All Saints' Church, Springfield

Energy Management Plan
2025

Drafted; Dave Gauld
Approved:

Contents

1. Introduction

This Energy Management Plan has been prepared to assist the PCC (Church Council) of All Saints' Springfield in prioritising maintenance work and fabric enhancements to reduce running costs and reduce our Carbon Footprint.

As an Eco Church, All Saints' is seeking to introduce more sustainable heating and lighting systems which will conserve energy resources and which seek to reduce our carbon emissions to net-zero by 2030. The Plan provides a basis through which the church can achieve those aims.

A comprehensive energy audit of the church and the church centre was carried by ESOS-Energy in December 2024. The Energy Management Plan is based on advice contained in the ESOS-Energy consultant's report and recommendations, supplemented by further correspondence with the consultant. These have been reviewed by the PCC Fabric Committee.

It should be noted that the buildings at All Saints' have very different constructions and usage patterns, which require different solutions and priorities.

1. The historic church building (Grade II* listed) which is of traditional construction with large leaded windows and a very high ceiling. This is primarily used two mornings per week for worship services, with additional services and events during the year.

2. The modern extension built in 1979 and further extended in 1988. This is constructed with modern materials, in accordance with building standards ruling at the time. This is extensively used seven days per week with an average utilisation of 65 hours per week.

It should be noted that very significant energy savings measures were achieved between 2019 and 2022 by replacement of all lighting by LED lamps, careful (aggressive) scheduling of the heating using the full capabilities of the existing controls and selective introduction of thermostatic radiator valves. See ESOS 5.1 and A7 of the checklist.

<u>As a result, there are fewer opportunities for small/cheap improvement measures.</u>

2. Approach to the Plan

Section 3 of the plan contains a table summarising the main recommendations and their environmental and cost implications. Section 4 provides further information about each of the main recommendations in turn.

The Church of England has produced a Net Zero Checklist as a tool for churches to review the carbon emissions from their buildings, and to identify practical actions which they can take to reduce energy use and associated emissions. This checklist has been completed for All Saints' (Section 5). It is cross-referenced where applicable to the ESOS-Energy report and the Energy Management Plan. This has ensured that the Plan is comprehensive. Comments in the checklist include some proposed minor improvements in addition to the Plan's main recommendations. These will be addressed during routine maintenance.

3. Plan Summary

This section contains a table presenting the status of the plan.

Reference	Energy and decarbonisation recommendations	Estimated Annual Energy Saving (kWh)	Estimated Annual Cost Saving (£)	Estimated capital cost (£)	Payback (years)	CO2 saving (tonnes of CO2e/yr)	Status (Year)
ESOS 1 (4.7)	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+++.)					Prepare policy
ESOS Corr. (4.1)	Install point of use water heater for kitchen	200	N/A	£400	N/A	0.03	Obtain quotes (2025)
ESOS Corr. (4.1)	Install point of use water heater(s) for toilets	200	N/A	£800	N/A	0.03	Obtain quotes (2025)
ESOS 7.5 (4.4)	Install electric heating method to the church pews, this could be under pew convectors or heated pew cushions	Higher power heaters offset by more efficient and targeted use	N/A	£33,000	N/A	At least neutral	Obtain quotes (2026)
ESOS 10.4 (4.2)	Increase amount of loft insulation in hall ceiling spaces	2,000	230	£3,000	13	0.36	Obtain quotes (2027)
ESOS 10.3 (4.3)	Install cavity wall insulation in older hall building	3,000	345	£4,000	11.5	0.54	Obtain quotes (2027)
ESOS 7.4 (4.5)	Install Air to Air Heat Pump systems for hall rooms	39,000 gas replaced by 10,000 electricity	2,500	£24,000	10	4.9	Obtain quotes (2028)
ESOS 11 (4.6)	Obtain quotes for Solar Photovoltaic Panels	5,000	960	£10,000	10.5	1.0	Obtain quotes (2029

Priorities

It is recommended that improvements are implemented, as indicated above, prioritising those providing rapid improvements to operation and comfort of the users of the church and centre, in addition to saving energy and working towards net-zero. Priority needs to be given to improvements impacting users directly.

