

Charities

Energy saving opportunities
for charitable organisations



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Foreword

I'm really pleased to introduce this publication that has been designed for charities right across the sector. Our job is to help charities operate effectively and promote the public's trust and confidence in the sector. This guide, produced by the Carbon Trust, outlining energy saving opportunities for charitable organisations, will assist charities on both these fronts, by providing practical advice on how to reduce their energy use, which in turn will result in lower carbon emissions.

Public expectations that all organisations – whether commercial, public, or charitable – should take action to fight climate change are growing. Thinking about how to improve the environmental sustainability of the way they work provides charities with a great opportunity to make an invaluable contribution towards protecting the planet and our environment, as well as enhancing their reputations by being seen to do so. Many of the suggestions outlined in this publication will result in cost-savings for charities – something which cannot be underestimated.

The Charity Commission has a statutory responsibility to promote the effective use of charity resources and to increase public trust and confidence in charity. With over 190,000 registered charities in England and Wales, just think of the impact the sector could make if every charity committed in some way, however small, to changing the way they work to become more environmentally responsible.

One of the charity sector's greatest strengths lies in its diversity and I'm particularly pleased to see that this guide recognises this diversity and tries to take into account the needs of different sizes and types of organisation. I hope many different charities will be able to take something away from this guide and make a real contribution to reducing energy consumption.

Fighting climate change takes will and know-how. You've already taken the first step: the publication is in your hands. Now read how to do it.

Suzi Leather

Dame Suzi Leather
Chair, Charity Commission



This guide has been produced with the kind support of the Charity Commission

Introduction

There are over 190,000 registered charities in England and Wales, all operating from within a diverse range of building types and carrying out a variety of different activities.

Although many are office based, there are charitable organisations running numerous ventures from museums and art galleries, village halls, retail outlets, hostels, warehouses, hospices and so on. There are many charities set up to protect the environment but who would still benefit from advice about increasing the energy efficiency of their own operations. Each property is unique and will therefore have different requirements when it comes to reducing energy consumption.

In addition to the financial benefits, there are also clear social and environmental advantages to reducing carbon emissions, such as minimising global warming. Increasing awareness about these issues has seen the public becoming more discerning about the environmental credentials of the organisations they deal with, charities included. Being energy efficient can enhance the reputation of all charities and help to attract more benefactors.

Further information

The Carbon Trust has a range of sector overviews covering a wide variety of building types including *Heritage and culture* (CTV026), *Retail* (CTV001) and *Office based companies* (CTV007)

Who is this publication for?

This publication provides some generic energy saving advice for the majority of building types occupied by charitable organisations. Designed mainly for charities who do not have a designated energy manager, this overview is intended to introduce the basic steps that a charity should take in order to control and reduce energy consumption in its building. It will also demonstrate how to gain an understanding of energy use and show where savings can be made.

Focusing on low- and no-cost measures and actions with short payback periods, readers will learn how to:

- Appraise the overall performance of their building
- Assess the potential for energy savings and indicate key areas for improvement
- Raise awareness of carbon reduction and energy conservation amongst staff and volunteers, and motivate them to reduce waste
- Measure savings in carbon emissions and energy costs to demonstrate achievement and maintain impetus for further improvement.

This publication also provides limited guidance on investment opportunities for more major refurbishment projects and gives readers an indication of where to go for further information and assistance.

By necessity, some of the advice given is generalised to cater for a broad building portfolio. Thus, if your building is of traditional historic construction, or provides accommodation or medical facilities, you should seek additional specialist advice.

Energy consumption

Energy is one of the larger controllable overheads in charity buildings. Using some straightforward, cost effective measures, fuel bills can often be reduced by as much as 20% and further savings are possible as part of major refurbishment projects.

Charity buildings house a variety of different activities and proportions of energy use may vary according to the type of activity being carried out. For example, a charitable retail outlet may require higher levels of lighting in order to effectively display goods. Similarly, a soup kitchen may consume more electricity on the refrigeration or preparation of food.

Occupancy levels and whether the building has air conditioning or mechanical cooling installed also have an influence. In a building without cooling, the greatest energy user is typically heating.

Although every charity building is different, there are still a number of universal areas where energy is commonly wasted. Lighting, heating, ventilation and air conditioning, office equipment and poorly performing building fabric are the biggest consumers and therefore offer the most significant savings.

In each of these, there are four main areas for making savings:

- Management
- Maintenance
- Purchasing
- Refurbishment.

The majority of energy efficiency tips in this publication are low- or no-cost and can be incorporated into standard management procedures or as part of a planned action programme.

Further information

More information on building fabric can be found in the Carbon Trust's *Building fabric technology overview* (CTV014)

What are the benefits of energy efficiency?

- Saving energy saves money, which can be put to better use
- Saving energy demonstrates good overall management within a charity and promotes the importance of energy efficiency in the public arena
- Good energy management results in improved internal conditions for building occupants
- Lower maintenance costs for buildings, associated services and equipment, and prolonged reliability and lifespan
- Saving energy results in reduced CO₂ emissions which helps combat climate change.

Breakdown of energy use for a charity operating within a typical air-conditioned office



- Air-conditioning
- Hot water
- Office equipment
- Heating
- Lighting

Heating

The heating and cooling requirements of buildings housing charitable organisations will differ depending on building type and use, and heating systems should be designed and adapted to suit.

A building's use will clearly influence the way the heating needs to be controlled. For example, a women's refuge providing temporary accommodation for mothers with babies or young children will need to be warmer than, say, a retail or office environment.

Costs can be reduced by maintaining appropriate internal temperatures and ensuring that heating equipment and controls are operated and managed correctly. In fact, it is possible to save up to 30% on heating costs through the implementation of some simple energy saving measures.

Avoid opening doors and windows when heating (and cooling) is in operation

Staff members, volunteers, visitors and delivery personnel require easy access to buildings but doors left open allow warmed air to escape and cold air to enter. The thermostat then senses a temperature decrease and automatically switches on heating, which may be unnecessary. Try to keep external doors open only when absolutely necessary.

Maintain appropriate internal temperatures

Ensure that room thermostats and radiator controls are on the minimum settings required for comfort or environmental control. Below are the recommended temperatures for some common charity buildings. Use these as a guide when setting heating controls.

