



# Energy Opportunity Survey

St Wilfrid, Halton, Leeds, LS15 7NP

**Green Journey**

© 2017 Energy House, Gateshead, NE8 2AP

 THE CHURCH  
OF ENGLAND  
Diocese of Leeds

# Energy Opportunity Survey

## Green Journey Contacts

### Administration

Craig Hogg

Church Liaison Officer

Email: [craig.hogg@greenenergyconsulting.co.uk](mailto:craig.hogg@greenenergyconsulting.co.uk)

Telephone: 03330 067177

### Diocesan Coordinator

Kilian Coyne

Project Director

Email: [kilian@greenenergyconsulting.co.uk](mailto:kilian@greenenergyconsulting.co.uk)

Telephone: 0191 300 6161

### Diocese of Leeds - Environment Officer

Jemima Parker

Diocesan Environmental Officer

Email: [jemima.parker@leeds.anglican.org](mailto:jemima.parker@leeds.anglican.org)

# Energy Opportunity Survey

## Introduction

Green Journey has been appointed by the Diocese of Leeds to carry out energy surveys and provide churches with the opportunity to join the Green Journey energy basket. The aim is to reduce the carbon footprint and energy costs of all churches within the Diocese of Leeds and across the wider Church of England.

Green Journey's buying power allows us to offer renewable energy at a similar, or lower, price to standard energy. This allows all churches opting into Green Journey to practise responsible stewardship, while also making a saving. Green Journey can help you in your stewardship by reducing your electricity and gas bills, whilst also providing a report detailing your church's energy consumption and sustainability, advising on how both can be improved.

**“To date, Green Journey has saved the Church of England over £230,000 in energy bills and VAT reclaims.”**

Reducing our energy consumption and cutting carbon dioxide emissions is of paramount importance for all, as together we must face the effects of climate change. The Church of England is a leading advocate of sustainability awareness and action, promoting a more environmentally conscious stewardship at local, regional and national levels.

Consumption figures presented in this report are calculated from billing figures and information collected during the energy survey. An estimation of your electricity consumption breakdown is also included, for example, lighting could be projected to comprise 60%, kitchen appliances 30% etc. Due care has been given to ensure that these are as close to the observable figure as possible, however these should be considered as calculated approximations only.



# Energy Opportunity Survey

## Site Summary



## Site Overview

Site Address		Site Contact	
Church Name	St Wilfrid	Contact	
Town	Halton, Leeds	Telephone	
Postcode	LS15 7NP	Email	

Audit Information		Site Information	
Auditor	Andrew Rogers	Annual Operating Hours	1,222
Audit Date	18/05/2018	Square Meters (Church and Hall)	673 & 100
Audit Time	10:30	Congregation Number	50

