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Energy Efficiency and Net Zero Carbon Advice

St Martin Church Halls, Liskard

Diocese of Truro

DIOCESE OF TRURO

Author	Reviewer	Audit Date	Version
Matt Fulford	David Legge	16th May 2023	1.0

Contents

1. Executive Summary

An energy and decarbonisation survey of St Martin Church Halls, Liskard was undertaken by Inspired Efficiency Ltd. to provide advice to the church on how it can be more energy efficient, provide a sustainable and comfortable environment, and move towards net zero carbon. This is part of the wider environment and parish support programme within the Diocese of ABC.

St Martin Church Halls, Liskard are two well used community halls (the upper and lower hall) which are in close proximity to the church. The upper hall is an old Victorian school building and contains a large main hall space, several smaller rooms, offices, and a youth club in the cellar. The building has a very significant issue with damp that appears to be caused by numerous significant roof leaks, the building is listed and should be considered for being placed on the Heritage at Risk register. The lower hall is a smaller, unlisted hall space with one main hall, kitchen, WC, and smaller music room. There is both gas (to both halls) and three phase electricity supplied to the site through one meter serving both halls.

The halls have a number of ways in which it can be more energy efficient and a clear path towards net zero carbon. 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 and the route to net zero carbon diagram below are used as the action plan for the church in implementing these recommendations over the coming years. The strategy must be one that addresses the condition of the building prior to or at the same time as addressing the energy efficiency and decarbonization. This would involve recovering the roofs and including insulation within this, replacing all the windows, and insulating under the floors. Once this has been completed, installing modern LED lighting throughout with an air-to-air source heat pump for the heating solution would be recommended.

Energy and decarbonisation recommendations	Estimated Annual Energy Saving (kWh)	Estimated Annual Cost Saving (£)	Estimated capital cost (£)	Payback (years)	Permission needed	CO2 saving (tonnes of CO2e/yr)
Contact suppliers to arrange for the meters to be changed to smart meters	None	None	Nil	N/A	None	N/A
Switch electricity (and gas) suppliers to ones which provide 100% renewable (or green gas) supplies	None	None	Nil	N/A	None	Offset xx tonnes
Fit 270mm of insulation into the roof space	8,522	£852	£-	0.00	Consult DAC	1.53
Consider installing Electric Vehicle Charging Points	0	N/A	£2,500	0.00	List B	-
Fit timed fused spurs to hot water heaters	324	£104	£180	1.74	List A (None)	0.07
Install PIR motion sensors on selected lighting circuits	478	£153	£542	3.54	List B	0.10
Change existing lighting for low energy lamps/fittings	4,260	£1,363	£5,331	3.91	Consult DAC	0.90
Install a Solar PV array to roof of building	8,547	£2,735	£12,950	4.73	Faculty	1.80
Install an Air-to-Air Source Heat Pump to replace the existing heating system served from the Lower Hall	12,325	£458	£13,500	29.49	Faculty	2.11
Install an Air-to-Air Source Heat Pump to replace existing heating system served from the Upper Hall	37,386	£1,389	£40,950	29.49	Faculty	6.40
Replace windows	12,783	£1,278	£50,701	39.66	Faculty	2.30
TOTAL	84,625	£8,332	£126,654	15.20		15.21

Consider registering for Eco Church	The Eco Church programme, which is recommended by the Church of England, helps congregations care for the environment in all aspects of church life. The programme is free; you can, however, donate to A Rocha UK towards its costs.
Create a procurement policy for appliances (and other goods)	Commit to buying only appliances with the new energy efficiency ratings of A, B or C at the lowest when those you currently have reach the end of their useful life. (NB ovens, air conditioners and space or water heaters are still on the older rating scale, so for these, try for A+++.)

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

Figures in the table are based on market prices of 32p/kWh and 10p/kWh for electricity and mains gas respectively. The carbon figures are based on the DEFRA 2022 carbon emission factors of 0.21107 for electricity and 0.18 for gas. Do note that as energy prices increase, payback periods decrease.

