

CTV028

Sector Overview



Local authorities

Saving energy in local authority buildings



Making business sense
of climate change

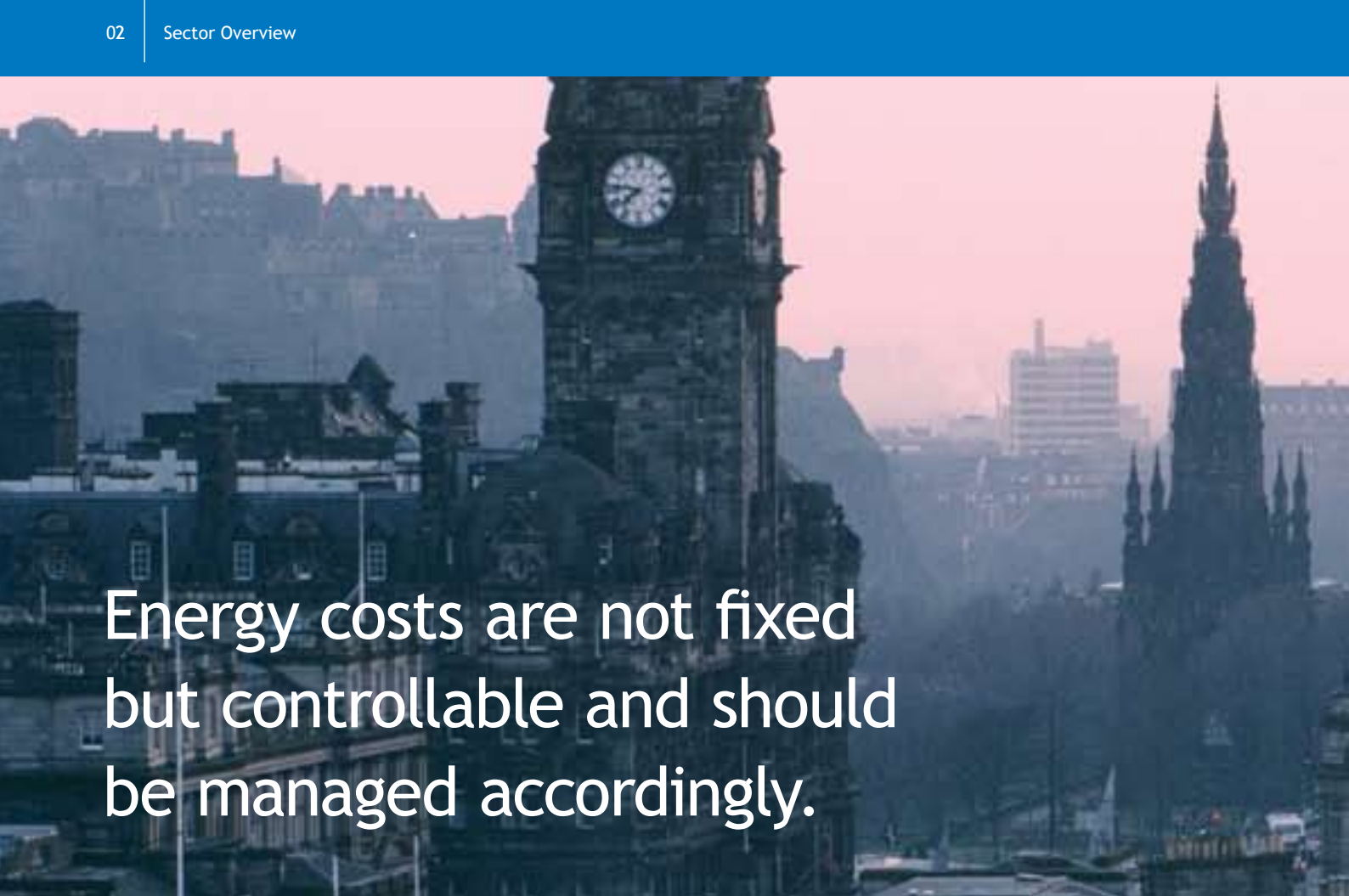
Contents

Introduction	02
Energy consumption in local authorities	04
Opportunities for energy saving	06
▶ Heating and hot water	06
▶ Lighting	10
▶ Ventilation and air conditioning	14
▶ Office equipment	16
▶ Building fabric	18
▶ Combined heat and power (CHP)	20
▶ Renewable energy and green technologies	22
▶ Catering	24
▶ People solutions	25
Purchasing and service contracts	27
Action checklist	29
Sources of help	30
Next steps	31

Reducing energy use makes perfect business sense; it saves money, enhances reputation and helps everyone in the fight against climate change.