Building	Temperature
Village halls	19–21
Museums and art galleries	19–21
General building areas	19–21
Offices	21–23

It is recommended that office thermostats are not set above 19°C, as internal heat gains from equipment and lighting will bring the temperature up to a level that most people find comfortable.

Discourage staff and volunteers from using thermostats as on/off switches. Turning them to maximum does not speed up the heating process – it just results in an overheated space.

A simple thermostat set at 19°C



Investigate and check controls

Where possible, set time controls to match occupation. Ensure that only occupied areas are heated and that heating is switched off or reduced during non-working hours, except where buildings require special environmental conditions.

Use simple time switches in smaller rooms or buildings to help to automate this process and ensure time settings are reviewed every month or so to check that they are correct. Many systems function inefficiently because someone made a short term adjustment and then forgot about it.

Adjust timers so that the building reaches optimum temperature just as people arrive and begins to cool down as people leave. This is best done by gradually altering settings over a number of days and checking the response of the building and its occupants. If the building is occupied for different periods over the week, install seven-day timers to allow the systems to operate only when the premises are likely to be occupied.

Keep systems clear and unobstructed

Radiators, fans and ducts should be clear of furniture and other obstructions. Keep fans and ducts clean and replace any filters at manufacturers' recommended intervals.

Maintain boilers and pipe work

Have boilers serviced regularly by a reputable firm. Gas-fired boilers should be serviced once a year; oil boilers twice a year. A regularly serviced boiler can save as much as 10% on annual heating costs.

Insulate boilers, hot water tanks, pipes and valves to prevent heat escaping. Payback can usually be expected within a few months of installation, with additional savings in subsequent years.

Consider zoning to match building occupancy and reduce operating costs

Some areas in larger charity buildings may require different levels of heating. A solution is to create zones in the building where separate time and temperature controls are installed. Zoned areas will provide closer, more efficient heating control which can improve comfort conditions and save on costs. Zoning should be considered when there are:

- Different occupancy patterns
- Different temperature requirements due to different uses
- A number of floors (particularly where top floors are poorly insulated).

Further information

More information on zoning and other solutions can be found in the Carbon Trust's *Heating control technology guide (CTG002)*.

When undertaking refurbishment, specify high efficiency condensing boilers; do not simply replace like for like

Ventilation and cooling

Providing staff and visitors with comfortable internal temperatures and adequate fresh air is achievable, and getting it right can save money.

It takes energy to heat or cool the air inside a building. If that air escapes through inefficient ventilation systems, or through opened windows and gaps in the building fabric, energy is wasted. It also means that more air must be brought in and heated or cooled to maintain optimum comfort conditions. Therefore, reducing unnecessary air loss will save on energy consumption and costs, and reduce carbon emissions.

Many charitable organisations are housed in older buildings. These typically have a large amount of air infiltration through floors and windows, for example, so they may not require any additional ventilation. In fact, some areas can be excessively draughty and so draught-proofing and weather stripping can be extremely beneficial in reducing energy bills as well as dust and noise levels. It is important, however, to provide enough ventilation to remove internal moisture and pollutants and also to avoid some of the problems associated with rising damp. Each building will have its own issues to consider. Further guidance for older buildings can be found in the *Heritage and culture* sector overview (CTV026).

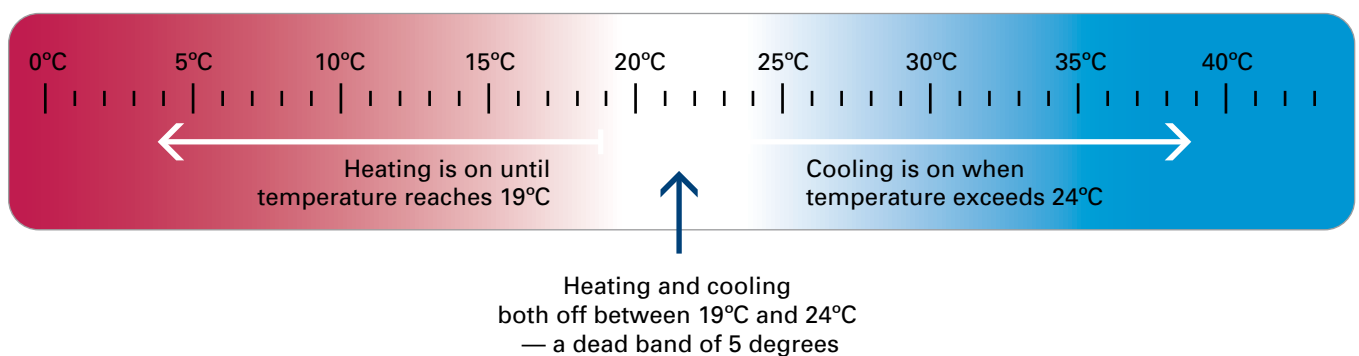
Take advantage of natural ventilation and free cooling

As simple as it sounds, natural ventilation and cooling relies on natural air flow between openings on opposite sides of a room or building – or rising warm air being replaced with cooler air sucked in through windows or vents. In many older buildings, it is possible to use windows and doors to provide good levels of natural ventilation, allowing mechanical ventilation to be switched off or turned down to save money. When opening vents, doors and windows, always consider security implications.

Do not let heating and cooling operate at the same time

This can be avoided by setting a temperature dead band – a wide gap between the temperatures at which heating and cooling cut in. For example, in an office, the heating might be set to switch off when a temperature of 19°C has been reached and cooling would not come on until the temperature exceeds 24°C.

Diagram of a dead band control providing recommended temperatures



Ensure ventilation controls operate at times and levels to reflect demand

Ventilation requirements may vary at different times and in different parts of a building throughout the day. Check that operating times for ventilation and cooling systems are consistent with the occupancy patterns of the building (unless ventilation is being used to provide cooling overnight or, in older heritage buildings, as part of a building conservation strategy).

Further information

For more information, see the [Heating, ventilation and air conditioning technology overview \(CTV003\)](#) and the more in depth [Air conditioning technology guide \(CTG005\)](#) available from the Carbon Trust.

Maintain system components to ensure efficiency

Energy consumption can increase by up to 60% if regular maintenance is not undertaken. Dirty or faulty fans, air ducts and components directly affect system efficiency and will increase running costs and risk of breakdown. The performance of the whole system should be reviewed annually and replacement parts ordered as necessary. Always consult a maintenance technician before embarking on a maintenance programme.