Report Information	
Report Author	Abigail Hardman
Date	18/06/2018

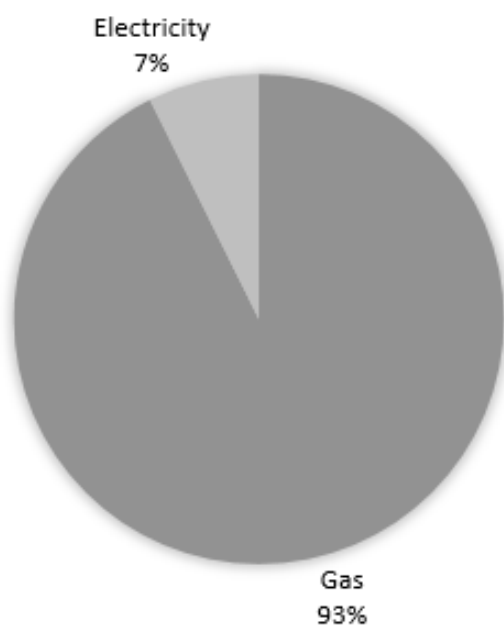
# Energy Opportunity Survey

## Energy Overview

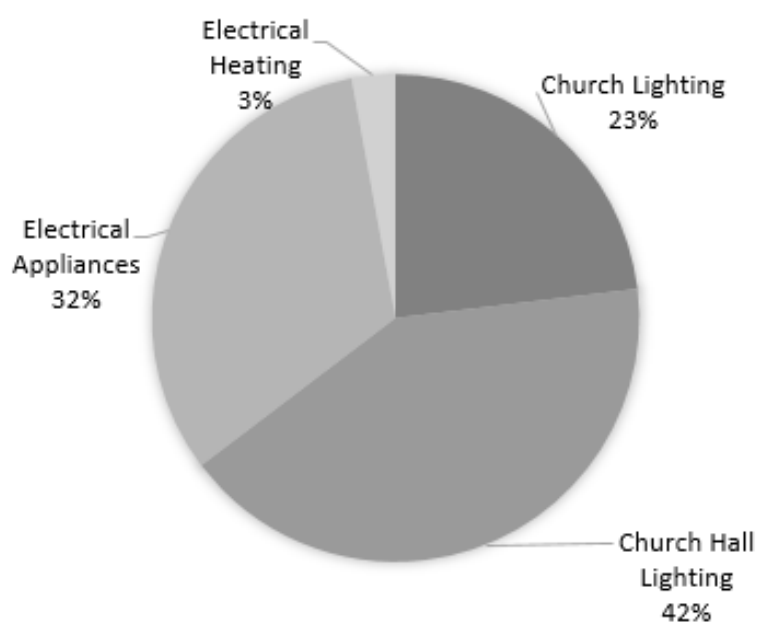
### Energy Breakdown

Electricity		Gas	
Period Covered	May 2017 – April 2018	Period Covered	May 2017 – April 2018
Electricity Usage (kWh)	7,856	Gas Usage (kWh)	99,249
Meter Quantity	2	Meter Quantity	1

### Total Energy Breakdown



### Electricity Breakdown



N.B. Breakdowns are based on observations made at the site and discussions with the church representative during the site visit.

# Energy Opportunity Survey

## Sustainability Overview

The following paragraphs contain information on the energy efficiency and sustainability of your church. This draws on observations made on, but is not limited to, building structure, lighting and space heating (such as boilers, electric heating). All recommendations provided within the report are intended to help your church streamline its energy consumption, reducing costs and ensuring the sustainability of your church is as near to what is deemed to be practically feasible. For example, churches that replace inefficient lighting with light emitting diode (LED) fixtures have observed on average, an 80% saving in lighting costs.

If you would like further advice on any of the recommendations made here, please get in touch and we will be happy to assist. We advise that you also speak with either the DAC Secretary or your Archdeacon to ascertain if a Faculty decision will be required, and if so to find out how your PCC should proceed.

## Main Heating - Gas

It is often challenging to find the correct temperature to heat your church. The following guidelines are provided based on our experience and if followed can help preserve the long-term structural integrity of your church.

Occupancy	Temperature (°C)	Comments
During a church Service	18-21°C	Most suitable temperature for the congregation during a service
Open Door (if the church remains open to the public throughout the day)	12°C	Comfort Temperature
Vacant/Overnight	8°C	Minimum temperature for reducing surface and interstitial condensation of the church building

However, it is acknowledged that financial restraints may not allow for a minimum background temperature of 8°C to be followed at all times.

# Energy Opportunity Survey

## Main Heating - Gas

The following information in this section highlights implementations which could be given consideration, in order to improve heating efficiency of your church. Should you wish to act upon any of the following suggestions you should first consult your Diocese Heating Advisor.

Location	Boiler Model	Quantity	Estimated Efficiency	Output (kW)	Condensing
Boiler House (Church)	Potterton Derwent Compact	2	74%	108	No
Boiler House (Church Hall)	Potterton Derwent Compact a	1	74%	52	No

N.B. Age and efficiency are based on observations made at the site and discussions with the church representative during the site visit.

We would advise, where financially possible, replacing the current non-condensing boilers with a newer, more efficient condensing equivalent. Condensing boilers can reuse the heat embedded within the boiler flue gases to increase the boiler efficiency to a value around 90%. This compares favourably to the current estimated efficiency of your boilers, which is 74%. As such, the boilers will have to consume a larger amount of gas (as more will be lost from inefficiencies) for the same heat output, thus increasing your gas bill.

We would advise that magnetic and sediment filters be installed, to prevent small metal particles and debris leading to corrosion in your heating systems, or at worst, a central heating breakdown. This debris can be extracted with magnetic and sediment filters, thus protecting the heat exchangers and improving the lifespan and efficiency of your boilers.

We would advise that EndoTherm is regularly added to the water in the radiators of your heating systems. This is a liquid that improves heat transfer rate and efficiency, resulting in the systems heating up faster and maintaining the determined temperature for longer.

Heating System Solution	Cost	Annual saving	Payback (years)
EndoTherm	£436	£641	0.7
Magnetic & Sediment Filters	£532	£348	1.5

Note: As your site has three boilers, this has been taken into account in the above costings/savings.