Fundraising will be required to enable most of the improvements to be implemented, which will require significant planning and approvals. Resultant energy savings will be reflected in running costs. See notes in paragraph 6.

4. Detailed description of Actions

4.1 Install point of use water heaters

Currently there is a large hot water tank located in the boiler house adjacent to the boiler supplying the original part of the hall and the chancel. This tank supplies the kitchen, and adjacent toilets. It can take over two minutes to obtain hot water at the kitchen tap, during this time approximately 10L of cold water is run off and is replaced by hot water which subsequently cools during the day, leading to an estimated annual total of 400kWh.

Ideally, installation of an Air to Air Heat Pump heating should involve electric water heating. Local HW provision to serve the kitchen and each set of toilets is sensible. This could be a small tank where there are a large number of hot taps, operated from a timer set to reflect hours of use.

The cost of heating the water used in the Centre is included in the overall energy (gas) consumption by the two boilers and cannot be easily estimated. With a transition from gas to electrical energy for water heating it is essential that waste is eliminated.

The survey estimated an annual saving of 400kWh (kitchen and toilets) and 0.06 tonnes of CO2e/year.

4.2 Add additional insulation to the Church Centre loft spaces

The loft void**s** above the Church Centre ceilings have 50 to 75mm of fibreglass 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.

With the regular use of the halls, adding insulation up to the present standards of 270mm is recommended. The capital cost is estimated as £3,000.

The survey estimated an annual saving of 2000kWh and 0.36 tonnes of CO2e/year. This would result in a 5% reduction in energy consumed.

4.3 Install Cavity Wall Insulation

The earlier phase was built with cavity walls but not insulated. Cavity wall insulation would be beneficial in these areas. It is proposed that we introduce cavity wall insulation to the external walls, following a detailed survey by the specialists. The capital cost is estimated as £4,000.

The survey estimated an annual saving of 3000kWh and 0.54 tonnes of CO2e/year. This would result in a 7.6% reduction in energy consumed.

4.4 Install Electric heating method for church pews

The church is currently heated by tubular electric heaters attached at low level behind the pews. These provide a weak radiant effect (having a small surface area, half of which is pointing at the pew or floor) and a weak convection effect, due to a low surface area. Additionally, the high temperature of the heater surfaces means that they must be turned off while the pews are occupied. To compensate for this the heating is switched on for between 2 and 2.5 hours before the service, but still does not provide a comfortable environment for the worshipers.

To improve the situation, it is recommended that we install under pew convector heaters or heated pew cushions to warm the people not the building.

The suggested solution is to install three heaters under each pew (between the pew supports) with a total consumption of 44.5kW. Since these would only be used for the duration of the service the power consumption will be equivalent to the current heating. The quick warm-up time would enable the heaters in unused pews to be switched off, and then reactivated as necessary, with consequent savings. This solution would have comprehensive controls, with scheduling capability to optimise energy consumption. Consideration will be given to individual and group controls of pews.

The alternative solution is to install heated seat cushions, which would directly supply heat to persons sitting on the pew. There are two suppliers of this type of product. We need to consider the costs and benefits of each product, including long term durability and maintenance issues. One product is directly upholstered to the pew while the other is in the form of a detachable cushion. Removable and rechargeable versions of the product present unacceptable handling and charging problems.

This activity is primarily to eliminate the safety hazard and to provide a comfortable environment for the worshipers, and will result in small energy savings by careful scheduling of use and reductions in areas heated, helped by the quick warm up times of the heaters. The estimated cost is approximately £33,000.

Further work needs to be done to evaluate the options, and obtain quotations.

4.5 Install air to Air heat-pump systems to Centre Rooms

The report prepared by ESOS Energy considers the use of heat pumps for the Church Centre, due to its high utilisation.