2. The Route to Net Zero Carbon

The UK has committed to move towards net zero carbon – the point at which we have reduced emissions as much as we can and then balanced any residual emissions through removal of carbon from the atmosphere. They have done this as part of a worldwide agreement which aims to limit global warming to well under 2 degrees Celsius, with an aim of keeping it below 1.5 degrees Celsius. This will help protect all of us from the impacts of climate change.

In February 2020, the Church of England's General Synod set its own net zero carbon target. The first stage of this target covers energy used by churches, cathedrals, schools, vicarages, other church buildings, as well as emissions caused by reimbursed transport. The target date is 2030.

This church has a clear route to become net zero carbon by 2030 by undertaking the following steps:

3. Introduction

This report is provided to the PCC of St Martin Church Halls, Liskard to give them advice and guidance as to how the church can be made more energy efficient. In doing so the church will also become more cost effective to run and potentially have higher 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 St Martin Church Halls, Liskard, (The Church Centre, Church St, Liskeard PL14 3AQ), was completed on the 16th of May 2023 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 Martin Church Halls, Liskard	
Church Code	639306
Gross Internal Floor Area	874 m^2
Listed Status	Grade II*
Average Congregation Size	

The church is typically used for 50 hours per week for the following activities:

Type of Use	Hours Per Week (Typical)
Services	4 hours per week
Meetings and Church Groups	8 hours per week
Community Use	40 hour per week

4. Energy Procurement Review

Energy bills for gas and electricity have been supplied by St Martin Church Halls, Liskard.

The current electricity rates are:

Single / Blended Rate	32p/kWh
Standing Charge	p/day
Availability Charge	p/kVA
Meter Charges	p/day

The current gas rates are:

Single / Blended Rate	10p/kWh
Standing Charge	p/day
Availability Charge	p/kVA
Meter Charges	p/day

The electricity is supplied by XXX and is not purchased on a renewable tariff. The church would be congratulated for procuring its supplies from a 100% renewable tariff and is encouraged to continue this.

OR

Going onto a renewable tariff is an important part of the process of taking churches towards net zero. The church is therefore encouraged to consider procuring its electricity from suppliers that offer 100% renewable electricity, and in some cases 'green' or 'carbon neutral' gas.

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

VAT	5%	The correct VAT rate is being applied.
CCL	Not charged	The correct CCL rate is being applied.

The above review confirmed that the correct taxation and levy rates are being charged.

5. Energy Usage Details

St Martin Church Halls, Liskard uses 7,875 kWh/year of electricity, costing £2,520 per year, and 85,220 kWh/year of gas, costing £8,522. The total carbon emissions associated with this energy use are 17 CO_2e.

This data has been taken from the annual energy invoices provided by the suppliers of the site. St Martin Church Halls, Liskard has one main electricity meter, serial number E15UP06106. There is one gas meter serving the site, serial number M016 A09645 14A6.

Utility	Meter Serial	Type	Pulsed output	Location
Electricity	E15UP06106	3 phase 100A	Full AMR Connected	Corner of Jerico
Gas	M016A096451 4A6			

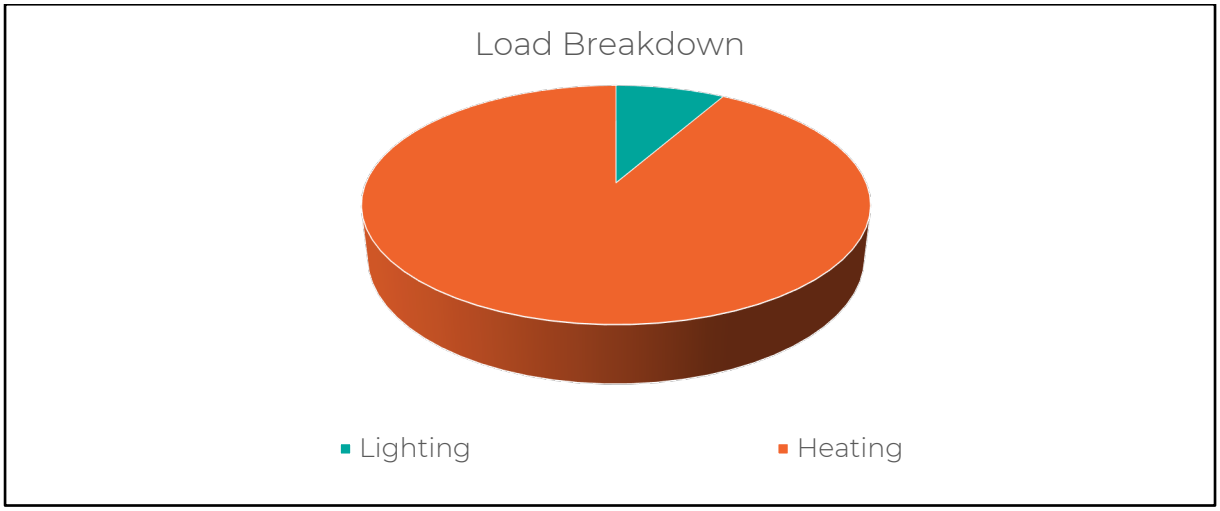
All the meters are AMR connected and as such energy profile for the entire energy usage should be possible. Half hour meter data has been provided for the purpose of this report and this has been used to verify the data.