Museums, art galleries and heritage buildings

Air conditioning is often used to help conserve exhibits, yet installing the system can significantly damage the building structure in older buildings. It can also cause humidification whereby additional moisture condenses on the surface of single glazing, within building fabric, or in unheated areas of the building.

Speak to an expert to find out the most appropriate ventilation options for your requirements.

- If possible, place exhibits that require special conditions in closely controlled enclosures. The rest of the building can then be serviced as normal.
- Only alter humidity and temperature if you have measured them first and can provide a baseline against which to measure improvements.
- Keep a record of visitor numbers, as people significantly alter temperature and humidity levels. Use this information to fine tune control settings.
- Avoid radically changing environmental conditions as this can stress the objects on display.

Always remember that when dealing with a historic or listed building, it is imperative to seek professional advice before undertaking any work. The listing protects everything, including the services such as the boiler and pipework and it is a criminal act to change anything without permission. For more information on heritage buildings, see the Carbon Trust's *Heritage and culture* sector overview (CTV026).

Case study: British Red Cross Regional HQ, Worcester

In June 2007, the British Red Cross opened its new environmentally friendly regional headquarters in Worcester, which features a natural ventilation and passive cooling system. The building has 'wind catchers' installed on its roof which bring in cool, fresh air and encourage natural ventilation deep inside the structure.

Louvres built into the walls also suck air into the building and a Building Management System automatically opens windows at night to help cool it, ready for the start of the next working day.



Consider weather compensation and optimum start controls

Technology has made it possible for heating systems to adjust themselves in line with the changeable UK climate. A compensator is a form of control for heating systems that automatically regulates the heating temperature based on the weather. An optimum start controller learns how quickly the building reaches the desired temperature and brings the heating on at the optimum time prior to building occupancy, again depending on the weather.

These types of controls can save thousands of pounds and should pay back their investment in just a couple of years. Consult a qualified heating technician to discuss the range of options available.

Consider a Building Energy Management System (BMS or BEMS)

A BEMS is based on a network of controllers and offers closer control and monitoring of building services performance including heating, ventilation and air conditioning. This is shown on a computer screen in real time and allows settings to be changed quickly and easily. BEMS can reduce total energy costs by 10% or more and could repay the capital investment in less than five years so they are well worth considering.

If your building has a BEMS installed already, check that it is operating correctly and that operators are trained to use it effectively.

Note

BEMS are only appropriate for larger charity buildings with the appropriate needs – see the Carbon Trust's *Building controls* technology overview (CTV032) for further information.

Take control

The more complex a building is, the greater the need for a clear strategy to define how each service (heating, cooling and ventilation) is controlled. This not only helps to improve awareness amongst staff and volunteers but will also ensure consistency in the management of a property.

To be effective, controls need to be user friendly and accessible to building occupants. Building control systems, coupled with a building management policy, have a major influence on the energy performance of a charity building.

Case study Field Studies Council

The Field Studies Council (FSC) is an environmental education charity offering residential accommodation to students undertaking courses in outdoor environmental education. With an annual energy bill of around £309,000, FSC contacted the Carbon Trust for a free energy survey to identify ways of reducing its energy costs and carbon emissions at three of its sites in Shropshire and the Lake District.

The survey identified a number of low-cost recommendations that could save FSC around £27,000 and 189 tonnes of CO₂ a year. By June 2007, they had saved over 60% of the predicted CO₂ emissions as a result of implementing energy specific training for key staff, insulating hot water pipe work around the boiler and resetting domestic hot water controls. Consequently, FSC has seen no rise in overall energy costs despite unit energy prices rising significantly above inflation.

Lighting

When altering lighting systems to reduce carbon emissions, it is important to be mindful of each purpose that lighting serves. For example, lighting often serves a fundamental health and safety function but can also create a welcoming atmosphere and help to display exhibits and items of interest.

The wise use of energy efficient lighting and controls can enhance all aspects of operation in providing:

- General lighting to communal areas such as receptions and corridors
- Task lighting, such as in offices and retail situations
- Security and safety lighting
- External lighting for car parks and signage.

There are many simple and inexpensive ways to reduce the energy consumption and costs associated with lighting without compromising health, safety or comfort levels.

Did you know?

Lighting equipment is also a major heat emitter in a building. As a general rule, the more energy efficient equipment is, the less heat it produces; so installing low energy lighting can also reduce cooling costs in summer months – a double saving.

Lighting an empty office building overnight wastes enough energy to heat water for 1,000 cups of coffee

'Switch off' policy – involve staff and volunteers and increase awareness

All staff and volunteers should be involved in making savings – this can be achieved by conducting regular meetings, placing stickers above light switches and posters around the building. These are available from the Carbon Trust website at www.carbontrust.co.uk/posters. It is everyone's responsibility to report failing lamps so they can be replaced. This will help maintain the desired light output and, in turn, provide a safer internal environment.

Label light switches

Light switches should be clearly labelled to help staff, volunteers and visitors to select only those lights they need. Lights in unoccupied areas should be switched off but remember to consider health and safety implications, particularly in corridors and stairwells.

Maintenance

Lighting is essential for providing a pleasant and productive environment so it is important to keep windows, skylights and light fittings clean. Replace old dim lamps and keep controls in good working order by ensuring timers are set to match occupancy hours and that occupancy sensors are clean.

Did you know?

Without regular maintenance, light levels can fall by up to 30% in 2–3 years. Establishing a basic lighting maintenance programme can reduce costs by up to 15% as well as improving the appearance of the internal environment.

Install low energy lighting

Upgrade all standard light bulbs to energy saving (CFL) bulbs, which use 75% less energy, produce less unwanted heat and last 8 to 10 times longer.

Replace blackened, flickering, dim or failed fluorescent tubes with triphosphor coated ones (as stated on the packaging). Triphosphor coating provides a more natural, brighter light for the whole life of the tube. If the tubes are 38mm (1.5 inch), they should be replaced with slimmer 26mm (1 inch) tubes.

Occupancy sensors

Learning how to set and regulate lighting controls can provide substantial savings and enhance comfort conditions for staff and visitors. Suitable switching arrangements may be all that is needed, or it may be appropriate to use more sophisticated automatic controls.