- Ground Source heat pumps were thought to be incompatible with our consecrated burial ground, and to have high installation costs.
- Air to Water heat pumps would be difficult and costly to integrate into our existing heating system. The location of the boiler-house is incompatible with a heat-pump, since it would result in a super chilled well between the church and Centre (there is nowhere for the cold air to escape) and subsequent failure of the pump. A position with a good flow of (cold) air away from the unit is needed. Additionally, the pipe work is buried in the floor with no opportunity to increase the size or improve insulation, and as we know repairs are difficult and costly.
- Air to Air Source Heat Pumps are highly efficient and would be distributed round the Centre, near the rooms they serve, which provides a good flow of (cold) air away from the unit and optimises efficiency.

The recommendations of the ESOS survey are that we investigate Air to Air Source Heat Pumps, which 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 can be used to estimate heat load for the building, showing that a heat pump system of 24 kW would be required for the building, however for our situation a number of smaller units provide a more flexible and efficient solution. It is likely that we will require 4 outdoor units supporting indoor units in each room (2 in the hall).

Installers will need to make specific heat loss calculations for each room before the final solution can be determined.

The Air to Air Source Heat Pumps under consideration provide comprehensive scheduling and control capabilities, generally through an WiFi network, which will support individual room temperature management.

The survey estimated an annual saving of 2500kWh and 4.9 tonnes of CO_2e/year. This would result in a 26% reduction in energy consumed, however the higher cost of electricity relative to gas, at this time, means the financial savings are less. Future government actions may significantly alter energy costs. The estimated cost is approximately £24,000.

4.6 Obtain quotations for Solar Photovoltaic Panels

The ESOS recommendations are that we investigate whether a small section of the Paynter room roof might be suitable.

Quotations will be obtained for a small system located on the roof of the Paynter Room which is less shaded.

A 30m2 array of 4.5kW peak output could deliver around 3,500kWh annually, offsetting over £650 of electricity costs. Capital costs for a system of this (domestic) size would be around £6k. An integrated storage battery would enable us to make best use of the energy collected.

The survey estimated an annual saving of 5000kWh and 1 tonnes of CO_2e/year. The estimated cost is approximately £10,000.

4.7 Create a Procurement Policy

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+++.)

This will guide our purchasing decisions.

4.8 Priorities

Year	2025	2026	2027	2028	2029
Improvement	2%	2%	12.5%	26%	12.5
Primary Measure	Water Heaters (4.1)	Pew Heaters (4.4)	Add Insulation (4.2 & 4.3)	Heat pumps (4.5)	PV Panels 4.6

5 Checklist

The checklist comments provide the rational for prioritisation of the actions, to which the ESOS-ENERGY survey and report provided the detailed consideration.

- Ongoing actions are considered to be directed by the Quinquennial Inspection and remedial work.
- None indicates that no specific action is planned at this time
- Actions detailed in the ESOS survey report are cross referenced to the relevant paragraph, and to the detail in paragraph 4.

CHECKLIST	Comments	Further Action
Part A - Where do we start?		
A1. Maintain the roof and gutters, to prevent damp entering the building and warm air escaping.	Routine maintenance has addressed any issues.	Ongoing
A2 Fix any broken window panes* and make sure opening windows shut tightly, to reduce heat loss.	Routine maintenance has addressed any issues. The historic church was very few opening windows. The Church Centre is regularly inspected for defects and repairs commissioned.	Ongoing
A3 Insulate around heating pipes to direct heat where you want it; this may allow other sources of heat to be reduced in this area.	Heating pipes, where accessible, are insulated. Much of the Church Centre heating pipework is buried in the floor screed, insulation is minimal, but cannot be improved.	None
A4 If draughts from doors are problematic, draught-proof the gaps or put up a door-curtain*.	Draughts from closed doors are not considered to be a problem, complaints centre round doors left open. The porch outer door has significant gaps, however we do not attempt to heat this area. An air curtain is fitted to reduce impact on the Nave occupants when the door is open. We will consider relocating the air curtain following the introduction of under pew heating.	None (ESOS 7.6)
A5 Consider using rugs/floor-coverings (with breathable backings) and cushions on/around the pews/chairs.	Nave and Chancel have carpet/carpet tiles, except on the timber platforms. The space under the timber pew platforms has minimal airflow (just enough to avoid dampness) and the	None

