Peter and St Andrew, Old Windsor	
Gross Internal Floor Area	296 m ²
Listed Status	Grade II

The church typically used for 2 hours per week for the following activities

Services	2 hours per week (Sunday service only)
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There is additional usage over and above these times for festivals, weddings, funerals and the like.



3. Energy Procurement Review

Energy bills for electricity have not been able to be supplied by St Peter and St Andrew, Old Windsor and have therefore no energy procurement review has been possible.

4. Energy Usage Details

St Peter and St Andrew, Old Windsor uses an unknown amount of electricity per year.

St Peter and St Andrew, Old Windsor has one main electricity meter, serial number S74C00045.

Utility	Meter Serial	Type	Pulsed output	Location
Electricity – Church	S74C00045	3 phase 100A	No	Base of tower



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

As the total energy consumption for the church is not able to be determined it has not been possible to determine an energy profile however it can generally be considered that the church uses a small amount of energy for lighting and a further small amount for plug in appliances such as kettles, sound system etc. The vast majority of the church’s energy consumption is going to be used to provide heating.



5. Energy Saving Recommendations

5.1 Lighting (fittings)



All the lighting within the church is currently efficient, low wattage compact fluorescent units. While these could be replaced for even lower wattage LED bulbs the saving is going to be rather low given the small hours of usage and therefore it is recommended that the conversion of the existing lighting to LED is made on replacement of the existing bulbs as the blow only.

5.2 Use of Electric Panels for Heating Specific Areas only



The church currently has a mixture of under pew heating (only to the first seven rows of pews on the north side) and overhead infrared heaters mounted on the wall plate at around 4.4m high.

The overhead units are unattractive and give off a red glow in operation. More importantly they are located too high up to provide effective heat. In order to be effective, they would need to be mounted at around 2.5m above floor level which would then provide an unacceptable visual intrusion to the church. The use of these overhead heaters is largely a wasteful practice.

Given the churches usage profile we would suggest that an adjusted heating strategy for the church would provide a much more efficient use of energy and a more comfortable church.

As with most medieval churches, this church would have survived most of its life without any form of heating; the modern addition 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 within their historic properties.

We would recommend that the existing overhead heaters are removed. Then the existing under pew heating system should be extended by installing under pew heating throughout the whole church. The two most popular under pew heaters within churches are BN Thermic PH30 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 could run along the North and South walls (all cabling should be in armoured cable or FP200 Gold when above ground) to the both rows of pews quite easily. The heaters should be wired back in two to three circuits which can be controlled separately depending on the size of the congregation for any service.

Given the length of the pew, two of the BN Thermic PH65 units or two of the Electric Heating Solutions PH107B can be used under each pew in the nave. Both these units have a higher heat output than the current under pew heaters, which are too few and too small to be most effective.

Within the choir, five similar under pew heaters can be installed on each side. As there is choir practice which occurs outside of service times it is recommended that the chancel/choir area is wired up on a separate circuit with its own programmer, so that these heaters can be switched on and off independently of the main church heaters.



To provide heating where there are not pews, it is recommended that far infrared panel heaters are installed to the wall by the font and on the south wall of the chancel between the choir stalls and the communion rail. Suitable electric panel heaters would be 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 accidentally after use.

To heat the tower for the bell ringer etc. it is recommended that the existing small electric convection heater mounted on the wall is removed and an overhead unit is installed on the wall plate and on the window cill such as the alpha bar unit <https://www.warm4less.com/product/77/1800-watts-bar-heater>



There is currently no heating in the vestry area and this could either be heated via a far IR panel heater as above, or more substantially heated by using a suspended pulsar heating unit such as <https://www.herschel-infrared.co.uk/product/pulsar/>



The use of under pew heaters will provide thermal comfort for people when seated in the pews but does not attempt to heat the entire air volume within the church. This can lead to some people feeling it is not heated when they arrive until they reach the pew. In order to provide some sense of “warm welcome” an overdoor heater could be installed for use solely for the 15mins prior to a service as people are arriving. Any overdoor heater should cover the entire width of the door and a unit such as <http://www.bnthermic.co.uk/products/fan-assisted-heaters/800-series/> may prove suitable.

There may still remain a few areas of the church which suffer from a lack of heat such as the chancel step area for the bride and groom in weddings. To address this the use of tripod mounted heaters which can be brought out only when required and then packed away might be the best solution and to enable this power sockets should be installed when such heaters are likely to be required.

5.3 Quattro Seal

There are a number of external doors in the building. 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 in to the church around the side and base of these doors.

It is recommended that draught proofing is fitted to all external doors. 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



6. 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 array and low general daytime usage
Battery Storage	No – No viable PV
Wind	No
Micro-Hydro	No
Solar Thermal	No – insufficient hot water demand
Ground Source Heat Pump	No – Archaeological considerations
Air Source Heat Pump	Yes – but unlikely to be successful give usage pattern of church and fabric.
Biomass	Yes – but major works required to integrate into the church and not the most efficient solution for the church's usage.

7. Funding Sources

This audit programme offers each participating church the chance to apply for a grant of up to £150 towards implementing some of the audit's recommendations. An application form is included with this report.

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-Jan-2019.pdf> .

Trust for Oxfordshire's Environment (TOE) does have some funds available (over and above the small implementation grants of £150 available through this scheme) to support energy efficiency improvements in community facilities. If your church is used by the wider community, visit www.trustforoxfordshire.org.uk or contact admin@trustforoxfordshire.org.uk to find out if your project is eligible for a grant of up to about £5,000.



8. 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 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.

