

Ten simple measures to make historic buildings more energy efficient.

It is a widely held view that older buildings are not energy-efficient, and require radical upgrading in order to improve their performance. But this isn't necessary true and this assumption about poor performance is not always justified. However, we do recognise that the energy and carbon performance of most historic buildings can be improved.

The following includes 10 simple measures to make historic buildings more energy efficient. But before we list these there are three very important considerations when dealing with buildings of traditional construction (pre-1914), especially those which are designated heritage assets and are listed buildings.

Firstly, trustees should adopt a holistic and whole building energy-planning process for devising and implementing suitable, well-integrated solutions that avoid harm to significance, are effective, cost efficient, proportionate and sustainable, ensure a healthy and comfortable environment for occupants and minimise the risk of unintended consequences.

Secondly, that anyone working to implement these upgrades is competent and has a proven track record of working on traditional and historic buildings, and thirdly, that if works are planned to a listed building then these should be discussed with the Connexional Conservation Officer before they are implemented, and trustees should apply for and receive the appropriate consents before any works commence.

1. Human Behaviour

It sounds simple, but the way we occupy our buildings can impact on energy consumption and energy use. Where occupants have some control over conditions, most do not mind small seasonal variations in building temperature. These small variations can have a big impact on energy use. Since occupant behaviour can have such a strong effect on the efficiency of energy saving measures, assessment should include both the analysis of fuel bills and interviews with building occupants to obtain information about the way they use the building. Shutting doors is a simple but effective means of reducing heat loss and preventing condensation, not to mention helping with privacy, fire protection and noise reduction.

2. Draughtproofing Windows and Doors

Heat in old buildings is lost through air leakage and conductivity. Air leakage occurs in gaps through windows and doors, cracks in walls and junctions between different building element. Thermal conductivity results in heat loss through the fabric of a building. Air tightness is more critical than insulation as heat is lost much faster through draughts than through conductivity. Draught-proofing is one of the most cost-effective and least intrusive ways of improving the comfort of occupants and reducing energy use with little or no change to a building's appearance. For more information on draughtproofing please follow this link: <https://historicengland.org.uk/advice/technical-advice/energy-efficiency-and-historic-buildings/windows-and-doors-in-historic-buildings/>

3. Reduce Energy Consumption

In addition to minimising heat loss there are many other ways to reduce energy consumption in your church. For instance, you could install a more fuel-efficient boiler, have heating appliances serviced annually by a licensed technician, install energy efficient appliances, don't boil a full kettle, defrost the freezer to increase its efficiency, install heating controls, including thermostatic radiator valves and a boiler timer and insulate pipework and hot-water cylinders.

Turning down the thermostat by just one degree C in a central heated environment may reduce its annual heating energy consumption by 10% or more. It is therefore important to consider the optimal position of the thermostat so that it is both accurately maintaining the temperature of the space and also is 'tamperproof' to ensure it works effectively. Try and avoid over-heating, and use thermostats to control room temperature rather than opening windows to let heat out.

4. Soft Furnishings

Soft furnishings such as rugs, wall hangings and cushions can also play an important role in softening large cold walls or floors. However, do consider that bringing new items in may be environmentally counter-productive: the energy and materials used to create and ship these may outweigh their benefit. It would be more cost-effective and environmentally effective to consider where materials could be sourced second-hand or upcycled out of old materials. Their installation also needs careful thought, as carpeting suspended timber floors can prevent the building's ability to breathe and can reduce air exchange, which can contribute or create problems with excessive moisture.

5. Regular repairs

Building condition has a major influence on energy use. Defects such as damp walls and poorly fitted doors and windows can substantially reduce thermal performance. Thus pinpointing building defects is an essential objective of any assessment. Close attention should always be paid to the adequacy and condition of rainwater disposal arrangements and drainage, and areas of dampness should be identified and diagnosed. Repairs are an important energy-saving measure in their own right as well as being an essential prerequisite for some thermal improvements.

Repairs can also include re-pointing and repairs to permeable renders, which should improve airtightness and water penetration (a dry wall will transfer much less heat). Do remember however that the correct intervention depends on the materials and the construction of the wall, but permeable materials such as lime mortars and renders should always be used. Where impermeable renders and mortars have been used the church should consider their replacement where practicable.

6. Be creative with outdoor space

Whilst a Church is more than its building, the building outwardly demonstrates the character and priorities of the Church. If your church has outside space, why not consider how this could celebrate nature. Some churches have planted wildflower meadows, there are also schemes to plant trees (e.g. Woodland Trust). Perhaps with enough space and willing volunteers you could have a water butt to collect rainwater and create a vegetable bed to provide food for Church activities or to donate? For more details on how you can create a wildlife haven in your burial ground see the resources section of the Caring for God's Acre website: <https://www.caringforgodsacre.org.uk/>

7. Switch energy provider

There are increasing numbers of green energy suppliers. For example A Rocha, the organisation behind eco-church have partnered with ecotricity to encourage churches to make the switch with the energy supplier, see more at: <https://arocha.org.uk/green-power-to-help-a-rocha-uk/>.

8. Lightbulbs: LEDS

Switching lightbulbs is an extremely easy and cost-effective way of making a small-win on reducing your carbon footprint. Research suggests that if all lightbulbs in the UK were switched to LEDs, this would be a saving equivalent to the energy footprint of the whole of Wales! These bulbs not only use roughly 90% less energy than traditional lightbulbs, they can also last up to 20 years reducing material waste also. Another tip is to fit photocells or timers to external lights and always remember to turn lights and appliances off at the socket when not required and do avoid leaving appliances on standby.

9. Compostable toilets

One third of church buildings has been identified as not having a toilet and this is particularly common to older buildings^[4]. Composting toilets are a great way to reduce the water footprint of your church building. These toilets can save huge quantities of water, are low-impact and low maintenance as well as money and energy. See more at:

<http://www.sustainablebuild.co.uk/composttoilets.html>

10. Roof insulation installation

Insulating below pitched roofs is one of the easiest and cheapest means of improving a building's energy efficiency as a large proportion of heat is lost through the roof. It can be carried out successfully in traditional and historic buildings if it is approached with care and consideration for their special circumstances, particularly the risk of condensation. Relatively thick layers of insulation will not cause problems if they are installed carefully and if the materials are compatible with the performance of older buildings.

When laying additional insulation make sure you maintain the air flow through the loft space. By reducing heat flow from below, improving insulation in this way will reduce the temperature in the loft space. If you have water tanks and pipes in the loft space, make sure that these too are adequately insulated, to stop them freezing. Check also that no electric cables or lights are covered with insulation as this could cause them to overheat. The church must plan carefully when installing roof insulation, and must take advice from a professional advisor to avoid the creation of problems with ventilation and condensation. Further guidance on this can be found here: <https://historicengland.org.uk/images-books/publications/eehb-insulating-pitched-roofs-ceiling-level-cold-roofs/heaq077-cold-roofs/>

1. <http://www.ecocongregationscotland.org/wp-content/uploads/2012/11/Greening-Church-Buildings.pdf>

2.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/128720/6923-how-much-energy-could-be-saved-by-making-small-cha.pdf

3. <https://3ak4be4522es3y5i4l2cwfkx-wpengine.netdna-ssl.com/wp-content/uploads/2016/01/Buildings-Lighting-Guide.pdf>

4. <https://www.nationalchurchestrust.org/toilets>