Most charitable organisations can benefit from occupancy sensors. These help to ensure lights only operate when there is somebody there to require them. Sensors can achieve savings of up to 30% on lighting costs and are especially useful in:

- Storerooms
- Toilets
- Meeting rooms
- Areas where lighting is zoned.

They are not appropriate for general office areas where people may not be moving frequently enough to be detected. Always maintain minimum light levels so as not to compromise health and safety standards.

Top tip

Specify high frequency fittings with mirror reflectors to help fluorescent tubes last longer and eliminate flicker and hum. Mirror reflectors allow the area to be lit by fewer tubes as more light is provided into the space than would be provided through plastic diffusers.

Daylight sensors

Light sensors or photocells can be used to control artificial lighting when there is sufficient natural daylight. As daylight hours vary throughout the year, sensors help to provide closer control and thus substantial savings. They can be particularly useful for external lighting, such as in car parks, and can often pay back their costs in less than a year. Both occupancy and daylight control are sometimes combined with time switches to provide even bigger savings.

Top tip

Always make the most of natural daylight. Most people prefer this compared to artificial lighting and it can have a positive effect on morale and wellbeing. Caution should be exercised in museums and galleries, however, as excessive sunlight could potentially damage some displays.


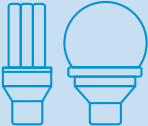




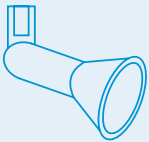


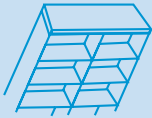
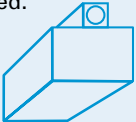
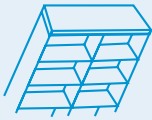
Switching in parallel

Consider wiring light switches to control lights in groups parallel to windows. This enables occupants to make the most of natural daylight by switching off lights near windows, without leaving those spaces further away from the windows in shadow.

Further information

The Carbon Trust's *Lighting technology overview* (CTV021) gives further advice about lighting in all situations and the more in-depth guide to *Display Lighting* (CTG011) may also be useful to some charities.

The table on the following page shows the most common lamps and the best energy efficient replacement options.

Existing lamp type	Uses	Energy efficient replacement option	Energy saving/benefits	Application notes
<p>Tungsten light bulbs.</p> 	<p>General lighting, a common bulb throughout many buildings.</p>	<p>Replace with compact fluorescent lamps (CFLs) in the same fitting.</p> 	<p>75% saving plus longer lamp life and reduced maintenance costs.</p>	<p>Attractive and appropriate modern CFL replacements are available and are acceptable for almost any application where standard bulbs were used.</p>
<p>38mm (T12) fluorescent tubes in switch-start fittings.</p> 	<p>General lighting, commonly used in staff areas, storage areas and offices of older buildings.</p>	<p>Replace with equivalent 26mm (T8) triphosphor fluorescent tubes of lower wattage.</p> 	<p>8% saving on standard tubes plus longer lamp life and reduced maintenance costs.</p>	<p>A direct replacement of the fatter tubes for the thinner ones is possible, but T8 tubes are even better used with modern fittings (see below).</p>
<p>High-wattage filament lamps or tungsten halogen lamps used in floodlights.</p> 	<p>Commonly used to light external areas, ornamental features and building facades.</p>	<p>Replace with metal halide or high wattage compact fluorescent lighting.</p> 	<p>65–75% saving plus longer lamp life.</p>	<p>Appropriate to flood lighting, external lighting and some general lighting situations.</p>
<p>Mains voltage reflector lamps, filament spot and flood types.</p> 	<p>General lighting in areas that require bright light and good colour rendering. Commonly used at reception and public areas and also used for display purposes in retail areas and museums.</p>	<p>Replace with low-voltage tungsten halogen lighting or metal halide discharge lighting.</p> 	<p>30–80% saving for equivalent lighting performance.</p>	<p>Spot lighting and display lighting. If low voltage tungsten halogen spotlights are installed there is a further saving using 35W Infrared coated (IRC) bulbs instead of the standard 50W bulbs.</p>
<p>Fluorescent fittings with the old 2ft 40W and 8ft 125W fluorescent lamps.</p> 	<p>General lighting, commonly used by a wide variety of charitable organisations.</p>	<p>Replace with efficient fittings using reflectors/louvers or efficient prismatic controllers with high-frequency electronic or low loss control gear.</p> 	<p>30–45% with much improved lighting quality. The use of high frequency electronic control gear eliminates flicker, hum and stroboscopic effect.</p>	<p>Reduction in flicker and hum can assist concentration of staff and other building users by removing distractions.</p>
<p>Fluorescent fittings with opal diffusers or prismatic controllers which are permanently discoloured.</p> 	<p>General lighting, commonly used in staff areas, storage rooms, hostels and offices.</p>	<p>Replace with new prismatic controllers or replace complete fittings as above.</p> 	<p>No reduction in energy consumption but increases the amount of light by between 30% and 60%</p>	<p>General lighting levels can be improved leading to a more attractive environment.</p>

Energy Technology List (ETL)

The Energy Technology List (ETL) is a register of energy saving products managed by the Carbon Trust. The scheme encourages businesses to invest in energy saving plant or machinery specified in the ETL to help reduce carbon emissions which contribute to climate change.

When replacing equipment, organisations are often tempted to opt for that with the lowest capital cost. However, immediate cost savings can prove to be a false economy. Considering the life cycle cost before investing in equipment can help reduce costs and improve cash flow in the longer term.

There are several leaflets available from the Carbon Trust on the technologies covered by the ETL, which include calculations to demonstrate cost savings. For more information, visit www.eca.gov/energy

Charities with special lighting needs

Research and reference areas

Charities with research or reference areas should be aware of the interaction of shelving and lighting layouts. If either of these are altered, lighting levels may be reduced.

Bookshelves must be lit adequately so users can find and read books without visual discomfort. Evenness of illumination is important and there are various ways of achieving this. The most common method is parallel lighting, where a row of lamps is located directly above the reading area. An alternative approach is indirect lighting, where lamps are aimed upwards to bounce light off the ceiling, which can be easier on the eyes.

Museums and galleries

When altering lighting systems in museums and galleries to improve energy efficiency, consider the importance of colour rendering for viewing items on display.

Colour rendering is an indicator of how accurately colours can be distinguished under different light sources.

Measure and control light levels carefully and seek professional advice to maintain the safety of collections.