The Carbon Trust provides simple, effective advice to help organisations take action to cut emissions. One of the simplest ways to do this is to use energy more efficiently.

This overview for local authorities introduces the main energy saving opportunities for the sector and demonstrates how simple actions save energy, cut costs and make the most of budgets.



Energy costs are not fixed but controllable and should be managed accordingly.

Introduction

Energy is one of the largest controllable overheads in many local authority buildings so there are many opportunities to make savings.

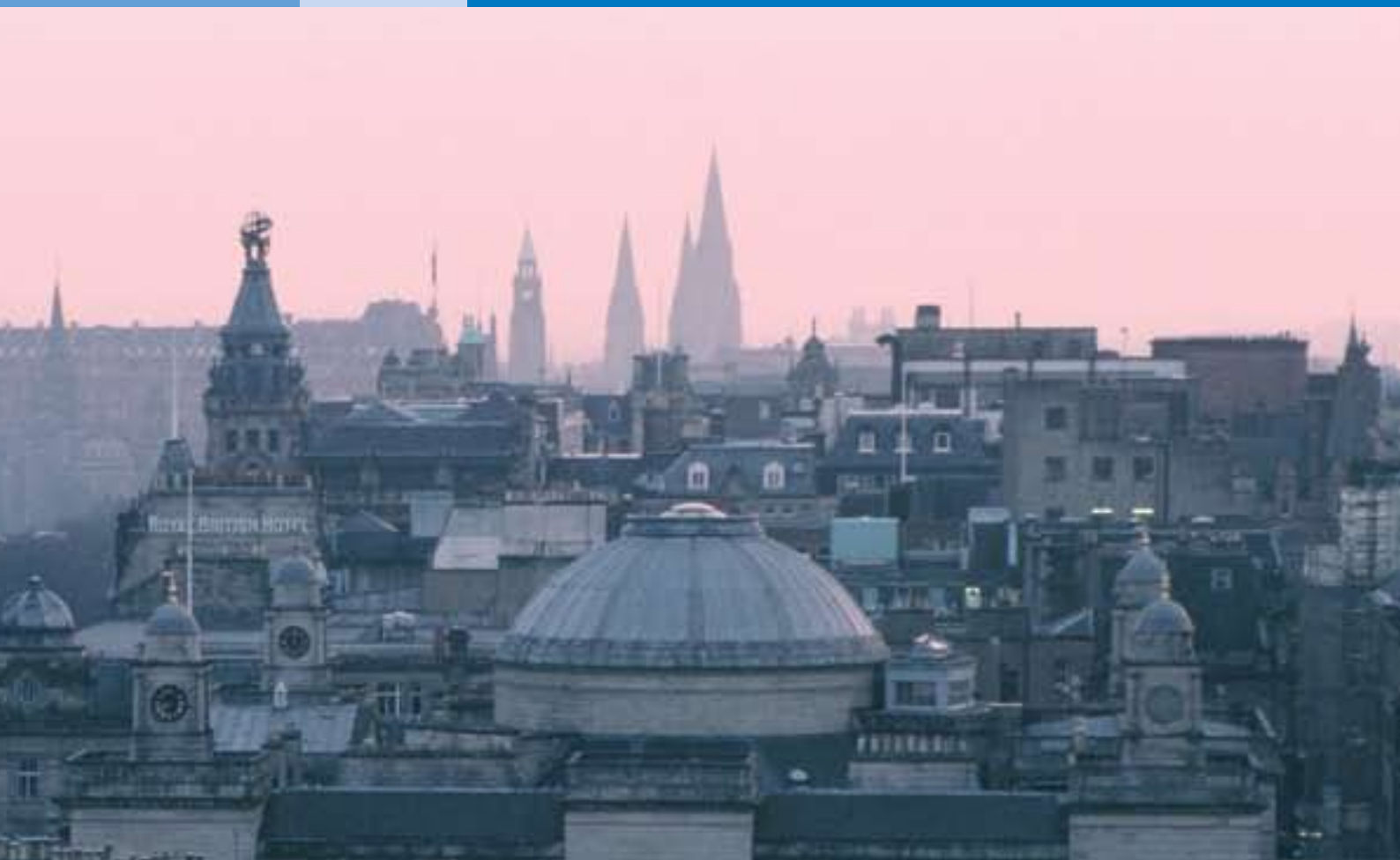
Reducing energy consumption not only saves money but improves working conditions which can increase staff productivity. Furthermore, the environment benefits from reductions in carbon emissions and energy use which can enhance organisational image and improve public relations.

