



**“Greening the Spires” CMEE Project
Church of England Carbon Management Programme
Carbon Abatement Opportunities Report**

Church of England & The Carbon Trust
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Executive Summary

The Church of England has approximately 43 cathedrals and 16,200 churches. These are dispersed across the country in 43 dioceses. In February 2008 work began undertaking 30 energy surveys across 7 dioceses - 24 churches and 6 cathedrals were to be surveyed. These surveys were undertaken as part of the Church of England's 5 Step carbon management programme.

The "Greening the Spires" project objectives were:

- To identify opportunities for reducing energy consumption that will help each of the individual churches or cathedrals reduce carbon emissions.
- To develop the Church of England's Carbon Management Project. This will provide a deeper understanding of energy consumption and the potential for carbon reduction across the Church of England portfolio. It will include an appraisal of the energy efficiency of church and cathedral lighting.

Outcomes

Greening the Spires has produced 30 energy surveys that have been distributed back to the individual sites to help with progression towards lower carbon operation. The investigation recognises the differences between sites but it has found a series of areas for energy savings that are common to most sites.

Energy savings can be achieved through simple changes to use of lighting and heating, to the way that a building is operated and through better understanding of heat loss. In general it is expected that implementing these energy saving opportunities should not affect the buildings fabric but it is acknowledged that each site is different. Therefore it is suggested that general guidance be produced and distributed that allows each site to implement energy savings where they are appropriate.

In general there is a high level of awareness of environmental issues at the churches and cathedrals visited. This awareness has created a push to implement energy saving light bulbs and to generally manage the energy being used at each site, especially in smaller rural churches. There is also a drive to further embrace energy saving initiatives on site and with the congregation as a whole and this is leading to a growing level of interest in renewable energy.

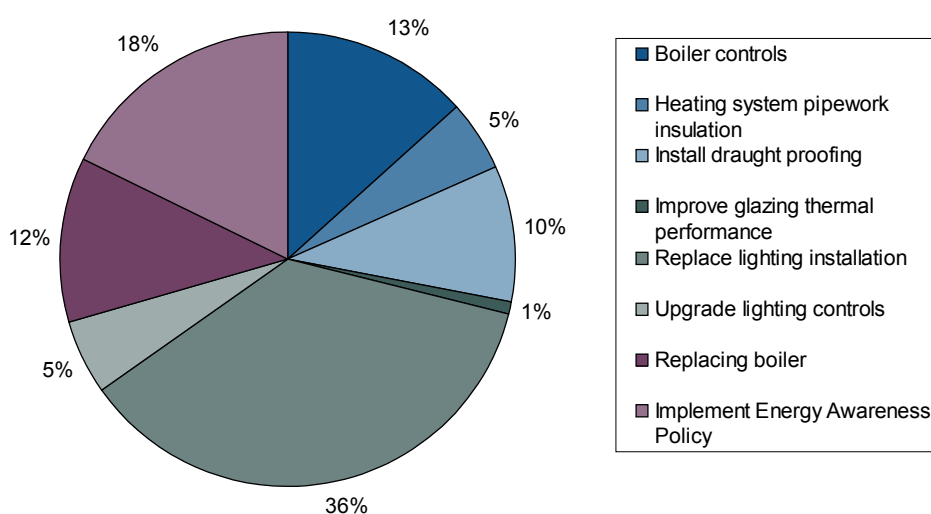
This report details the potential savings that could be achieved if the opportunities identified at these sites were rolled out to all applicable Church of England churches and cathedrals. The table displays the summary findings of this activity.

| Opportunity | Description | Capital cost | Annual Energy saving (kWh) | Annual cost saving | Annual CO ₂ saving (tonnes) | Simple Payback (years) | Cost per tonne CO ₂ saved |
|--|-------------------------|--------------------|----------------------------|--------------------|--|------------------------|--------------------------------------|
| Cathedrals | | | | | | | |
| Good housekeeping opportunities | No capital cost | None | 2,085,217 | £78,904.88 | 524.7 | None | None |
| Opportunities requiring capital investment | Capital cost | £4,244,991 | 9,170,269 | £372,125 | 2,428.1 | 11.4 | £1,748.26 |
| Churches | | | | | | | |
| Good housekeeping opportunities | No and low capital cost | None | 45,984,808 | £1,494,888 | 9,399 | None | None |
| Opportunities requiring capital investment | Capital cost | £12,869,152 | 54,141,851 | £2,405,305 | 14,544 | 5 | £885 |
| TOTAL | | £17,114,143 | 111,382,146 | £4,351,222 | 26,896 | 5 | £836 |

The study has shown that there is a large potential for energy and carbon savings across the Church of England. If all the identified opportunities are implemented there is a potential saving of £4,350,000 per year and almost 27,000 tonnes of carbon dioxide (tCO₂). This would represent a 12% reduction in the annual carbon dioxide emissions from these buildings. To achieve these savings a capital investment of £13.1 million is required, it is estimated that the investment is due to payback in 5 years.

The savings listed above are composed of opportunities to save energy through heating system replacement and control, reducing heat loss and (most notably) by increasing the reach of energy efficient lighting and lighting controls and from the implementation of energy saving practices.

Percentage breakdown of Carbon Dioxide Savings - Cathedrals



This chart shows the opportunities identified during the cathedral site surveys and the relative component of the estimated 2,952.8 tonnes of carbon dioxide that can be saved. The opportunities for saving energy found at churches are generally from the same areas. In summary this investigation has identified the following areas of action that should be applied to both churches and cathedrals:

- Lighting
 - Guidance is required to ensure that lighting in churches and cathedrals is consistent. The guidance should encourage energy efficient lighting and controls to be installed at all sites.
- Heating
 - Guidance is required to ensure energy efficient operation and maintenance of boilers and controls.
 - Boilers that are not operating appropriately should be replaced with energy efficient alternatives.
- Reducing Heat Loss
 - An ongoing draught proofing and awareness raising programme about heat loss from buildings is required to improve the performance of heating systems.
- Energy Consumption
 - All sites should begin an energy reporting programme. Keeping track of the units (kWh or litres) used as well as the cost per year will enable progress/change to be measured.
 - Many sites were unable to locate the appropriate energy information when asked. This was usually due to churches having submitted their accounts for the financial year, but this highlights the need for a separate energy monitoring process. Monitoring is particularly important at cathedrals and churches with large energy consumption.

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