Retail outlets

Charities with retail outlets will require bright, attractive lighting to draw in customers and maximise sales. Although lighting plays a critical role in the retail environment, there are some efficiency measures which can be put into place to minimise consumption and costs.

For example, display areas may be effectively lit to higher levels than other sections in a charity shop, particularly the back of house areas. These can be lit at lower levels whilst still meeting health and safety requirements.

For more information, see the Carbon Trust's *Retail* sector overview (CTV001).

Energy Efficiency Loans

Energy Efficiency Loans from the Carbon Trust are a cost-effective way to replace or upgrade your existing equipment with a more energy efficient version. Businesses can borrow from £5,000 to £100,000* on an unsecured, interest-free loan, payable over a period of up to four years. There are no arrangement fees and applying is straightforward. Go to www.carbontrust.co.uk/loans to see if you qualify.

*Subject to eligibility. Regional variations apply.

Charities may apply for Energy Efficiency Loans as long as their charter does not preclude borrowing.

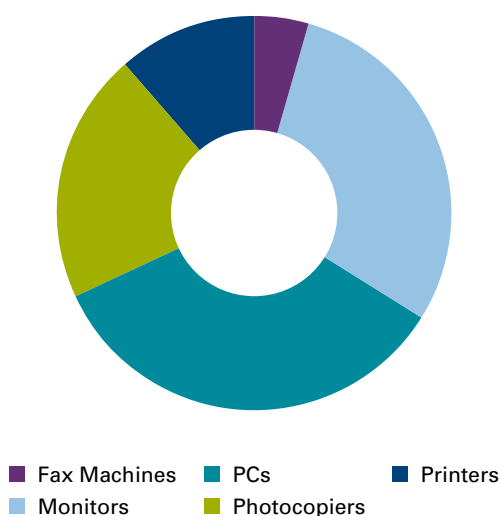
Did you know?

Fluorescent tubes use only a few seconds worth of power in start up, therefore it is always better to switch them off when leaving a room.

Office equipment

The growth of IT equipment in many charitable organisations accounts for a significant proportion of electricity bills. Office buildings will be the biggest candidates for energy saving in this area – however, the presence of computers in most types of organisation means that there are good opportunities across the board.

The chart below shows the proportion of total energy used by facilities in a typical office environment.



Turn off and power down

Most equipment need not be on at all times, so switch it off when not in use and enable power down modes. This reduces the energy consumption and heat produced by equipment which, in turn, lowers cooling costs. Equipment lifespan will also be extended and maintenance costs and risk of breakdown will be reduced.

Use the most appropriate equipment for the task

For internal printing, use a black and white printer. Set default printing to double-sided (duplex) and try to print in batches where possible to allow the machine to spend more time in standby than idling mode. Take care though; machines with a very deep sleep mode can take longer to reach the right temperature which can result in staff and volunteers disabling the standby feature, thereby missing out on savings.

Minimise cooling loads

Where possible, place heat-emitting equipment such as printers and photocopiers in a separate, naturally ventilated area with good airflow. This helps minimise air conditioning costs and excessive noise. Colder areas on the north side of buildings are ideal.

Did you know?

A single computer and monitor left on 24 hours a day will cost around £50 a year. Switching them off out of hours and enabling standby features could reduce this to less than £15 a year and prolong the lifespan of equipment.

Top tip

Consider using laptops – they have been developed to be as energy efficient as possible because of their usage patterns. Using laptops and docking ports can maintain familiar desktop arrangements of mouse, keyboard and monitor combinations and increase workspace flexibility.

Maintain equipment for optimum performance

Printers and copiers should be checked and cleaned regularly. Keep parts clean and free of dust and blockages. Follow manufacturers' advice on servicing schedules in order to maintain optimum efficiency.

Raise awareness

Ensure all staff members and volunteers are aware of switch-off policies and inform them of the cost and environmental benefits of putting these into practice. The Carbon Trust has materials and publications that can help, such as *Creating an awareness campaign* (CTG001), which includes posters and stickers and an *Office equipment technology overview* (CTV005) containing practical tips for everyone. Some charities have been especially innovative in awareness-raising (see the case study box below).

Install plug-in seven day timers

These can be bought for a few pounds from most DIY stores and will help to reduce the likelihood of machines being left on out of hours. Timers can be fitted to communal equipment such as printers, photocopiers and even vending machines, although it is advisable to check with your supplier first about whether this would affect service agreements.

Purchase for your requirements

Choose equipment that caters for current business needs and predicted requirements only. High-spec computers with large screens and fast processors use more energy. Always take running costs into account.

Ensure all new equipment has energy saving features meeting at least ENERGY STAR performance specifications. See the Carbon Trust's *Office equipment technology overview* (CTV005) for further information or visit www.eu-energystar.org to find out more.

Consider upgrading existing PCs

Some computers can simply be upgraded with newer, more energy efficient components. Look into this option before purchasing new machines. Flat screen (LCD) monitors can reduce monitor energy use by over two-thirds. There are also obvious space advantages.

Case study

Nottingham Voluntary and Community Sector (VCS)

When faced with an energy bill that showed 20% of energy was being used out of hours, Nottingham VCS enlisted the assistance of Dr Green and the Green Fairy to help improve energy efficiency in a fun and original way.

The Green Fairy is a token system designed to encourage people to switch off energy-consuming equipment when it is not being used. For example, if a monitor is left on unnecessarily, the Green Fairy leaves a note to remind staff to turn it off next time, and a thank-you card when users do get into the habit. Anyone can be a green fairy, so there is a general sense of involvement and accomplishment amongst staff and colleagues.

Dr Green is a questions and suggestions box designed to dispel climate change myths and encourage staff to make recommendations for energy efficient improvements around the building.

Other initiatives include training staff on double-sided printing and setting printers to eco-mode; a cycle-to-work scheme with secure cycle store and showers for cyclists and a 'think before you print' tag line for emails. The scheme won a prize in the national Every Action Counts survey and is a great example of what increased social responsibility can achieve in the charity sector.

Catering facilities

Whether providing hot meals for 300 people every day, or just hot drinks for 20 people a few times a month, all catering facilities have common areas where energy savings can be made when all users take responsibility.

The way catering equipment is operated has a big effect on the costs of running it.