	substantial floorboards provide a degree of insulation meaning the floors are not perceived to be cold. Additionally we are pursuing a “heat the people, not the building” strategy thus carpets have very small benefits. The Church Centre has carpet tiles, except in the hall (which is used for youth activities, inc games, etc).	
Heating and lighting:		
A6 Switch to 100% renewable electricity (for example through Parish Buying’s energy basket) and ‘green’ gas.	We have switched to renewable tariffs from Octopus Energy.	None
A7 Match heating settings better to usage, so you only run the heating when necessary*.	The heating controls are carefully matched usage. There are 5 zones controlled by time clocks. These are programmed to provide heat to the zones ahead of occupancy and to switch off as soon as possible, taking account of residual heat in the radiators, and building fabric. Two of the zones have manual over-ride buttons, providing 40min additional heating, enabling the programmed heating times to be shortened, without causing user inconvenience. Thermostatic radiator valves are fitted on many radiators, where appropriate to supplement the zone thermostats. Note:- The proposed air to air heat pump systems provide comprehensive scheduling and control capabilities, generally through an WiFi network, which will support individual room temperature management.	None
A8. If you have water-filled radiators, try turning off the heating 15 minutes before the service ends; for most churches this allows the heating system to continue to radiate residual warmth*.	Part of the strategy, see A7	None
A9. If you have radiators, add a glycol based ‘anti-freeze’ to your radiator system and review your frost setting.	Not considered necessary at this stage, the frost stat is seldom triggered. Additionally the introduction will raise the risk of leaks in the inaccessible pipework.	None
A10. Replace lightbulbs with LEDs, where simple replacement is possible.	All lights in the body of the historic church were changed to LED in out during 2017 relighting project. All the lights in the Church Centre and tower were changed in 2023 replacement project.	None

A11. Replace floodlights with new LED units.	The high efficiency discharge lamps are being replaced by equivalent LED units where the fittings fail. The energy saving is minimal. The lights are controlled by a timeclock and ambient light sensor to minimise consumption.	None
A12. If you have internet connection, install a HIVE- or NEST-type heating controller, to better control heating.	See A7. The current controls / thermostatic valves are working very effectively. At this stage it is not appropriate to make changes ahead of our transition from gas heating to air-pumps, which will provide equivalent or more flexible control options.	None
A13. If your current appliances fail, then replace with A+++ appliances.	Our policy is to utilise the most efficient appliances when selecting replacements.	Action 4.7
People and policies:		
A14. Complete the Energy Footprint Tool each year, as part of your Parish Return, and communicate the results.	The Energy Footprint is completed annually in the Parish Return and will be included as a topic within the Eco Church pages of the magazine during 2025.	Magazine article
A15. Create an Energy Champion who monitors bills and encourages people to turn things off when not needed.	The Eco Church group encourage efficient use of resources. Notices and reminders are placed adjacent to basins and switches.	None
A16. Write an energy efficiency procurement policy; commit to renewable electricity and A+++ rated appliances.	A procurement policy is being prepared (see paragraph 4.7). See A6 for renewable energy, and A13 for energy-efficient appliances.	Action 4.7
A17. Consider moving PCC meetings elsewhere during cold months, rather than running the church heating.	PCC meetings are held in the church centre.	None
Offset the rest:		
A18. For most low usage 'Sunday' churches, once they have taken steps like these, their remaining non-renewable energy use will be very small. For the majority, all they need to do now to be 'net zero' is offset the small remaining amount of energy through Climate Stewards or other reputable schemes.	Inappropriate for our situation since the church centre is used heavily on a daily basis (40hr/week) and our energy consumption is commensurately high. We are pursuing low carbon solutions to obviate carbon offsetting, including renewable energy tariffs.	None
A19. Also, think about your church grounds. Is there an area where you could let vegetation or a tree grow?	Our churchyard has a large number of trees and we have planted additional trees in past years. We have created a wildflower area in part of the ground. There is little scope for additional plantings.	None

