

# Assessment Of Energy Saving Opportunities For

## Kingsway Methodist Church



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## EXECUTIVE SUMMARY

The Carbon Trust is grant funded by the Department for Environment, Food and Rural Affairs, the Department for Business, Enterprise and Regulatory Reform, the Scottish Government, the Welsh Assembly Government and Invest Northern Ireland.

This report presents the results of a CMEE (Carbon Management Energy Efficiency) site survey of the Kingsway Methodist Church in Wellingborough carried out by Natalie Isaac of AECOM. The agreed objectives of the wider CMEE project is to undertake audits of 12 churches to identify energy saving opportunities and to produce a short, site specific report. The 12 reports are to be used to prepare a 'How To Guide' which will be distributed to all Methodist Churches to help them prioritise energy saving actions at their sites using real case examples.

Site visits were to concentrate on lighting, space heating, hot water as well as opportunities for changing people's behaviour. If a site could apply for the Carbon Trust Loans to assist in paying for installation of the measures recommended within the report then this will be indicated within the Action Plan (overleaf). For more information on the Carbon Trust Loan scheme, see <http://www.carbontrust.co.uk/cut-carbon-reduce-costs/products-services/business-loans/pages/loans.aspx>

If all the prioritised measures at this site are implemented, the aggregated savings from the measures identified represent a 15% reduction in energy consumption and a 34% reduction in cost or £351 which translates into direct cost savings.

## ACTION PLAN

The recommendations listed below are prioritised, according to estimated annual savings and payback, with energy management the first priority.

Priority	Recommendations	Estimated annual savings					Estimated cost (£)	Payback period (years)	Timescale for implementation and by whom	May be eligible for loan*
		(£)	CO <sub>2</sub> (tonnes)	(kWh)						
1	Reduce hall heating time on weekdays by half an hour on Mondays and Tuesdays	£19	0.13	683	£0	0.0	Immediate Rev Michael Lewis	NO		
2	Reduce heating time on Sundays by 1.5 hours (one hour from the morning and half an hour from the afternoon)	£28	0.19	1,024	£0	0.0	Immediate Rev Michael Lewis	NO		
3	Replace remaining Tungsten Halogen lamps with CFLs	£47	0.22	402	£22	0.5	Immediate Rev Michael Lewis	NO		
4	Insulate boiler pipes	£13	0.09	485	£80	6.0	0 – 3 months Rev Michael Lewis	NO		
5	Replace eight T12s in Hall with high freq T5s	£167	0.78	1,443	£1,440	8.6	6 – 12 months Rev Michael Lewis	YES		
6	De-stratification fans for Hall	£76	0.51	2,764	£874	11.5	3 – 6 months Rev Michael Lewis	YES		
TOTAL	TOTAL Savings	£351	1.41	4,036	£1,542					

\* Please refer to the Site Survey Publication for eligibility details or visit [www.carbontrust.co.uk/loans](http://www.carbontrust.co.uk/loans)

# 1. INTRODUCTION

**IMPORTANT NOTICE:** Whilst reasonable steps have been taken to ensure that the information contained within this report is correct, you should be aware that the information contained within it may be incomplete, inaccurate or may have become out of date. Accordingly, AECOM, the Carbon Trust, its agents, contractors and sub-contractors and the Government make no warranties or representations of any kind as to the content of this Report or its accuracy and, to the maximum extent permitted by law, accept no liability whatsoever for the same including without limit, for direct, indirect or consequential loss, business interruption, loss of profits, production, contracts, goodwill or anticipated savings. Any person making use of this Report does so at their own risk. © Queen's Printer and Controller of HMSO. Any trademarks, service marks or logos used in this publication are the property of the Carbon Trust, and copyright is licensed to the Carbon Trust. Nothing in this publication shall be construed as granting any licence or right to use or reproduce any of the trademarks, service marks, logos, copyright or any proprietary information in any way without the Carbon Trust prior written permission. The Carbon Trust enforces infringements of its intellectual property rights to the full extent permitted by law.

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## 1.1. Site details

The Kingsway Methodist Church is part of the Nene Valley Circuit, Northampton District and is on the Kingsway Estate in Wellingborough. The Church was built in 1957 and is the newest one in the Circuit and seats 60 – 70 people. It is of brick cavity wall construction with a flat roof covered with felt for the Chapel and a low pitch roof covered with profile corrugated sheeting for the Hall areas. The building is not listed.



In 2008 Kingsway was awarded £26,765 to “Upgrade the existing building to include: the installation of disabled toilet access and parking bay: upgrading existing toilets: improving the heating system: provide new kitchen and storage facilities” by Northamptonshire County Council. As part of this work energy efficiency savings from this project included installing a new combination gas boiler, double glazing was installed to Chapel and Hall windows. Insulation was provided to the Church hall in the form of under floor insulation and plasterboard dry lining for the external wall. The new combination gas boiler heats two zones; one for the Hall area and one for the Church. Kingsway have received further funding of £2,500 for refurbishment works and in August the ceiling tiles in the upstairs room (historically used for storage) are going to be replaced.