The importance of local authorities

Local authorities have a huge sphere of influence and a duty to promote the social, economic and environmental well-being of their community. As permanent bodies that plan for the long term, they are uniquely placed to play a significant part in achieving the national goal of developing a low-carbon economy.

Some key areas that authorities influence, include:

- ▶ Housing, through the planning process, local housing strategies and social housing provision
- ▶ Their own and public buildings, including libraries, leisure centres and entertainment venues
- ▶ Transport, including traffic regulation, working with bus and rail companies to improve public transport and through the provision of cycle ways and footpaths
- ▶ Waste removal through street-cleaning, household waste collection, waste management and recycling
- ▶ Street-lighting and illuminated signage, the majority of which comes under the control of local authorities.



Who is this publication for?

The information in this publication is aimed at facilities managers, departmental energy managers and decision-makers working in local government. Focusing on low and no-cost measures and actions with the quickest payback, this overview demonstrates the best energy saving opportunities available in many local authority buildings, helping managers to:

- ▶ Appraise the overall performance of a local authority building
- ▶ Assess the potential for energy savings and indicate key areas for improvement
- ▶ Raise awareness of energy conservation amongst staff and motivate them to reduce waste
- ▶ Overcome organisational barriers such as capital investment and purchasing
- ▶ Measure energy and cost savings to demonstrate achievement and maintain impetus for further improvement.

Local authority portfolios include many types of building, each which use significant amounts of energy, including town halls, civic offices, residential care homes, sheltered accommodation, housing units for homeless people, museums, libraries, theatres, community centres, day centres, schools and sports facilities. Although this guide focuses on offices as a key area of waste, the advice given can help solve general issues faced by the managers of many kinds of local authority building. Readers are also referred to the following sector overview publications for specific guidance:

- ▶ *Heritage* (CTV026)
- ▶ *Office based companies* (CTV007)
- ▶ *Primary healthcare* (CTV025)
- ▶ *Schools* (CTV019)
- ▶ *Sports and leisure* (CTV006).

The Carbon Trust is currently running a Local Authorities Carbon Management (LACM) programme and an LA network. Further details can be found on page 30.

▶▶▶ For more information, contact the Carbon Trust (details can be found inside the back cover).

Energy consumption in local authorities

The energy consumption of local authorities is estimated to be at least 26 billion kWh per year. This results in annual CO₂ emissions of more than 6.9 mt and corresponds to energy expenditure in the order of £750 million per year.¹

Expenditure in local authorities amounts to 25% of all public expenditure and councils spend the largest proportion of this on education (41%) and social services (19%). Local authorities are significant users of energy and emitters of CO₂. Counties and Unitary councils can have energy bills in the range £7-10m, but this can be up to £20m for larger local authorities.

Local authority buildings offer a wide range of services and therefore require different kinds of premises. Buildings are vastly different in size, form and age; some are older, refurbished properties while others are purpose-built. Such features impact on energy use and more importantly, on opportunities for energy saving.

There are, however, some common areas of excessive energy consumption where savings can be made, in:

- ▶ Lighting
- ▶ Heating
- ▶ Ventilation
- ▶ Air conditioning
- ▶ Office equipment.

The following charts provide an indication of the main areas of energy consumption, subsequent costs and carbon emissions within local authority buildings.