	There is an approved Churchyard Management Plan, which seeks to ensure that the churchyard is managed sympathetically for its environment, ecology and wildlife.	
Part B - Where do we go next?		
The building itself:		
B1. If you have an uninsulated, easy-to-access roof void, consult with your Quinquennial Inspector (QI) about insulating the loft*.	The historic building has an uninsulated loft above the Nave, however the heating strategy for this part of the building is to "heat the people, not the building" thus insulation is of little value. The Church Centre has insulated loft spaces, however this is not up to current standards and it is planned to increase the depth.	None ESOS 10.4 Action 4.2
B2. If you have problematic draughts from your door, and a door curtain wouldn't work, consult with your QI about installing a glazed door within your porch, or even a draught-lobby*.	See A4	See A4
B3. Consider creating one or more smaller (separately heatable) spaces for smaller events.	Not appropriate for our situation, we have adequate alternative rooms available to us in the Church Centre.	None
B4. Consider fabric wall-hangings or panels, with an air gap behind, as a barrier between people and cold walls.	Not applicable. We are following a "heat the people, not the building" in the historic church building. The Church Centre has cavity walls (part insulated). We are considering additional insulation. See D2. Additionally, when appropriate, the users are encouraged to close the curtains to minimise heat loss through the windows, and glazed doors.	None
Heating and lighting:		
B5. Learn how your building heats/cools and the link to comfort, by using data loggers (with good guidance).	Our experience with the current systems has guided our heating strategy, embodied in current controls, See A7.	None
B6. Improve your heating zones and controls, so you only warm the areas you are using.	See A7	See A7

B7. Install TRVs on radiators in meeting rooms and offices, to allow you to control them individually.	See A7	See A7
B8. Consider under-pew electric heaters and/or infra-red radiant panel heaters*, which keep people warm without trying to heat the whole church space. Radiant panels are especially good for specific spaces like chapels and transepts, which you might want warm when you don’t need the whole church to be warm.	The heating strategy for the historic part of the building is to “heat the people, not the building”. We are investigating under pew heaters and heated seat cushions.	ESOS 7.5 Action 4.3
B9. If you have radiators, install a magnetic sediment ‘sludge’ filter to extend the life of the system.	Magnetic filters are fitted to both boilers.	None
B10. Consider thermal and/or motion sensors to automatically light the church when visitors come in, for security lights, and for kitchens and WCs.	The security lights round the church access are controlled by motion sensors. Users are encouraged to switch off unwanted lights In the future we may consider motion sensors for WCs (1 lamp @ 7W ea), although these are not a priority at present.	None
B11. Install an energy-saving device such as Savawatt on your fridge or other commercial appliances.	The SavaPlug device used to be sold as a device to reduce the energy used by fridges and freezers. However more modern fridges have internal controls to reduce overall energy consumption and the introduction of devices like the SavaPlug is not recommended and may be harmful. This is probably why the device appears to be no longer being sold.	None
B12. Get your energy supplier to install a smart meter, to better measure the energy you use.	Smart Meters are fitted for both Gas and electricity.	None
People and policies:		
B13. Vary service times with the seasons, so in winter you meet early afternoon when the building is warmer.	Not appropriate for our situation. Services are primarily held in mid-morning. Occasional services are held in the evening where these are indicated by the Church’s year.	None
Part C - Getting to zero		
The building itself:		