- Switch off and turn down equipment when it is not required
- Label equipment with its pre-heat time. Educate staff to switch on only when required
- Avoid using catering equipment to warm the kitchen – the building’s heating system should do this effectively. If it doesn’t, find out why and rectify the problem
- Choose the correct saucepan size for the job and use lids where possible
- Keep chiller and freezer door openings to a minimum
- Use dishwashers only on full loads
- Clean and maintain equipment including door seals and gas burners
- Purchase equipment with running costs in mind
- Consider replacing any kitchen equipment over 15 years old with newer, more efficient models
- Specify the most efficient equipment possible and look for models using the European A–G efficiency label.

Refrigerators and freezers that are not properly maintained will gradually use more energy and increase the risk of breakdown. Establishing a simple maintenance schedule will save on energy and costs.

- Ensure that defrost procedures are followed
- Check door seals on cold rooms, fridges and frozen food stores
- Keep condensers clean and free of dust
- Check systems have the correct amount of refrigerant
- Maintain correct temperatures and avoid over-cooling
- Ensure that the equipment is set to the manufacturer’s recommended operating temperature.

Keeping refrigerated produce at the correct temperature is better for food and for cost savings.

- Store drinks and other non-perishable chilled goods in a cool place, avoiding direct sunlight and heat-emitting equipment to ensure stored products are as cool as possible before being put into cabinets
- Energy consumption can be reduced by 2–4% if the set cooling temperature can be increased by 1°C.

Temperature code	Product temperature	Suitable for
L1	Below -15°C/-18°C**	Ice cream and frozen foods
L2	Below -12°C/-18°C**	Frozen foods
M0	Between -1°C & +4°C	Poultry and meat
M1	Between -1°C & +5°C	Meat and dairy products
M2	Between -1°C & +7°C	Processed meat and dairy products
H1	Between +1°C & +10°C	Produce and canned and bottled drinks
H2	Between -1°C & +10°C	Canned and bottled drinks

* The products in the above table are only a guide. Refer to the Food Safety (Temperature Control) Regulations 1995 or your food supplier for more specific information relating to your food storage requirements.

** The maximum temperatures shown are those allowed after defrost.

Building fabric

From refurbished offices to purpose-built hospices, small shops and huge warehouses, the buildings occupied by charitable organisations are as diverse as the savings opportunities available.

Regardless of the age or purpose of the building, most managers will be able to implement energy efficiency improvements in the building material itself. In fact, around two-thirds of heat lost from most buildings escapes through the building fabric (walls, floors and ceilings). It therefore makes sense to improve the building fabric before considering any investment to improve or replace services such as heating, cooling or ventilation systems.

Top tip

If you are a tenant in your building, use the advice in this section to open a discussion with the building owner. Once they have seen the benefits of upgraded building fabric, they may be happy to work with you to make improvements.

Improving building fabric makes good sense for many reasons:

- Better temperature control – it can lower ventilation costs and prevent overheating
- Improved productivity – staff morale and output can be enhanced by providing a more comfortable working environment through reducing draughts, solar glare, overheating and noise
- Lower capital expenditure – a more efficient, well-insulated building needs smaller heating and cooling systems
- Good investment – better insulation can increase a building's value and attractiveness.

Top tip

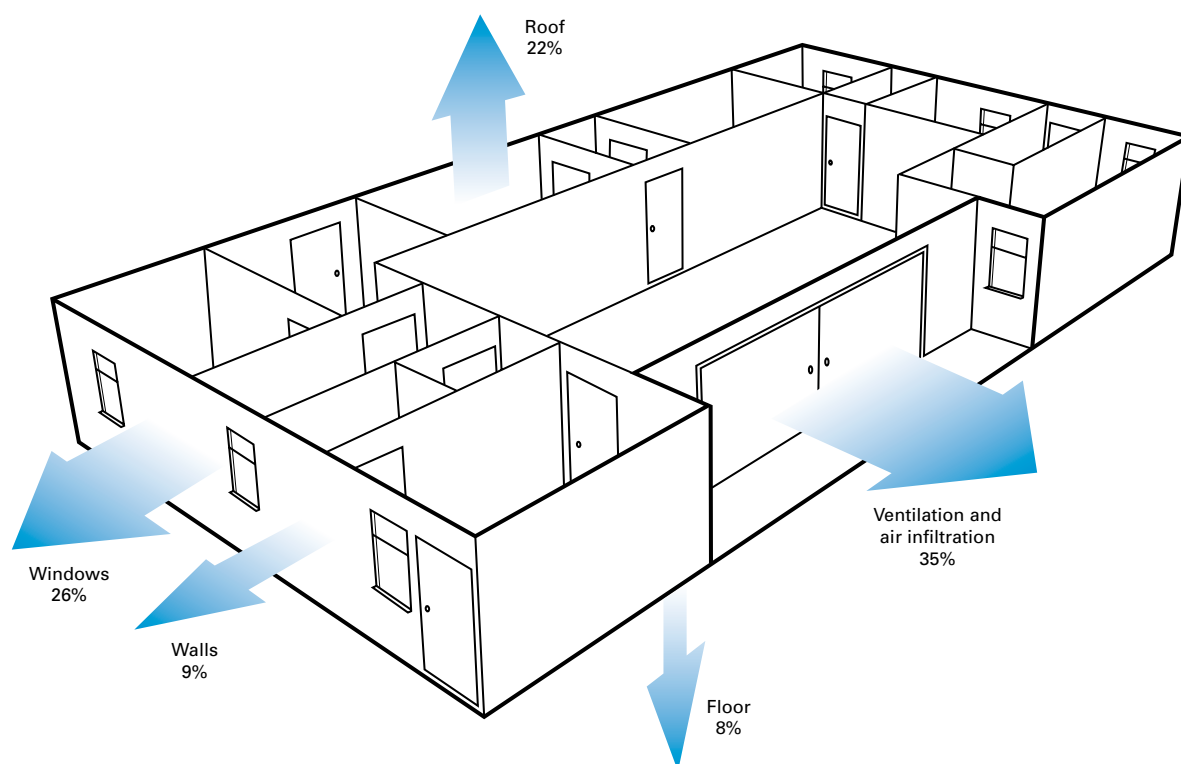
If your building suffers from draughts through windows and doors, it is better to address these before improving the heating, ventilation or cooling systems.