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.

5.1 Energy Profiling

The main energy use within the church can be summarised as follows:

Service	Description	Estimated Proportion of Usage
Lighting	LED: 29%	8%
Heating		92%



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 load is lighting.

6. Efficient / Low Carbon Heating Strategy

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 near future. Mains gas does have some potential to reduce its carbon content through the use of biogas and hydrogen, but these are less developed solutions and will be unable to deliver 'zero carbon mains gas' in the foreseeable future.

It is therefore important to review and set out a plan to make heating more efficient and less carbon intensive. One way to achieve this is to consider a transition to electrical heating where this also represents an efficient and comfortable solution for churches. 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 oil and coal-fired power stations.

The halls are currently heated by gas fired boilers. The boiler to the upper hall was installed in 1989 and is beyond the end of its serviceable life. The lower hall boiler was installed in 2009 and appears to have a further 5 years serviceable life before requiring replacement. The boilers provide heating to contemporary pressed steel radiators fixed to the walls and some fan convector units to the larger hall spaces.

The heating is set to come on for the whole day on most days and the halls are extensively used by the community and there is no zoning for different areas.

The various options for a decarbonised heating solution have been reviewed in the table below.

Decarbonized Heating Viability	Feasible?	Notes:
Air to Water Source Heat Pump	Yes	Would be feasible but would require completely new heating system and least responsive
Air to Air Source Heat Pump	Yes	Would be most viable solution providing responsive heating solution to different rooms at different times.
Water Source Heat Pump	No	No water source locally
Ground Source Heat Pump	No	Significant archaeology
Under Pew Electric Heating Panels	No	No fixed pews
Electric Panel Heaters (to provide supplemental heating only)	Yes	Could be used for supplemental heating to WC areas and the like
Over door air heater (to provide supplemental heat only)	No	Architecture around door would not permit unit to be fixed
Overhead Infra-Red Heaters	No	Least preferred heating source due to comfort
Heated chair cushions	No	Other solutions preferred

Any decarbonised heating solution must be considered as part of a major refurbishment of the building which address the roof leaks and insulation of the building. The recommendation for an appropriate decarbonised heating solution is that the halls use an air-to-air heat pump (essentially an air conditioning system run in heating mode) to provide heat into all the spaces and can be used to heat each individual room separately.

6.1 Air to Air Source Heat Pumps

Air-to-Air Source Heat Pumps (AASHP) work by having an external unit which sucks air in and extracts the heat from it. The pumps concentrate this heat and put it into a refrigeration gas (in the same way as a fridge or freezer works). This refrigeration gas is then piped inside the building in a small pipe where is it then allowed to expand in an internal unit with a fan. This heat is then blown out into the space. This system is identical to an air conditioning system, but it works in reverse to heat the space. As warm air is blown into the space this type of system can heat spaces from cold relatively quickly. AASHPs provide around 4.5 units of heat for every 1 unit of electricity used in the heat pump; they therefore have a Coefficient of Performance (CoP) of up to 4.5.

The Centre for Sustainable Energy model[1] can be used to estimate heat load for the building.

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

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

Insulation Factors

Condition	Factor kW/m³
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 m³	Insulation Factor kW/m³	Heat Required (Space heating) kW
Halls	1440	0.033	47.5

Therefore, a heat pump of xx kW would be required.