Figure 1 Local authorities – percentage energy use

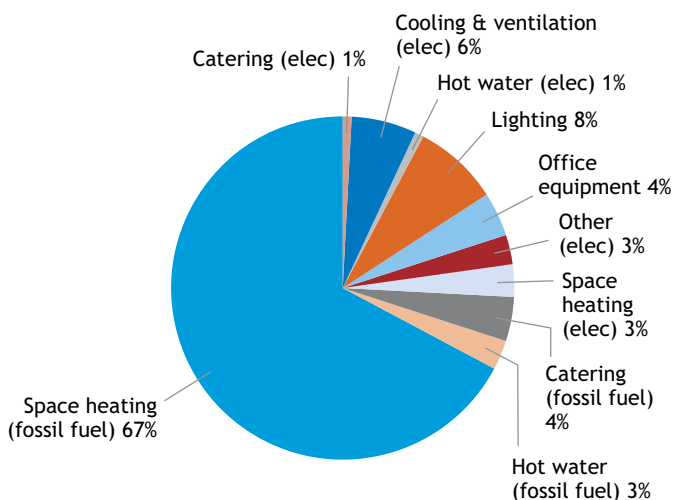


Figure 2 Local authorities – percentage cost

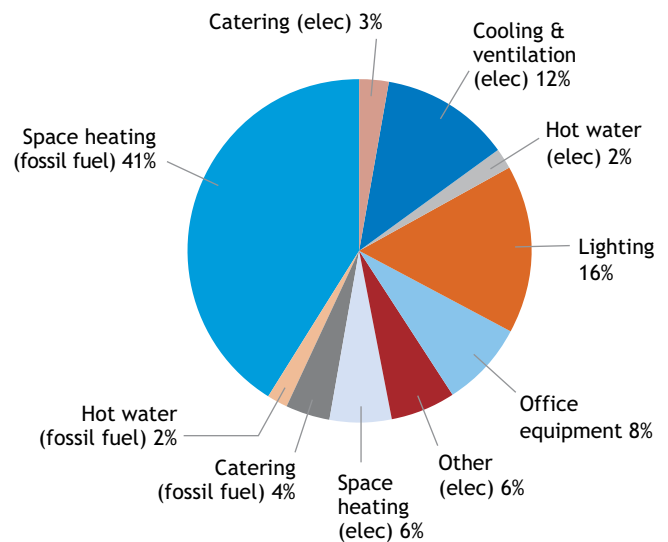
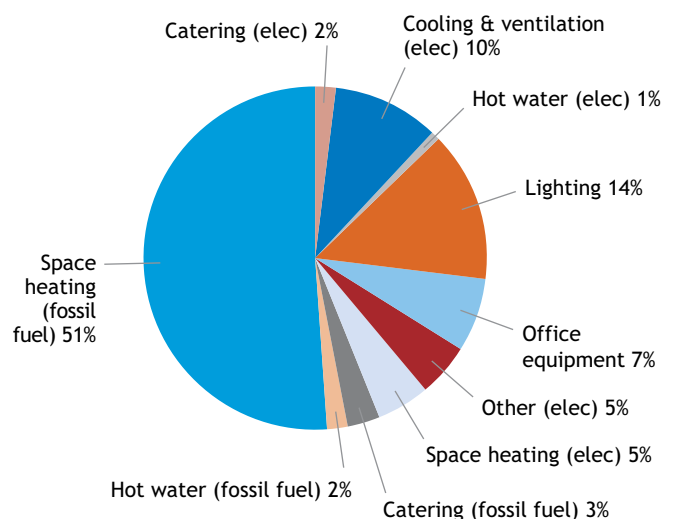


Figure 3 Local authorities – percentage carbon emissions



¹ Source: Office of Government Commerce

Proportions of energy use will vary according to the activity being carried out in a building, and whether it is occupied.

There are three main opportunities to save energy:

Switching off – all energy consuming equipment should be switched off when not required. This can be done by staff, by time switches or by adjusting building control systems and need not cost any money.

Maintenance – a number of energy efficiency measures can be carried out as part of routine maintenance procedures for no extra cost.

Refurbishment – investing in energy saving measures when planning major building refurbishment can be extremely cost effective.

The following pages introduce some generic energy saving tips and also provide some specific advice for the main types of local authority building listed above. There are a wide range of opportunities to look out for and each of these measures can be incorporated into an energy saving action plan. Remember – the more measures that are implemented, the more savings can be achieved.

Benchmarking for local authority buildings

Energy consumption benchmarks provide representative values for common building types against which a local authority building's actual performance can be compared. Comparisons with simple benchmarks of annual energy use per square metre of floor area (kWh/m²/annum) allow the standard of energy efficiency to be assessed and priority areas for action to be identified. Benchmarking can be a powerful motivator for taking action and is covered in more detail in *Energy use in local authority buildings* (ECG087) available from the Carbon Trust.