Some general guidance applicable to the wide range of charity buildings is outlined in this section. However, it is always worth seeking specialist advice where there is any doubt.

Some charities may have reservations about making extensive changes to older buildings in their estate, fearing that the essential character could be ruined. There is also the matter of legislation on listed buildings to be taken into consideration. Nevertheless, the fabric of older buildings is usually in need of particular attention and it is often possible to make vast improvements while remaining sensitive to the original heritage values of the structure.

Further information – historical buildings

Further information and advice specific to buildings of historical significance can be found in the *Heritage and culture* sector overview (CTV026), available from the Carbon Trust.



Insulate to accumulate

25% of a building's heat will escape via an un-insulated roof, which adds hundreds of pounds per year to heating bills. Insulating any roof spaces and unfilled external cavity walls is an effective and inexpensive way of reducing heat losses.

Undertake regular maintenance and avoid expensive problems later on

Regular building maintenance should mean that any potential problems are identified and dealt with promptly. Compile a checklist to address the areas where energy is lost via the building structure and note where the building fabric needs repair or upgrade. In particular, gaps or holes in walls, windows, doors and skylights should be repaired immediately.

Keep windows and external doors closed as much as possible when heating is on and encourage staff and visitors to do the same. Consider sealing unused doors or windows to further reduce draughts.

Warehouses

Staff and suppliers require easy access to the building but open doors allow any warmed air to escape and cold air to enter. To prevent warm air from escaping within storage areas and anywhere where there are delivery doors, try to keep external doors closed when they are not being used and consider installing air-locks, PVC curtains or warm air curtains.

Some charities may be eligible for an Energy Efficiency Loan to help cover the costs of installing these measures – contact the Carbon Trust on **0800 085 2005** for more information.

Establish a housekeeping schedule and involve staff and volunteers

Compile a checklist to address areas where energy is lost via the building structure. A comprehensive schedule should include regularly checking window panes and frames, roof lights and doors. The larger a building, the more beneficial it would be to appoint a staff member or team to carry this out. Ask staff to report any problems and ensure these are promptly dealt with. Example checklists can be found in the Carbon Trust factsheet *Assessing the energy in your building* (CTL003).

Regularly check the building for damp

Damp causes significant damage to the building structure and reduces its insulating properties. Repair split down-pipes, faulty gutters and leaky roof tiles. Check for signs of damp and condensation at least once a year, preferably prior to winter months.

Redirect heat and light from the sun

Overheating due to high levels of glazing is a growing problem in many buildings. Fit horizontal blinds or external shading to windows to direct light away from workstations and on to ceilings and walls. This will allow more daylight into the space, whilst minimising heat and glare from sunlight.

Further information

More detailed guidance is available in the *Building fabric technology overview* (CTV014) available from the Carbon Trust.

Improve glazing

Double glazing is now a minimum requirement when replacing windows but specifying triple glazing on north facing or exposed sides of a building can offer further comfort and energy savings. Some window units even have integrated blinds and/or allow for secure night opening which can provide additional ventilation and cooling benefits.

Windows can have a coating applied to improve insulation properties. Coatings that allow daylight through but block or reduce heat (infra-red) can be particularly effective at reducing overheating from direct sunlight.

A number of charities operate from 1960s buildings which are characterised by highly glazed spaces. In these areas, it may be more effective to replace some of the glazing with insulated blank panels. This will reduce the amount of light entering the space but provide better insulation and can also reduce heat-gain and glare associated with a large area of windows.

Good housekeeping and energy management

Savings are easily achievable in all charities and need not require any initial outlay. Many opportunities are within the control of building occupants, which is an ideal way of involving people and raising awareness of the importance of reducing energy consumption.

Everyone should be reminded that good energy management helps to achieve:

- Reduced carbon emissions, minimising climate change
- Healthier and more productive working conditions
- Cost savings
- An enhanced image for the organisation which can be promoted to the general public.

Whether starting an energy conservation programme from scratch or simply checking the effectiveness of an existing management system, there are a number of basics to consider.

Responsibility and commitment

To effectively implement a change in practice, senior management personnel through to front-line staff must be committed to energy efficiency. This should be backed up by a tailored mission statement and energy policy. It is also important to appoint an 'energy champion'. In most small charitable organisations, this may be the office manager, but in some larger ones appointing a specific staff member will often improve the sense of involvement and awareness throughout the organisation.

Involve staff

All staff members and volunteers are important in saving energy so they must be made aware of wastage areas and be trained to operate equipment and controls correctly. Motivate staff – ask their opinions and encourage them to review their own working practices to increase energy savings. Competitions, campaigns and team projects are great ways to get buy-in. Reinforce the benefits of improving their work area and give them a sense of ownership of energy management.

Further information

The Carbon Trust's *Creating an awareness campaign* (CTG001) includes a staff survey, useful tips, posters and stickers.

Record and understand your energy consumption

Understand your energy consumption by reviewing energy bills over the last year. This will enable you to build a picture of your past performance. Contact your energy supplier for these data if you do not already have them.

Take regular meter readings at the same time each month and use these to track your progress against the previous year's energy usage. Meter readings should also be checked against your energy invoices to ensure accurate billing. This simple monitoring and targeting system will help you to track the benefits of energy saving measures implemented and enables any unusual changes in energy consumption to be quickly identified and followed up.

Set targets

Tell staff how much energy is currently being consumed. As the energy saving programme gathers momentum, it will be possible to compare current and initial consumption to highlight energy savings. Set targets – most charities in the UK could reduce their energy consumption by 10–40%. Be realistic, however – many small organisations start by aiming for just 5% per year.

Further information

The Carbon Trust guides to *Practical energy management (CTV023)* and *Energy management strategy (CTV022)* give, respectively, practical and strategic advice on low- and no-cost measures to reduce energy consumption.

Check energy consumption out of hours

If a building is empty overnight, it is worth finding out how much energy is being used when no one is around. Take meter readings at the end of one day and the beginning of the next. Is the difference between the two – showing the energy used overnight – more than expected? Find out what could be using that energy.

Undertake regular housekeeping walk rounds

Carry out a series of walk rounds at different times of the day to get a better idea of where and when energy is being wasted, as patterns of energy use vary throughout the day. Note down and act on any maintenance measures needed, in order to avoid expensive problems later on.