# Energy Opportunity Survey

## Heating Controls

The overall efficiency of a heating system is based on three factors: the efficiency of the boiler, the type of fuel used and the responsiveness of the controls. It is often the latter of these that gets overlooked. Appropriate controls will ensure that a heating system is only in use when actually needed; saving money, reducing carbon emissions and maintaining the correct comfort level.

There are many varieties of controls, but they all control the timing of the heating system and/or the demand temperature required. Traditionally, a heating system would be fitted with a programmer (a clock device with "on" and "off" periods) and a room thermostat (that monitors the air temperature in the building). There are now many automated devices that can offer these from a remote location, called "smart controls" such as Nest, Hive and Evohome.

In addition to the above, modern controls include thermostatic radiator valves (TRVs), programmable TRVs, zone control, boiler energy managers, weather compensators and load compensators.

In real terms, the three most cost effective controls in churches and church halls, depending on the heat demand and budget available are:- boiler energy managers, programmable room thermostats and TRVs.

However, a note of caution. The pipework of old heating systems may not be configured to take modern controls. We would be happy to carry out a detailed survey and advise further, but would also recommend consultation with your Diocesan Heating Advisor.



# Energy Opportunity Survey

## St Wilfrid Energy Supply and Metering

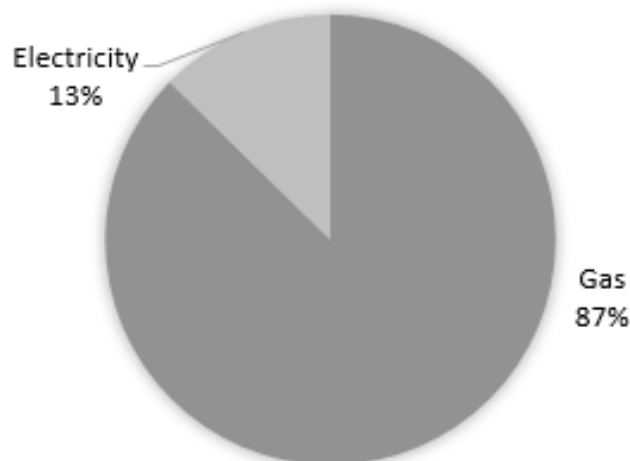
Switching to a green supply has allowed St Wilfrid to significantly reduce its carbon footprint and enhance its sustainable image.

### Green Electricity & Carbon Neutral Gas

Currently St Wilfrid purchases electricity from SSE (7,856kWh/annum) and gas Crown (99,249 kWh/annum).

St Wilfrid's previous electricity supply accounted for 2.65 tonnes of CO<sub>2</sub> per annum and the previous gas supply accounted for 18.28 tonnes of CO<sub>2</sub> per annum. So it can be said that St Wilfrid's has reduced its carbon footprint by over 20 tonnes of CO<sub>2</sub> per annum.

### PREVIOUS CO<sub>2</sub> EMISSIONS BREAKDOWN



### Automatic Meter Reading (AMR)

AMR-metering provides accurate, remotely read data on energy consumption. This allows for analysis of real time half- hourly data for both gas and electricity, identifying areas for significant energy savings, such as out of hours consumption.

In addition, AMR water metering enables a water consumption profile analysis to be undertaken, allowing for any leaks to be identified.

# Energy Opportunity Survey

## Main Heating (Electric)

The church has 2 electric heaters which account for 3% of the total electricity consumption. Electric heating is in use during church services and events throughout winter.

We would advise that timer switches be installed on the heaters in order to reduce energy consumption by ensuring the heater is only operated when required.

We would advise that the scheduled usage of the heaters be examined to identify any potential reductions in electricity consumption. For example, if the church has two events on per week and is otherwise unoccupied, it would be prudent to ensure that the electric heater usage accurately reflects this. By closely coordinating the church's schedule with electric heater usage it may be possible to optimise your heating system and subsequently reduce your consumption.

Please note, that if you wish to make any changes to your current heating system you should first consult your Diocese Heating Advisor.

# Energy Opportunity Survey

## Church Lighting

In total, church lighting contributes 23% of the site's total electricity consumption. Lighting fixtures within the church are predominantly fluorescent lights, for example the 40 13W compact fluorescent lamps (CFL).

We would advise replacing the existing light fixtures with light emitting diode (LED) equivalents. This could manifest as a proactive LED retrofit scheme or as a reactive scheme whereby current fixtures are only replaced at the end of their working life.