How can local authorities benefit from energy efficiency?

- ▶ Saving energy saves money, which can be used for other needs
- ▶ Saving energy demonstrates good overall management within an authority and promotes the importance of energy efficiency in the community
- ▶ Good energy management results in lower maintenance costs for buildings and associated services and equipment, as well as prolonged reliability and lifespan
- ▶ Saving energy results in less environmental pollution
- ▶ Saving energy helps to meet UK Government energy/CO₂ reduction targets
- ▶ Good energy management results in improved internal conditions for building occupants.

Opportunities for energy saving

► Heating and hot water

Some facilities managers have shaved up to a third off their building's heating costs through the implementation of some simple energy saving measures.

Heating accounts for a high proportion of the energy costs in a typical local authority building, especially in sites such as residential care homes which are often heated continually throughout the day, all year round. This means that there are big opportunities to make savings.

What are the appropriate internal temperatures?

Ensure that room thermostats and radiator controls are on the minimum settings required for comfort or environmental control. The recommended temperatures for most local authority buildings is between 19-21°C, although some may find this too cool, especially if the occupants are sedentary. Some areas may require significantly less heating, for example in laundries, where heat gains from machines mean that it is appropriate to set controls to 16-19°C, or in sports facilities, where people exercising will be more comfortable in lower temperatures.

For more details, refer to Guide B1 produced by the Chartered Institution of Building Services Engineers (CIBSE), www.cibse.org.

Opportunities for energy savings can be grouped in three main types of action:

- Staff habits
- Maintenance
- Controls.

More information about these topics can be found in the Carbon Trust's *Heating, ventilation and air conditioning* technology overview (CTV003).

top tip:

Discourage staff 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.

Staff habits

Keep the heat in

Avoid opening doors and windows when heating is in operation. Staff members and delivery personnel require easy access to buildings but open doors 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 and windows open only when absolutely necessary.

Get feedback and take action

Staff should be encouraged to report any areas that are too hot, cold or draughty. Investigating problem areas can highlight maintenance issues. If action is taken promptly, staff will be less likely to open windows whilst heating or cooling is on, or bring in portable electric heaters or fans to make their workspace more comfortable. They may also be more inclined to buy into an energy management programme if their concerns are being addressed.

Consider the season

Set internal temperatures in relation to outside conditions. During cold weather, for example, staff will be wearing warmer clothing so this should be factored in when setting heating controls. The same rationale can be applied when setting cooling controls in summer.

fact:

Reducing heating temperatures by just 1°C can cut fuel consumption by 8%.

Maintenance

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 pipework

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.

Pipe insulation



Timer control

Adjust timers so that the building reaches optimum temperature just as people arrive and that it 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.

Controls

Ensure controls match building occupancy

Check that the system operating hours match the times when heating, ventilation and cooling are required, as needs vary throughout the day. 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. Some more energy saving tips for controls are outlined below.

Offices – note what time most staff arrive and leave then adjust timers accordingly. Remember to turn off heating at weekends when the building is unoccupied.

Schools – adjust controls during holiday periods as leaving the heating or cooling on all summer is wasteful. Switch the services off, and ask caretakers to check them at the end of term.

Leisure facilities – if customers are exercising and the facilities are busy, less heat may be required. Peak times will vary, and are more likely to be in the early mornings and evenings.

Residential homes – for premises that require year round warmth, it is especially important to ensure controls are operating effectively. Also consider improving the building fabric to reduce the amount of heated air that escapes. Refer to the technology overview *Building fabric* (CTV014) for more information.

Eliminate poor control

Controlling temperature can sometimes be difficult. Some signs of poor control include:

- ▶ Heating being on when the building is unoccupied, because timers are not set correctly
- ▶ Heating being on too high or not high enough, because the thermostat is located where sunlight, radiators or office equipment affect the reading.

Often, simple adjustments to the location and/or the setting of controls can reduce costs without affecting staff comfort.

Consider weather compensation and optimum start controls

Heating systems can adjust themselves in line with the changeable UK weather. 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 can pay back their investment in just a couple of years. Consult a qualified heating technician to discuss the range of options available.