A walk round helps to:

- Establish current operating practices
- Eliminate wasteful practices and ensure they do not recur
- Demonstrate commitment to improving energy performance
- Identify maintenance and investment opportunities for savings
- Involve staff and volunteers and raise awareness of the importance of reducing energy consumption
- Demonstrate commitment to improving performance.

Transportation

Although travel and transport are essential elements of charity work, there are several key ways to minimise the associated environmental impact and resulting carbon emissions.

- Encourage staff to use public transport or car share, walk or cycle to work
- Provide safe storage facilities for bicycles
- Encourage staff to travel by train or bus rather than car or aeroplane for longer journeys
- Plan effectively so that delivery or collection vehicles can make a single trip for multiple purposes
- When specifying new vehicles, choose those with the lowest emissions and consider replacing standard petrol vehicles for hybrid versions.

For more information visit [www.dft.gov.uk/ACTONCO₂](http://www.dft.gov.uk/ACTONCO2)

'ACT ON CO₂' is a Government campaign, providing advice to consumers to help them reduce their CO₂ emissions. In fact, by following their Smarter Driving tips and suggestions, CO₂ emissions from cars could be reduced by 8%, and if everyone buying a brand new car this year opted for the most fuel efficient model in its class, CO₂ emissions from new cars could be reduced by 24%.

Further information

The Carbon Trust's leaflet *Assessing the energy use in your building (CTL003)* provides hints, tips and a sample checklist that can be tailored to suit each organisation.

Action checklist

Action	Complete	Action/Comment
Switch off all non-essential lighting out of core operating hours. Install timers to help with this (Page 9)		
Replace traditional tungsten lamps with energy efficient, compact fluorescent lamps (CFLs) to reduce operating and maintenance costs (Page 10)		
Establish a basic lighting maintenance programme to keep lights and windows clean. Identify and replace failing lights (Page 9)		
Ensure thermostats are set correctly – increase temperature set-point for cooling and reduce set-point for heating (Page 4)		
Turn off unnecessary equipment during the day and especially out of hours to reduce heat build-up and electrical costs (Page 13)		
Set a gap or 'dead band' between heating and air conditioning control temperatures of about 5°C to avoid them operating at the same time (Page 6)		
Walk around the building at different times of the day and during different seasons to see how and when heaters and coolers are working. Check time and temperature settings (Page 5)		
Check insulation levels and increase wherever practical to reduce heating requirements (Page 17)		

Next steps

There are many easy low- and no-cost options to help save money and improve the operation of buildings occupied by charities.

Step 1. Understand your energy use

Look at your building and identify the major areas of energy consumption. Check the condition and operation of equipment and monitor the power consumption over say, one week to obtain a base figure against which energy efficiency improvements can be measured.

Step 2. Identify your opportunities

Compile an energy checklist. Walk round your building and complete the checklist at different times of day and night to identify where energy savings can be made. The action checklist on the previous page could form the basis of your walk round.

Step 3. Prioritise your actions

Draw up an action plan detailing a schedule of improvements that need to be made and when, along with who will be responsible for them.

Step 4. Seek specialist help

It may be possible to implement some energy saving measures in-house but others may require specialist assistance. This is particularly important for traditional historic buildings. Discuss the more complex or expensive options with a qualified technician and conservation officer.

Step 5. Make the changes and measure the savings

Implement your energy saving actions and measure against original consumption figures. This will assist future management decisions regarding your energy priorities.

Step 6. Continue to manage your organisation's energy use

Enforce policies, systems and procedures to ensure that your building or site operates efficiently and that savings are maintained in the future.

Related publications

In addition to those mentioned, the following publications may also be useful for charities and are available from the Carbon Trust: *Creating a low carbon future with the Public sector* (PFL304) and *Renewable energy sources technology overview* (CTV010)

The Charity Commission

The Charity Commission is the independent regulator of charities in England and Wales. The Commission has published some information for charities interested in increasing the environmental responsibility of their operations on its website at www.charitycommission.gov.uk/enhancingcharities/enviro.asp. For information about registered charities, or if you are a charity and you want advice from the Commission, visit www.charitycommission.gov.uk or call 0845 3000 218.



Go online to get more

The Carbon Trust provides a range of tools, services and information to help you implement energy and carbon saving measures, no matter what your level of experience.

Carbon Footprint Calculator – Our online calculator will help you calculate your organisation's carbon emissions.

—▶ www.carbontrust.co.uk/carboncalculator

Interest Free Loans – Energy Efficiency Loans from the Carbon Trust are a cost effective way to replace or upgrade your existing equipment with a more energy efficient version. See if you qualify.

—▶ www.carbontrust.co.uk/loans

Carbon Surveys – We provide free surveys to organisations with annual energy bills of more than £50,000. Our carbon experts will visit your premises to identify energy saving opportunities and offer practical advice on how to achieve them.

—▶ www.carbontrust.co.uk/surveys

Action Plans – Create action plans to implement carbon and energy saving measures.

—▶ www.carbontrust.co.uk/apt

Case Studies – Our case studies show that it's often easier and less expensive than you might think to bring about real change.

—▶ www.carbontrust.co.uk/casestudies

Events & Workshops – The Carbon Trust offers a variety of events and workshops ranging from introductions to our services to technical energy efficiency training, most of which are free.

—▶ www.carbontrust.co.uk/events

Publications – We have a library of free publications detailing energy saving techniques for a range of sectors and technologies.

—▶ www.carbontrust.co.uk/publications

Need further help?



Call our Customer Centre on 0800 085 2005

Our Customer Centre provides free advice on what your organisation can do to save energy and save money. Our team handles questions ranging from straightforward requests for information, to in-depth technical queries about particular technologies.

The Carbon Trust was set up by Government in 2001 as an independent company.

Our mission is to accelerate the move to a low carbon economy by working with organisations to reduce carbon emissions and develop commercial low carbon technologies.

We do this through five complementary business areas:

Insights – explains the opportunities surrounding climate change

Solutions – delivers carbon reduction solutions

Innovations – develops low carbon technologies

Enterprises – creates low carbon businesses

Investments – finances clean energy businesses.

www.carbontrust.co.uk

0800 085 2005



The Carbon Trust supports ACT ON CO₂, the Government's initiative to help individuals understand and reduce their carbon footprint. To calculate your personal carbon footprint, visit <http://actonco2.direct.gov.uk>

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