It is suggested that the 13W CFLs be prioritised for replacement. Although fluorescent lighting is efficient compared to halogen/incandescent lighting, further efficiencies can be yielded by replacing it with an LED equivalent. As an illustration, 13W CFLs can typically be replaced by 6W LED equivalents. Thus, the same quality of light can be produced by an LED equivalent with a 53% reduction in energy consumption being observed.

## LED Lighting Savings

A costed LED retrofit project for the church has been provided below to present the potential energy and monetary savings. Annual costs can also be substantially reduced through lower maintenance costs. During many energy surveys Green Journey has carried out it has often been mentioned to us that light fittings are sometimes left in a state of disrepair until it becomes commercially viable to replace all malfunctioning fittings at the same time. As such, LED lighting represents a sound investment from both an energy saving and a maintenance perspective, especially when taking into consideration its lifespan of up to 50,000 hours. This compares favourably to the 2,000-4,000 hours observed in halogen fittings.

Replacement Cost (£)	Annual Saving (£)	% Saving (Lighting kWh/Year)	Payback (Years)
£438	£410	76%	1.1

N.B Delivery and installation are not included in these figures, however, an annual maintenance saving has been factored in.

# Energy Opportunity Survey

## Church Hall Lighting

In total, church hall lighting contributes 42% of the site's total electricity consumption. Lighting fixtures within the church are predominantly fluorescent lights, for example the 28 6ft 70W T8s.

We would advise replacing the existing light fixtures with light emitting diode (LED) equivalents. This could manifest as a proactive LED retrofit scheme or as a reactive scheme whereby current fixtures are only replaced at the end of their working life.

It is suggested that the 6ft 70W T8s be prioritised for replacement. Although fluorescent lighting is efficient compared to halogen/incandescent lighting, further efficiencies can be yielded by replacing it with an LED equivalent. As an illustration, 6ft 70W T8s can typically be replaced by 30W LED equivalents. Thus, the same quality of light can be produced by an LED equivalent with a 57% reduction in energy consumption being observed.

## LED Lighting Savings

A costed LED retrofit project for the church has been provided below to present the potential energy and monetary savings. Annual costs can also be substantially reduced through lower maintenance costs. During many energy surveys Green Journey has carried out it has often been mentioned to us that light fittings are sometimes left in a state of disrepair until it becomes commercially viable to replace all malfunctioning fittings at the same time. As such, LED lighting represents a sound investment from both an energy saving and a maintenance perspective, especially when taking into consideration its lifespan of up to 50,000 hours. This compares favourably to the 2,000-4,000 hours observed in halogen fittings.

Replacement Cost (£)	Annual Saving (£)	% Saving (Lighting kWh/Year)	Payback (Years)
£926	£366	48%	2.5

N.B Delivery and installation are not included in these figures, however, an annual maintenance saving has been factored in.



# Energy Opportunity Survey

## Renewables

### Solar Photovoltaic Electricity (Solar PV)

Because of the Grade II listing it would be inappropriate to consider the installation of solar PV panels, however the roof of the hall may be a suitable location.

### Biomass

When the gas grid is unavailable, particularly in rural areas, wood fuelled systems, called biomass, are often a cost effective and environmentally friendly option.

Biomass is regarded as a low carbon form of heating as the carbon dioxide emitted when the wood is burned is assumed to be the same amount that was absorbed over the tree's life when it was growing. The process is regarded as sustainable if new trees continue to be planted in place of those used for fuel.

Biomass boilers often tend to be more expensive to install compared to their oil-fired equivalents; however, they may attract Renewable Heat Incentive (RHI) payments that could help offset the initial capital cost.

### Ground and Air Source Heat Pumps

Heat pumps absorb heat from the air or ground around a property and convert it to usable heat that can be used in radiator, or preferably, underfloor heating systems. Like biomass systems, heat pumps may be a viable option when there's no access to the mains gas grid, however, a reliable electricity supply is essential.

Heat pump systems could qualify for RHI payments and may reduce carbon emissions, depending on which fuel is being replaced.

Green Journey is able to provide specialist advice on the above technologies and RHI payments.

# Energy Opportunity Survey

## Appliances & Windows

### Appliances

In total, appliances contribute 32% of the site's total electricity consumption. Appliances include fridges, an electric cooker and water heaters.

We would advise ensuring that there is at least a 2 inch gap between the wall and your fridges. This will ensure that the device efficiently releases heat, meaning less energy will need to be used to keep the appliance interior cool.

In order to yield reductions in appliance energy consumption, we would advise that the church ensures that appliances have a scheduled switch off time. This could be achieved by installing plug timers on the wall sockets, this acts as a failsafe should the appliances accidentally be left on.