AASHPs 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 AASHP comprising of three smaller 3kW units and two larger 10kW units.

Internal units come in a variety of styles. The most appropriate internal units for most churches are floor mounted units which look very similar to a fan convector heater.

FUA-A - Under ceiling cassette air conditioning unit

Unique under ceiling cassettes for high rooms with solid ceilings or false ceilings with a shallow void. Suitable for all types of commercial applications.

The FUA-A range provides comfortable heating and cooling even for rooms with high ceilings and has individual louvre control flexibility to suit every room layout.

FTXM-R - Wall mount air conditioning unit

Attractive, wall mounted design with perfect indoor air quality. 2 area motion detection sensor: air flow is sent to a zone other than where the person is located at that moment; if no people are detected, the unit will automatically switch over to the energy-efficient setting.

FVXM - Floor Mount Air Conditioning Unit

Designed to fit rooms of any size and shape, it blends well with the interior due to the new design which incorporates more flowing lines and softer edges. These units are ideal when it is not possible to fit a high level wall mount unit for aesthetic or practical reasons.

They are suitable for a wide range of applications including domestic, small to medium offices and commercial uses.

All these units do have a fan element within them and therefore a small amount of fan noise is emitted. This tends to be less than a fan convector heater on a boiler-based system and similar to the noise from a fridge or freezer. Air conditioning units are commonplace in hotel rooms, indicating that the noise is low enough even to be suitable for sleeping environments.

A case study of a church which has installed such a solution is available at 5. Air-source heat pumps at Hethel Church - All Saints Church, Hethel - A Church Near You

> Recommendation: Install an Air-to-Air Source Heat Pump to replace the existing heating system.

6.2 Install Electric Panel Heaters

Electric panel heaters can provide additional heating to areas where there are no pews. Suitable electric panel heaters would be far-infrared panels. These heaters have a strong radiative effect (where heat is reflected to people from the surface) as well as a light convective effect (where air is warmed and moves around to heat the general space). For this reason, these heaters tend to provide a relatively instant sense of heat and comfort within a specific space and only need to be on for short periods of time. The heating effect spreads out from the panel by up to 3 meters, although this is reduced by people and furniture. This means that these heaters provide a useful source of supplementary heating or primary heating for some well-defined areas but are not very well suited to providing a complete heating solution for a church without other forms of heating (such as under pew). As these heaters warm up almost instantly, this reduces the amount of preheating required before each use of the building and can make electric heating cost competitive with gas. It also means that areas using this form of heating can rapidly and economically be brought into used for short or unplanned meetings if needed.

It is recommended that the PCC consider installing supplementary electrical panel heaters (on a time delay switch) in areas such as the WC, allowing removal of the existing radiators.

These can be purchased widely and fitted by any competent electrician. It is recommended that they are fitted with a time delay switch so they cannot be left on accidently after use.

If you would like to discuss panel heaters with a church in the diocese that already makes use of them, please contact the diocese.

Electric panel heater installed behind an altar.

7. Energy Saving Recommendations

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.

7.1 New LED Lighting

The lighting makes up a relatively small overall energy proportion of the electricity used within the church. There are some areas of the building which have had efficient LED lights installed but there are still a large number of inefficient fluorescent T8 fittings within the hall, kitchen, music room, cellar, boiler room, and hallway.

It is recommended that the fittings scheduled in Appendix 1 are all changed for LED fittings. There are a vast number of specifications of LED light fittings on the market, but it is recommended that any purchased should come with branded chips and drivers and offer a 5 year warranty. An example of such a range of fittings is available through Parish Buying.

If all the light fittings were changed on a simple “like for like” the total capital cost (supplied and fitted) would be £5,331. The annual cost saving would be £1,363 resulting in a payback of around 4 years. This estimate includes the supply of the lights, the labour to install them and the access required. It does not include any upgrade to the wiring or a new lighting design, both of which the church may wish to consider. Guidance on lighting, produced by Historic England for churches, can be found at: https://historicengland.org.uk/advice/caring-for-heritage/places-of-worship/making-changes-to-your-place-of-worship/advice-by-topic/lighting/

Recommendation: Change existing lighting for low energy lamps/fittings.