There is no caretaker in charge of building maintenance at Kingsway however Church members assist where possible. Community groups have their own keys and are responsible for switching equipment on and off. Heating and lighting are managed by building users. Good practice onsite includes prompts to assist building users with this task, including an exit notice for the people who are “last to leave” reminding them to switch equipment off and that Tungsten Halogen lamps are replaced with CFLs when they fail.

## 2. ENERGY USAGE PROFILE

### 2.1. Site Energy Consumption and Spend


The site consumes approximately 27,561 kWh of energy per annum (based on estimated figures), costing a total of £1025. All energy values are in terms of delivered energy.

#### This comprises

Utility	Energy Consumption		Cost		CO <sub>2</sub> Emissions
	kWh/year	%	£/year	%	tCO <sub>2</sub>
Electricity (if used)	2,991	11%	346	34%	1.52
Gas (if used)	24,570	89%	678	66%	4.51
Total Energy	27,561	100%	1,025	100%	6.03



The unit costs for electricity and gas have been 11.58 and 2.76 p/kWh respectively (excluding VAT and standing charges where the data provided allows for this). Unit costs p/kWh were not available for this site and therefore for the purposes of this report the electricity figure has been taken from the nearby Raunds Church and gas from Wesley Chapel. The electricity and gas costs above include the Climate Change Levy. Carbon conversion factors used – grid electricity (0.544) and gas (0.1836) kgCO<sub>2</sub>/kWh.

### 3. CARBON REDUCTION OPPORTUNITIES


<b>Priority no. 1</b>	<b>Reduce hall heating time on weekdays by half an hour on Mondays and Tuesday</b>			
<b>Cost Saving £/yr</b>	<b>CO<sub>2</sub> Savings tonnes/yr</b>	<b>Energy Savings kWh/year</b>	<b>Cost £</b>	<b>Payback Years</b>
£19	0.13	683	£0	0.0
<b>Detail</b>	<p>At present the hall at Kingsway is heated on Monday and Tuesday evenings until 22:00. It is recommended that the heating timing is reduced to 21:30pm on these days.</p>  <p>Implementing this opportunity will not only provide energy savings but also a chance to see if building users notice the slight change in heating times. Should this change of half an hour provide successful it is recommended that the Church further explore options to reduce heating times at the end or beginning of the day.</p>			
<b>Risks</b>	None			


<b>Priority no. 2</b>	<b>Reduce heating time on Sundays by 1.5 hours (one hour from the morning and half an hour from the afternoon)</b>			
<b>Cost Saving £/yr</b>	<b>CO<sub>2</sub> Savings tonnes/yr</b>	<b>Energy Savings kWh/year</b>	<b>Cost £</b>	<b>Payback Years</b>
£28	0.19	1,024	£0	0.0
<b>Detail</b>	<p>At present Kingsway is heated on Sundays from 6am – 1pm. It is recommended that the heating schedule is changed to come on at 7am and off at 12:30pm.</p> <p>Implementing this opportunity will not only provide energy savings but also a chance to see if building users notice the slight change in heating times. Should this change of an hour and a half provide successful it is recommended that the Church further explore options to reduce heating times at the end or</p>			

	beginning of the day.
<b>Risks</b>	None. It may be worthwhile discussing with the boiler installation company whether the controller they provided with the boiler has optimal start built in. If this is the case this should be activated as this will allow the controller to learn the characteristics of the building and hold off heating until the last possible moment while still having the building up to temperature at occupancy.

<b>Priority no. 3</b>	<b>Replace Tungsten GLS bulbs with CFLs</b>			
<b>Cost Saving £/yr</b>	<b>CO<sub>2</sub> Savings tonnes/yr</b>	<b>Energy Savings kWh/year</b>	<b>Cost £</b>	<b>Payback Years</b>
£47	0.22	402	£22	0.5
<b>Detail</b>	<p>During the site visit it was observed that 60W GLS lamps were in use in the Chapel, bathrooms, within the building. The site currently replaces the tungsten lamps when they fail, as can be seen by the mix of lamps in the Chapel.</p> <p>It is recommended that these are replaced with CFL equivalents immediately as the savings that can be achieved mean that it is unnecessary to wait until the existing bulbs fail.</p> <div style="display: flex; justify-content: space-around;">   </div> <p>Although the cost savings are low it is a good example of how purchasing and installing energy efficient products where possible can assist the Church to reduce energy use.</p>			
<b>Risks</b>	No risk. The cost to purchase these lamps is based upon the church buying them at £2 per lamp. However, it is recommended that a request is put out to congregation that if they have any 'spare' CFL bulbs at home they should be donated. The Energy Saving Trust has estimated that the average household has six unused bulbs lying in drawers that were sent out by the electricity supply companies to meet their Government Energy Efficiency scheme. If the congregation are not using theirs then maybe the church could.			



