



# Energy Opportunity Survey

St Chad Parish Centre, Far Headingley, Leeds, LS16 5JT

**Green Journey**

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 THE CHURCH  
OF ENGLAND  
Diocese of Leeds

# Energy Opportunity Survey

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# 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	
Site Name	St Chad Parish Centre	Contact	
Town	Far Headingley, Leeds	Telephone	
Postcode	LS16 5JT	Email	

Audit Information		Site Information	
Auditor	Andrew Rogers	Annual Operating Hours	4,004
Audit Date	21/05/2018	Square Meters	796
Audit Time	16:00	Congregation Number	-

Report Information	
Report Author	Abigail Hardman
Date	21/06/2018

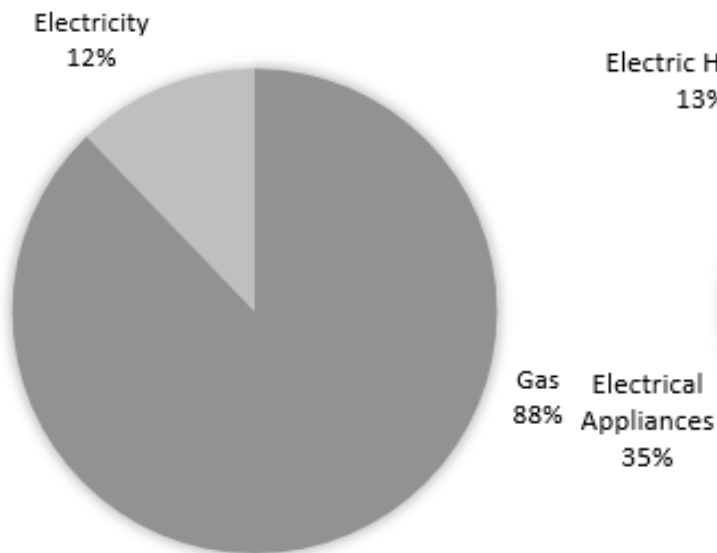
# Energy Opportunity Survey

## Energy Overview

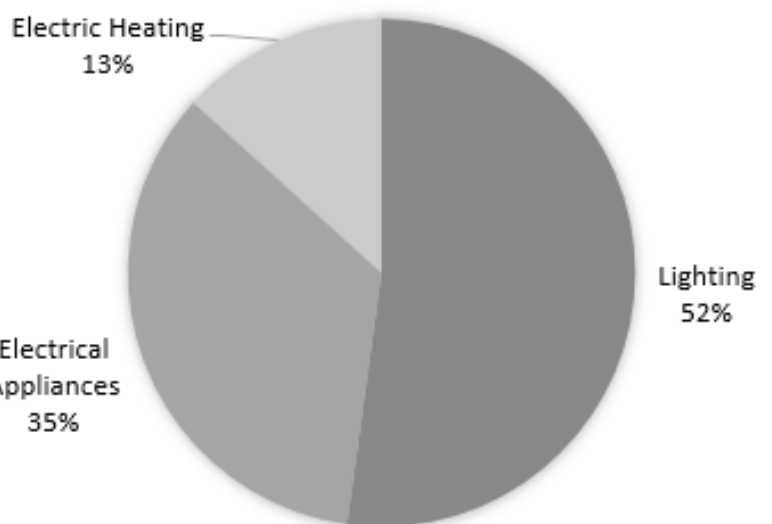
### Energy Breakdown

Electricity		Gas	
Period Covered	May 2017 – April 2018	Period Covered	May 2017 – April 2018
Electricity Usage (kWh)	26, 592	Gas Usage (kWh)	191,584
Meter Quantity	1	Meter Quantity	1

### Total Energy Breakdown



### Electricity Breakdown



N.B. Breakdowns are based on observations made at the site and discussions with the building representative during the site visit. The kWh consumption figures have been kindly supplied by Mike Willison. The kWh figures supplied by the previous fuel companies were 21,316 (electricity) and 271,710 (gas).

# Energy Opportunity Survey

## Sustainability Overview

The following paragraphs contain information on the energy efficiency and sustainability of the building. 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 the building streamline its energy consumption, reducing costs and ensuring the sustainability of the building is as near to what is deemed to be practically feasible. For example, buildings 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 the building. The following guidelines are provided based on our experience and if followed can help preserve the long-term structural integrity of the building.