7.2 Lighting Controls (Internal)

There are several lights which currently remain on all the time in areas such as the WCs, lobby, boiler room, entrance hall, corridors, and the like. Some of these areas are only used occasionally and for a short amount of time. The light, therefore, does not need to remain on constantly. There are also spaces which benefit from a good amount of natural daylight coming in through the windows, such that artificial lighting is not required for much use during the year.

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 considered 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.

Recommendation: Install PIR motion sensors on selected lighting circuits.

7.3 Timers on Fuse Spurs to Water Heaters

There are a number of electric point-of-use water heaters to provide hot water for hand washing. This only needs to heat the water to the required temperature when the building is in occupation but at the moment this heater is directly wired in without any form of time control and therefore maintains it set temperature 24/7.

It is recommended that the heaters are fitted with a 24 hour/7 day timeclock to replace the fused spur switch. They should be set up with times to match the times that the building is occupied. This will prevent the standing losses from the unit wasting energy during periods when the building is not occupied.

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

Recommendation: Fit timed fused spurs to hot water heaters.

7.4 Replace Windows

The windows (Appendix 2) in the building are single glazed with wooden casements and as such are very poor in terms of thermal quality. In addition, many of the openings do not close well against the frames and excessive cold air is being let into the space.

The introduction of new double glazed units would considerably reduce the heat loss from the building and improve thermal comfort. This measure would be costly

and disruptive to install but could be considered as part of a refurbishment programme. The use of high quality windows will also reduce external noise transfer and provide added security. To enhance heat ingress in particularly cold areas, double glazing with low emissivity (Low-E) glass could be selected as this allows more solar gain than standard double glazing.

It is therefore recommended to replace these windows with new double glazed windows with wooden/aluminium/uPVC casements set into the existing surrounds. It is suggested that any window installation is undertaken by a FENSA Approved Installer www.fensa.org.uk

Recommendation: Replace windows.

7.5 Insulation to Roof

The loft void above the ceiling was inspected as part of this audit and found to have no insulation present. In cases where there is 100mm or less of insulation within accessible roof spaces it is recommended that insulation be added to prevent heat loss and create a more comfortable environment for the occupants of the building.

Because heat rises, the ceiling/roof of a building is the largest contributing area to heat loss from a building. 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.

Recommendation: Fit 270mm of insulation into the roof space.

8. Other Recommendations

8.1 Electric Vehicle Charging Points

The church has a car park to the side and rear of it which serves the church and also the frequently used church hall. In order to make a visible statement on the church's mission of stewardship and to facilitate more sustainable transport choices by those visiting the church and/or using the hall, the church may wish to consider installing an electric vehicle charging point, probably on the side of the church hall to allow visitors to charge their electric cars.

Some units allow the organisation control over who is allowed to use the unit with a key operated system. Or, given the type of use of the building and control over the usage of the car park as a whole, a simple 32 amp type 2 wall pod type charger without the need for a key may be most suitable. These are widely available through many suppliers.

Because of the parish office within the building, the church can be considered as a place of work and, as such, installation grants are available through the workplace charging scheme https://www.gov.uk/government/publications/workplace-charging-scheme-guidance-for-applicants-installers-and-manufacturers which will fund 75% of the installation cost up to £500.

Recommendation: Consider installing electrical vehicle charging points.

9. Photo Voltaic Electricity Generation Potential

The potential for the generation of renewable energy on site has been reviewed and the viability noted.

Renewable Energy Type	Viable?
Solar Photo Voltaic (PV)	Yes
Battery Storage	Yes

Now that the Feed in Tariff scheme has come to an end, the installation of solar PV panels in situations where there is not almost full usage of the electricity generated on site is not really viable.

There is potential for a solar PV array of the lower hall. The lower hall is not listed in its own right, and it has a good south facing roof that is ideal for PV. As both halls share a single electricity supply any electricity generated anywhere on the site will be of a shared benefit to both halls. It is therefore preferred to consider the PV panels on the lower hall roof to keep them off the listed building. This size of the lower hall roof would allow a 10kWp PV array to be installed which is the maximum size that could be installed and connected to the incoming electricity supply without requiring significant permissions from the DNO. It is therefore recommended that a 10kWP PV installation should be installed on the roof of the lower hall to provide renewable electricity to both halls.

