Assessment of Energy Saving Opportunities For East Goscote Village Hall

Prepared by Third Stone Limited

Tel 0115 9231707
Email enquiries@third-stone.co.uk

Date 27.09.22

Executive Summary

This report presents an energy efficiency survey for East Goscote Village Hall.

East Goscote Parish Council currently spends around £1,300/year on energy; the carbon emissions associated with this use are estimated at 3.588 tCO_2/year. The building's energy consumption shows an 83% improvement over typical electricity benchmark for a community building and a 46% improvement over the typical fossil fuel (gas) benchmark. These are both an improvement over the previous energy survey in 2018.

The survey has identified some no and low cost opportunities as well as some investment measures including management and metering. A full summary of the identified measures is outlined in the Recommendation Summary overleaf.

When fully implemented, the recommendations contained within this report will reduce the building's energy consumption by around 4,500 kWh/year, with a corresponding reduction in carbon emissions of approximately 0.7 tCO_2/year. At current costs, the financial value of these energy savings will be around £998 to £345 /year.

Recommendation Summary

No.	Recommendations	Estimated annual savings			Estimated cost (£)
		(£)	CO_2 (tonnes)	(kWh)	
1	Allocate responsibility for management of energy	£50	0.18	1062	0
2	Improve control of IT and electrical equipment	£20	0.02	156	0
3	Improving air tightness	£35	0.13	724	£400
4	Investigate us of Smart Metering	£50	0.18	1062	Unknown. May be provided by energy company
5	Installation of Photovoltaic Panels & battery storage 4 kWp	£190	0.19	1500	£10,000
	TOTALS	£345	0.7	4,504	£10,400

1 Introduction

1.1 Overview and Objectives

This consultation was carried out on the 19th July 2022 by Third Stone Limited. Our main site contact was Charlotte Turlington and her assistance is gratefully acknowledged.

This report presents recommendations and their associated energy and financial savings, resulting from an energy survey.

1.2 Site Details

East Goscote Village Hall is heated via a gas fired, wet central heating system.

The buildings are open throughout the week for pre-school and other community activities as highlighted on the Parish Council website.

1.3 Building Fabric

1.3.1 Walls

The main walls are of cavity wall construction. These were uninsulated when constructed but have been retrospectively filled with insulation.

1.3.2 Roof

The roof is mainly of flat or sloping construction. These have been improved and insulated recently.

1.3.3 Floor

The existing floor of the building is of solid slab construction. Given the size of the floor the heat loss will not be significantly greater than for an insulated floor as heat is mainly lost around the perimeter. It would not be cost effective to improve the floor insulation. The Uvalue of the existing floor is likely to be around 0.50 W/mK compared with a new build floor which would have achieved a Uvalue = 0.22 W/mK or better.

1.3.4 Openings

Windows and doors are fairly recently installed double glazed units. These would have a reasonable insulation value. Rooflights are under drawn by secondary glazing panels.

1.3.5 Air Tightness

As well as losing heat through individual thermal elements, buildings can lose significant levels of heat by air infiltration. New buildings are now tested for air tightness under the building regulations and have been shown to achieve levels around 5 m3/h/m2 of air loss. A building of this age wouldn't have had an air pressure test at building stage and will probably have reduced air tightness since then due to various works having penetrated the external envelope of the property and deterioration of draught seals around opening.

An air permeability well in excess of 15m3/h/m2 might be expected of a property of this age, which will present a major source of heat loss.

1.4 Building Services

1.4.1 Boilers and Heating

The building is heated by a low temperature wet central heating system using radiators.

The boiler is a recently installed Baxi Platinum combination, condensing boilers which have a seasonal efficiency of 95% which is above the minimum standard for a new boiler.

The capacity of the system appears to be in line with expected heating demands of the building as a whole.

Independent time and temperature heating controls are provided to the office area from the rest of the property which allows the more frequently occupied office to be heated while other areas can be unheated.

1.4.2 Lighting

The lighting has recently been upgraded to LED fittings with manual controls. These are amongst the most efficient available.

1.4.3 Hot Water Use

Hot water is provided vis the combi boiler.
Taps are not low flow but do have automatic switch off (push taps)

1.4.4 Metering

It was noted during the survey that the property had one fiscal gas meter and one electric meter.

The meters are not 'Smart' and don't allow remote reading of consumption.

1.4.5 Renewables and other technologies

A large array of photovoltaic panels has been installed on the roof of the property.
This generated 2847 kWh of electricity from 31.03.21 to 31.03.22.

2 Energy performance

2.1 Annual Energy Consumption

The property, consumes approximately 18,109 kWh of gas per annum, costing a total of £903.87 (based of data August 2021 to August 2022 for gas and May 2021 to May 2022 for electricity)

The electricity meter imports approximately 1,702 kWh per year. The solar panels generate approximately 2,847 per annum with 1,424 kWh being exported, the remainder (1423 kWh) being utilised within the property.
This gives the total electricity consumption of 3,125 kWh per annum, costing £409.51.