Priority no. 4	Insulate boiler pipes			
Cost Saving £/yr	CO <sub>2</sub> Savings tonnes/yr	Energy Savings kWh/year	Cost £	Payback Years
£13	0.09	485	£80	6.0
<b>Detail</b>	<p>This opportunity relates to the heating flow and return pipes and hot water distribution pipes in the upstairs room which houses the gas boiler as they do not have insulation. Insulation on any exposed pipes will reduce the amount of waste heat being provided to this room.</p> <p>Pipe insulation is relatively easy to install, low in price and will reduce heat waste. It is assumed that this work could be undertaken without the use of an external contractor</p>			
<b>Risks</b>	None			

Priority no. 5	Replace eight wire bound T12s in Hall with high freq T5s			
Cost Saving £/yr	CO <sub>2</sub> Savings tonnes/yr	Energy Savings kWh/year	Cost £*	Payback Years
£167	0.78	1,443	£1,440	8.6
<b>Detail</b>	<p>The hall at Kingsway was recently refurbished to improve energy efficiency and use as a community hall. Unfortunately the refurbishment did not include upgrading of the lighting to this area, which currently includes eight wire bound low frequency T12 fluorescent luminaires.</p> <p>This type of lamp is inefficient and also phased out of production. Any future refurbishment plans should include an upgrade to the lighting in the hall to high frequency T5 fluorescent as this lamp type uses less energy than the T12s. T5 fluorescents give better quality light, for less energy consumption and have a longer life (approx 20,000 hours).</p>			
<b>Risks</b>	None			

Priority no. 6	De-stratification fans in the Hall			
Cost Saving £/yr	CO <sub>2</sub> Savings tonnes/yr	Energy Savings kWh/year	Cost £	Payback Years
£76	0.51	2,764	£874	11.5
<b>Detail</b>	<p>In heated rooms with high ceilings (+5m) de-stratification fans can help to blow the heat trapped under the ceiling back to ground level, thus sending the heat where it is needed and also reducing heat loss through the roof. De-stratification fans in the Hall would help to reduce energy use to the area by sending the heat back to ground level and thereby reducing the time that the heating needs to be on.</p> <div data-bbox="641 654 1219 1084" data-label="Image"> </div> <p>Ensure that the fans are thermostatically controlled so that the fans will switch on when the temperature in the roof area reaches the temperature required at floor level. Speed control can also be added to vary the air velocity.</p> <p>Calculation for this opportunity has been made for the heating period only and is based upon the installation of three de-stratification fans to this area.</p>			
<b>Risks</b>	<p>The system should be commissioned during the heating season in order to ensure that:</p> <ul style="list-style-type: none"> <li>• Noise level is acceptable at floor level</li> <li>• Air speed is acceptable at floor level</li> <li>• That proximity to lighting and other fixtures is suitable</li> <li>• Controls for the fan thermostat reduce the temperature at the ceiling to that at floor level throughout the hall</li> </ul> <p>Further inspection would be required to ascertain the ceiling construction and suitability to the installation of this system.</p> <p>There is also a risk that these fans will be used in the summer to provide cooling to this area. In order to provide energy and CO<sub>2</sub> savings it is advised that Wollaston switch the fan system off when the heating season is over and request that natural ventilation is used to provide cooling to the area if required.</p>			

**Further Considerations:**

In addition the following measures are recommended for further investigation by the site, but are not graded as a priority for action at the present time:

Item No	Description of Recommendation
1	<p>Solar PV: The building could benefit from the installation of a small PV array. Should funding be available the following should be taken into consideration: panels need to have south facing orientation (<math>\pm 30^\circ</math>) and should not be shaded. Space will be required for an inverter inside the roof space or plant room.</p>
2	<p>Roof insulation: It is unclear as to whether or not the Chapel roof is insulated. Up to 25% of heat loss from a building's fabric is lost through the roof and the application of insulation to a roof without insulation can reduce this heat loss by up to 90%. If there is no insulation to this area then Kingsway should investigate the possibility of reducing energy loss from this area by installing insulation.</p> <div data-bbox="652 786 1206 1198" data-label="Image"> <p>The image shows a two-story brick building with a blue door and a blue sign on the wall. The building has a gabled roof and a set of stairs leading to the entrance. The sign is blue with white text, but the text is illegible. The building is situated in an urban or residential area.</p> </div> <p>Ensure that the work is carried out by an experienced and professionally registered contractor.</p>