Furthermore, we would advise that, where finances permit, the church seeks to purchase only equipment which has a high energy efficiency rating. Ratings typically go from "A" to "G" however some appliances, such as fridges and freezers, go up to A+++.

### Windows

The windows at the church feature double glazed fittings and windows at the church hall feature a mix of both single and double glazed fittings.

Double glazing reduces the rate of heat loss by up to 65% compared to its single glazed counterpart. Benefits of double glazing also include a reduction in condensation, noise pollution and improved security.

We would advise where possible, that the church hall installs secondary single glazing. Secondary single glazing adds another single pane to the currently installed fixture. It is possible that secondary single glazing can reduce heating consumption by as much as 10% from current levels.

# Energy Opportunity Survey

## Summary

### Summary of Costed Recommendations

Recommendation	Cost	Annual saving	Payback (years)
Endotherm	£436	£641	0.7
Magnetic & Sediment Filters	£532	£348	1.5
Church LED Lighting	£438	£410	1.1
Church Hall LED Lighting	£926	£366	2.5

### Summary of Non-Costed Recommendations

Recommendation	Benefit
Replace non-condensing boilers	This can improve the efficiency to >90% compared to the current esteemed efficiency of "74%".
Install a tamper-proof box for boiler controls.	This will ensure that only authorised people can programme the boilers' timer and thermostat.
Install secondary glazing	This can yield heat loss savings of up to 10%.
Adopt an energy efficient procurement policy	Replace existing appliances with more energy efficient alternatives at the end of their working life.
Appoint an 'Energy Champion'	Appoint someone to ensure appliances, lights and heating systems are switched off when not needed.
Solar PV	This would allow the generation of renewable power on site and provide a certain degree of independence from the national electricity grid.

Further advice can be found from the Diocesan Environment Officer or visit the Environment pages on the Diocesan Website. Your Diocese Heating Advisor should be consulted before any heating recommendations are to be acted upon.

# Energy Opportunity Survey

## Water Overview

As of 1st April 2017, the water market in England became deregulated. This allows non-domestic entities to switch water suppliers. Green Journey is delighted to be able to provide water efficiency and procurement services to churches. It is important to note that your church's water consumption will be billed based on one of the two tariffs outlined below:

- **Non-metered Value** – In this case, your consumption is estimated based on an estimated water consumption, in addition to a Rateable Value (RV) attributed to your church. RV is a value given to all buildings in the U.K based on the area and operation of the building.
- **Metered Value** – In this case, volumetric consumption data can be recorded and transmitted to your water supplier, this may also extend to surface water/sewerage charges, where a secondary water meter exists.

For more information on the above, please get in touch with Green Journey whom can help you secure the most competitive water rates. In the meantime, there are a number of ways your church can improve its water consumption, as detailed below.

**Rainwater Harvesting** - This involves rain water being collected in outside tanks, which can then be reused. This will reduce the volume of water the church uses, as they can harness rainwater for usage in urinals/toilets and other greywater facilities. As such, your church will require less water by volume, allowing it to improve its water efficiency.

**Tap Aerators** - Tap aerators can reduce water supply rates by as much as 60% per minute. Older taps, such as those installed within churches, supply water at an average rate of 15 l/m, compared to 6 l/m when having an aerator installed. This will reduce your annual water consumption, especially where your kitchen and toilet areas are in frequent use. Aerators can be installed on most taps; Green Journey can facilitate this should your church wish to go ahead with it.



# Energy Opportunity Survey

## Grants & Funding

There are an array of funding mechanisms available to churches to make alterations to their building structures, undertake crucial maintenance work and to improve on current energy efficiency. Our in-house team can assist your church in applying for such funding, ensuring that you will have the best chance of being successful in your application.

### Listed Places of Worship (LPW) Grant Scheme

This scheme allows eligible churches to claim back VAT on qualifying services and products it purchases. It is only aimed at listed church buildings which provide public religious services at least six times each year. Qualifying services and products are detailed in depth in LPW guidance, however the key areas that qualify for this grant are identified as: electrical (including energy efficiency improvements) and structural works, aesthetics improvements, plumbing (including heating systems). Funding is accessible via two separate routes:

- Projects with a value of £500-£1000 (only one application can be submitted per year)
- Projects >£1000 (an unlimited number of applications can be submitted in this category)

### Heritage Lottery Funding

Available since September 2017, this supersedes the “Grants for Places of Worship” programme. 100% of funding can now be applied for via:

- “Our Heritage” scheme (up to £100k)
- “Heritage Grants” (up to £5million)