Utility	**Energy Consumption**		**Cost**		**Carbon**	
	kWh/year	%	£/year	%	tCO_2/year	%
Electricity	3,125	14.7	£409.51	31.18	0.329	9.2
Gas	18,109	85.3	£903.87	68.82	3.260	90.8
Total Energy	**21,234**	**100%**	**£1313.38**	**100%**	**3.589**	**100%**

Unit prices taken as:

Electricity (including CCL) 14.529p/kWh
Natural gas (including CCL) 3.66p/kWh

NOTE: While energy costs have increased markedly since the site visit, this report is based on historical energy costs. Should energy costs remain much higher for several years, the cost effectiveness of proposed recommendations will be greatly improved.

Comparison with Benchmarks

The consumption of the property can be compared to other similar properties to get an indication of how much scope there would be for improvement.

Consumption figures were provided for electricity and gas over a 12 month period

They were; Electricity: This translates to 8 kWh per m^2

Typical consumption for this kind of property might be around 48 kWh per $m^{2.}$

This property out performs by around 83% from typical standard for electricity.

Gas: This translates to 85 kWh per m^2

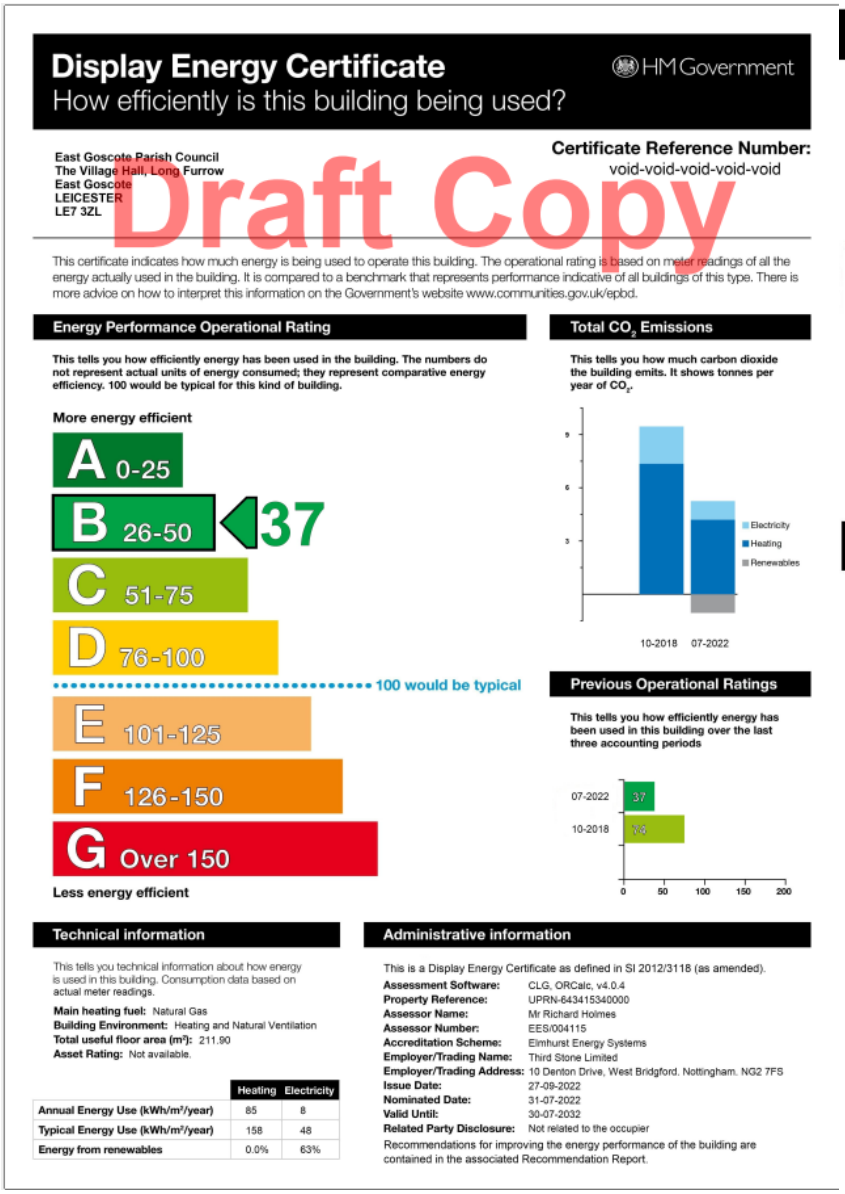
Typical consumption for this kind of property might be around 158 kWh per $m^{2.}$

This property out performs a typical property by around 46% for gas.

Display Energy Certificate

Display Energy Certificates provide a method of benchmarking a property against other similar properties.

An draft Display Energy Certificate of the property has been created and shows a rating of 37 C which is above average (100 D). The previous DEC showed a rating of 74 in 2018.



Display Energy Certificate
How efficiently is this building being used?