Occupancy	Temperature (°C)	Comments
During building activities	18-21°C	Most suitable temperature for the public during an activity
Open Door (if the building 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 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 the building. 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	Condensing
Ladies WC	Worcester Greenstar 30di combi	1	76%	30	Yes
Cellar	Stelrad Ideal Concord CX	1	61%	125	No
Kitchenette	Worcester Greenstar 24i	1	82%	24	Yes

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

We would advise, where financially possible, replacing the current non-condensing boiler 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 boiler, which is 61%. As such, the boiler 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 system, or at worst, a central heating breakdown. This debris can be extracted with a magnetic and sediment filter, thus protecting the heat exchanger and improving the lifespan and efficiency of your boiler.

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

Heating System Solution	Cost	Annual saving	Payback (years)
EndoTherm	£625	£1,074	0.6
Magnetic & Sediment Filters	£533	£534	1.0

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.

With its three boilers, each with a programmer, room thermostat and TRVs, the Parish Centre in effect benefits from full zone control.



# Energy Opportunity Survey

## St Chad's Parish Centre Energy Supply and Metering

Switching to a green supply has allowed St Chad's Parish Centre to reduce significantly its carbon footprint and enhance its sustainable image.

### Green Electricity & Carbon Neutral

We understand that St Chad's Parish Centre changed fuel suppliers during the past year and now sources both gas and electricity from green carbon offset suppliers. The electricity supply is from Ecotricity (26,592 kWh per annum) and gas from Crown (191,584 kWh per annum). Therefore the building is not responsible for any CO<sub>2</sub>e emissions from its fuel use.

However, as a guide, typically using non-green or non-carbon offset fuel suppliers, this level of consumption would be expected to be responsible for 9.03 tonnes of CO<sub>2</sub>e from the electricity used and 35.03 tonnes of CO<sub>2</sub>e from the gas.

The CO<sub>2</sub>e figures have been calculated using the National Energy Foundation's carbon calculator based upon DEFRA's July 2017 Environmental Reporting Guidelines.

# Energy Opportunity Survey

## Main Heating (Electric)

The building has 2 electric convection heaters and a Toshiba air conditioning unit which account for 13% of the total electricity consumption. Electric heating and cooling is in use during general activities and events throughout winter and summer.

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

We would advise that the scheduled usage of the equipment be examined to identify any potential reductions in electricity 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

## Lighting

In total, lighting contributes 52% of the site's total electricity consumption. Lighting fixtures within the building are extensively LED lights, for example the 27 5ft 24W T8s, however there are many fluorescent T8s in the bar, kitchen and corridors.

We would like to commend the management committee for installing LED lighting fixtures, as these will be subsequently reducing your buildings lighting electricity consumption compared to previous non-LED fittings.

### LED Lighting 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.

# Energy Opportunity Survey

## Renewables

### Solar Photovoltaic Electricity (Solar PV)

The management committee is to be commended on the installation of the 16 PV panel array fitted to the roof. We understand that they have a capacity of 3.92 kWp and the annual output was estimated by Mike Willison to be 3,290 kWh.

### 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 35% of the site's total electricity consumption. Appliances within the building include commercial kitchen equipment, bar cooling equipment and beer chillers.

We would advise ensuring that there is at least a 2 inch gap between the wall and your fridge-freezer. 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 building 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 building 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 building feature 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.



# Energy Opportunity Survey

## Summary

### Summary of Costed Recommendations

Recommendation	Cost	Annual saving	Payback (years)
Endotherm	£625	£1,074	0.6
Magnetic & Sediment Filters	£533	£534	1.0

### Summary of Non-Costed Recommendations

Recommendation	Benefit
Replace non-condensing boiler	This can improve the efficiency to >90% compared to the current estimated efficiency of "61%".
Investigate the possibility of reducing the set-flow temperature of the condensing boilers.	The boilers may be able to achieve greater efficiencies.
Install a tamper-proof box for boiler controls.	This will ensure that only authorised people can programme the boilers' timers and thermostats.
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 and energy consumers are switched off when not needed.

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 buildings. It is important to note that your buildings 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 building can reduce 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 building uses, as they can harness rainwater for usage in urinals/toilets and other greywater facilities. As such, your building 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 you wish to proceed.