Battery storage is not strictly a renewable energy solution, but it does provide 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 solar PV is no longer generating. It therefore extends the usefulness of the existing solar PV system particularly in this sort of hall arrangement.

Recommendation: Install a Solar PV array to roof of building.

10. Funding Sources

There are a variety of charitable grants for churches undertaking works and a comprehensive list of available grants is available on this Parish Resources page: https://www.parishresources.org.uk/resources-for-treasurers/funding/

11. 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.

12. Other Observations

12.1 Bats in Churches

The Bat Conservation Trust has a project with the Church Buildings Council Natural England, the Church of England, Historic England and the Churches Conservation Trust to address bat issues:

www.churchofengland.org/resources/churchcare/advice-and-guidance-church-buildings/bats-churches

Non-energy saving items

Comments on items mentioned by client but not recommended

Health and Safety concerns noted on site

Thanks, and commendations

13. Appendix 1 – Schedule of Lighting to be Replaced or Upgraded

Room/Location	No. of Fittings	Recommended Upgrade	Annual Saving (£)	Total Cost (£)	Payback
Lower Hall	6	600 x 600 25W Panel	£183	£449	2.45
Kitchen	1	5ft Single Vapour LED	£27	£81	2.95
Gents	1	2D LED 11W	£11	£59	5.21
Music Room	2	5ft Single Proteus LED	£38	£255	6.75
Cellar lobby	1	2D LED 11W	£11	£59	5.21
Cellar	1	5ft Single LED	£72	£88	1.22
Cellar WCs	1	5ft Single LED	£34	£88	2.62
Cellar	4	5ft Single LED	£289	£351	1.22
Pool rom	1	2D LED 11W	£11	£59	5.21
Boiler Room	1	5ft Single Vapour LED	£32	£81	2.50
Hall Lobby	2	2D LED 11W	£23	£118	5.21
WC	1	2D LED 11W	£11	£59	5.21
Entrance hall	3	5ft Single LED	£129	£263	2.04

Office	2	5ft Single LED	£86	£176	2.04
Hall Store	1	5ft Single LED	£43	£88	2.04
WC Lobby	2	2D LED 11W	£31	£118	3.82
Cleaners	1	LED GLS	£37	£12	0.32
Kitchen	1	5ft Single Vapour LED	£42	£81	1.94
WCs	6	2D LED 11W	£92	£353	3.82
Understairs	1	2D LED 7W	£14	£55	3.98
Jericho Room	8	5ft Single Proteus LED	£70	£637	9.04
Stairs	2	2D LED 11W	£31	£118	3.82
Upper Room	4	5ft Single Proteus LED	£3	£509	150.12
Upper Room	6	4ft Single LED	£42	£430	10.16

14. Appendix 2 – Window Replacement Schedule

Reference	Height (m)	Width (m)	Number	Area
W1	0.49	0.7	2	0.686
W2	0.53	1.94	29	29.8178
W3	0.43	1.01	4	1.7372
W4	0.92	1.96	1	1.8032
W5	2.14	2.58	2	11.0424
W6	0.54	1.5	4	3.24
W7	0.85	0.93	1	0.7905
W8	0.93	2.04	1	1.8972
W9	0.6	0.74	1	0.444
W10	1.24	0.93	4	4.6128
W11	0.86	2.08	2	3.5776
W1	0.49	0.7	2	0.686
W2	0.53	1.94	29	29.8178
W3	0.43	1.01	4	1.7372
W4	0.92	1.96	1	1.8032
W5	2.14	2.58	2	11.0424
W6	0.54	1.5	4	3.24
W7	0.85	0.93	1	0.7905
W8	0.93	2.04	1	1.8972
W9	0.6	0.74	1	0.444
W10	1.24	0.93	4	4.6128
W11	0.86	2.08	2	3.5776
TOTAL			51	59.6487

NB: Window replacement costs have been priced on an average installed cost of £550/m².

1 The Coaches, Fields Road, Chedworth, GL54 4NQ

01285 721134

07971 787363

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