HM Government

East Goscote Parish Council
The Village Hall, Long Furrow
East Goscote
LEICESTER
LE7 3ZL

Certificate Reference Number:
void-void-void-void-void

Draft Copy

This certificate indicates how much energy is being used to operate this building. The operational rating is based on meter readings of all the energy actually used in the building. It is compared to a benchmark that represents performance indicative of all buildings of this type. There is more advice on how to interpret this information on the Government's website www.communities.gov.uk/epbd.

Energy Performance Operational Rating

This tells you how efficiently energy has been used in the building. The numbers do not represent actual units of energy consumed; they represent comparative energy efficiency. 100 would be typical for this kind of building.

More energy efficient

A 0-25
B 26-50 37
C 51-75
D 76-100
100 would be typical
E 101-125
F 126-150
G Over 150

Less energy efficient

Total CO_2 Emissions

This tells you how much carbon dioxide the building emits. It shows tonnes per year of CO_2.

Previous Operational Ratings

This tells you how efficiently energy has been used in this building over the last three accounting periods

Technical information

This tells you technical information about how energy is used in this building. Consumption data based on actual meter readings.

Main heating fuel: Natural Gas
Building Environment: Heating and Natural Ventilation
Total useful floor area (m^2): 211.90
Asset Rating: Not available.

	Heating	Electricity
Annual Energy Use (kWh/m^2/year)	85	8
Typical Energy Use (kWh/m^2/year)	158	48
Energy from renewables	0.0%	63%

Administrative information

This is a Display Energy Certificate as defined in SI 2012/3118 (as amended).

Assessment Software: CLG, ORCalc, v4.0.4
Property Reference: UPRN-643415340000
Assessor Name: Mr Richard Holmes
Assessor Number: EES/004115
Accreditation Scheme: Elmhurst Energy Systems
Employer/Trading Name: Third Stone Limited
Employer/Trading Address: 10 Denton Drive, West Bridgford. Nottingham. NG2 7FS
Issue Date: 27-09-2022
Nominated Date: 31-07-2022
Valid Until: 30-07-2032
Related Party Disclosure: Not related to the occupier

Recommendations for improving the energy performance of the building are contained in the associated Recommendation Report.

Previous Operational Ratings

This tells you how efficiently energy has been used in this building over the last three accounting periods

Total CO_2 Emissions

This tells you how much carbon dioxide the building emits. It shows tonnes per year of CO_2.

While overall the property has above average rating, the blue bar graph on the right of the image shows that electricity (light blue) consumption has greater impact on the rating than gas (dark blue). This suggests that there is greater scope for improvement on gas consumption rather than electricity. The grey rectangle represents electricity generated from the photovoltaic panels.

3 Recommendations

Recommendation No: 1	Allocate responsibility for management of energy

Description:

It will be of benefit to allocate responsibility for energy management to a member, or members of staff. This would include;

- Developing an energy policy with targets for reduction
- Monitoring of energy consumption from regular manual or automatic meter readings
- Encouragement of building users to switch off appliances when not in use
- Ensure good control of heating and lighting etc by ensuring that energy is only used where it is needed, when it is needed

Recommendation No: 2	Improve control of IT and electrical equipment

Description:

When the audit was carried out it was noted that the property has fairly little IT & electrical equipment. Nonetheless building users should be encouraged to switch computers, monitors and other equipment off during the day when they are not being used.

Recommendation No: 3	Improving air tightness

Description:

As previously discussed, heat is lost via air leakage in older buildings to a greater extent than new build properties. To deal with this draughts can be sealed with various products, such and fillers. These areas of draughts can be located by use of a smoke stick (or incense stick) on a windy day. This will highlight where draughts come from. Draughts will also be source behind servicing inlets such as water pipes and electrical wiring.

Recommendation No: 4	Investigate use of 'Smart' metering

Description:

Gaining access to pulsed data from gas and electric meters will allow building users to see when energy is consumed in the property and allow for behavioural changes to reduce it accordingly. The energy supply company should be contacted to query whether or not there is a possibility of having meters upgraded and gaining access to subsequent electronic meter readings.

4 Longer term investment savings

The property has already had all the major changes to its energy performance carried out. While photovoltaic panels have already been installed, there would be room on the remaining roof for additional panels. If this was to be installed long with a battery, excess generated by the system could be stored and used at a later time, when the property was occupied. The proportion of electricity being stored in this way would depend on the capacity of the battery and the times of usage of the property.

Electricity generated in excess to the demand would form part of the solution to making the building a net-zero property.

The installation of a 4 kW PV system with battery storage might be around £10,000.

5 Net Zero by 2050

East Goscote Village Hall has an ambition to achieve net zero carbon emissions by 2050.

The annual carbon emissions calculated for this report are 3.589 tonnes per annum. This is a reduction of 751 tonnes or 17% from 4340 tonnes in 2021. It also represents a 53% reduction from the 2018 of 7701 tonnes.

The property is well placed to achieve the 2050 goal as there is likely to be a natural improvement on carbon efficiency over this period. The heating is likely to be replaced by heat pump technology which might reduce carbon from heating by over 75%, while windows, light fittings and other energy consuming devices will naturally be replaced by more efficient units as they become available