C1. Draught-proof windows*.	See A2	None
C2. If you have an open tower void, insulate or draught-proof the tower ceiling *.	The Ringing Chamber has an insulated ceiling and the hatch to the Clock chamber is draft proofed.	None
C3. Double-glaze or secondary-glaze suitable windows in well-used areas such offices, vestries and halls*.	The survey analysis (see ESOS Correspondence) shows that the annual savings from double glazing the Church Centre would be about 6,000kWh (£690 at present price). The size and cost (guide price of double glazing at £600/m2) would result in an installation cost of £36,000 and a 50 year payback period. When window replacement becomes necessary the option of double glazed units will be assessed.	None
C4. Internally insulate walls in well-used areas such as offices, vestries and halls*.	The Church Centre has cavity walls, see D2. The vestries are a very small part of the buildings and do not lend themselves to internal insulation, due to their historic nature, small size and window/door openings.	None
C5. If you have pew platforms, consider insulating under the wooden platform with breathable materials*.	See A5	None
C6. Reinstate ceilings, and insulate above*.	Not applicable, all ceilings are in good repair. See B1	None
Heating and lighting:		
C7. Install a new LED lighting system, including all harder-to reach lights, new fittings and controls.	See A10	None
C8. Install solar PV, if you have an appropriate roof and use sufficient daytime electricity in the summer.	Church is Grade II* listed and in a conservation area. The main south facing roof is pitched at a steep angle and very visible, and there is therefore no area of the church roof is suitable for the installation of solar panels. Most of the Church Centre roof is shaded by the church or is obstructed by roof lights, however a small section of the Paynter room roof might be suitable. Ground based PV panels are considered incompatible with the historic burial ground (also in a Conservation area.)	ESOS 11 & ESOS Correspondence Action 4.6
Part D - “Only if….”		
The building itself:		

D1. If you are reroofing anyway, then insulate the roof, if appropriate for your roof*.	Not a consideration at present since the roofs are relatively modern (nave was reroofed in 1990, church centre constructed in 1979 &1988).	None
D2. If you have an uninsulated wall with a cavity (typically built 1940 onwards), then insulate the cavity.	The later phase of the extension was built with cavity wall insulation. The earlier phase of the extension was built with cavity walls but not insulated. Cavity wall insulation would be beneficial in these areas.	ESOS 10.3 Action 4.3
D3. If the building is regularly used and suitable, such as a church hall, consider appropriate external insulation or render, appropriate for the age and nature of the building*.	See D2	None
Heating and lighting:		
D4. If there's no alternative that does not run on fossil-fuels, then replace an old gas boiler or an oil boiler with a new efficient gas boiler.	Not Applicable. We are planning to move to renewable sources. See D5	None
D5. If yours is a well-used church which you want to keep warm throughout the week, then consider an air or ground source heat pump. Ground source heat pumps are more expensive and invasive to install than air source heat pumps, but run more efficiently once installed, depending on ground conditions.	Air to Air heat pumps	ESOS 7.4 Action 4.5
D6. If you are doing a major reordering or lifting the floor anyway, and yours is a very regularly used church, then consider under-floor heating. This can work well in combination with a heat pump (above).	Not Applicable. We are not considering a major reordering. The Church Centre is of modern construction with solid floors.	None
Church grounds:		
D7. If you have car parking that is sufficiently used, EV charging points for electric cars can work out cost neutral or earn a small amount of income for the church. Note, they will increase the church's own energy use, but will support the uptake of electric cars. They could be good in combination with solar PV panels.	Not Applicable. We have no car park.	None

6. Fundraising

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/

The Council may have funding for community organisations towards reaching Net Zero carbon.

Landfill Tax Funding from waste disposal companies (such as Biffa and Veolia) may be available to community organisations if near to a facility.

7. References

1) ESOS-Energy consultant's report and recommendations
2) Correspondence with the consultant following the report

8. Renewable Energy Potential

Potential sources of on-site renewable energy are discussed below.

The availability of suitable roof areas limits the application of solar photo voltaic panels, nevertheless a small installation is possible on the roof of the Paynter Room. This is proposed in paragraph 4.6.

Ground based PV panels are considered incompatible with the historic burial ground (also a Conservation area). Additionally, much of the area is shaded by the church building and trees. Only the east end, and most public, part of the churchyard has an open aspect, however this is also used during the summer for church events which would be impacted by lack of space.

We are proposing to use Air to Air heat pumps for the Church Centre rather than ground source Air to Water pumps, for the reasons explained in paragraph 4.5.

Wind power would be neither viable nor practical in this situation, nor would it be compatible with the listed building and Conservation Area setting.