More information about these and other types of control can be found in the Carbon Trust *Heating control* technology guide (CTG002).

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 so they are well worth considering.

CASE STUDY

»»» What are other local authorities doing? – Woking Borough Council

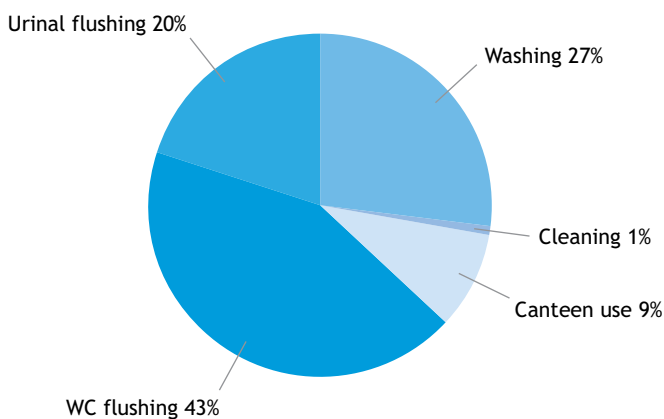
Woking Borough Council has installed double glazing, cavity wall and loft insulation and thermostatic controls in sheltered accommodation in the town centre. A programmer operated from the Council's central weather station ensures that each flat is kept at a minimum comfort temperature to ensure comfort for building occupants as well as providing maximum cost savings.

Hot water

Any areas within local authority buildings that have running water could hold significant energy and cost savings. In fact, it is possible to save up to 50% on water costs.

Provision of hot water is essential for many local authority buildings, but it can lead to considerable energy costs. As water is a metered and controllable resource, it is possible to save both water and energy costs by implementing some inexpensive efficiency measures.

Figure 7 Typical use of water in offices



Local authority buildings vary significantly, hence their water-usage profiles will be different. This graph shows the main areas to consider generally when planning a water reduction campaign as part of energy saving. Approximately 90% of this water usage can be decreased by using water-saving devices.

facts:

- Readings taken when water is not in use can show up smaller leaks early. Water and sewage charges account for approximately 15% of running costs for most buildings and leaks will drastically increase the bill. **Each cubic metre of water saved will reduce costs by around £1.**
- Achieve lower water temperatures by mixing cold water at the point of use and not by reducing the stored water temperature. Water should be stored at 60°C to prevent the occurrence of Legionella.

Maintenance tips

Maintain water services including taps, storage facilities and pipework on a regular basis and ensure all drips are fixed immediately. Check for water vapour, flooded ducts and corrosion around joints or fittings on pipework. If the leak is underground, it may be harder to spot so read water meters regularly.

Encourage staff to report any issues such as dripping taps, overflowing cisterns and inefficient water saving/flushing devices in toilets so they can be repaired before the problem escalates. Where spray taps are not installed, all hand basins should have plugs and chains. Hot drinks machines and boilers should be switched off at night and weekends. Check who is responsible or use a time switch.

Check hot water temperature

If water is too hot to keep hands under the tap, ask your maintenance technician to reduce the temperature. Accepted standards are: 50°C (120°F) or less for hand-washing and 55°C (130°F) for washing utensils. Every 1°C reduction in water temperature will reduce energy consumption by 1-3%.

Insulate to accumulate

Boilers, hot water tanks, pipes and valves should be insulated to prevent heat escaping. Payback can usually be expected within a few months of installation with continued savings in subsequent years. See the section on maintaining heating systems on page 7 for further information.

Supply efficiently

It is inefficient to supply isolated and infrequently used hot water taps from a central hot water storage tank because of heat loss from the long pipe runs. Consider installing a point-of-use water heater in such cases.

▶ Lighting

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

'Switch off' policy

Lights in local authority buildings frequently remain on longer than necessary, particularly in buildings with varied occupancy patterns. One way around this is to appoint a person, or group of people to ensure they are switched off. Staff at all levels should be involved in making savings – this can be achieved by conducting regular meetings, placing stickers above light switches and posters around the building (available from the Carbon Trust).

Train cleaning staff to turn off unnecessary lights, particularly as they may be the last people to leave a building. Consider adding a note on energy saving as part of their contract to ensure everyone is committed to reducing consumption.

Avoid blinds down and lights on

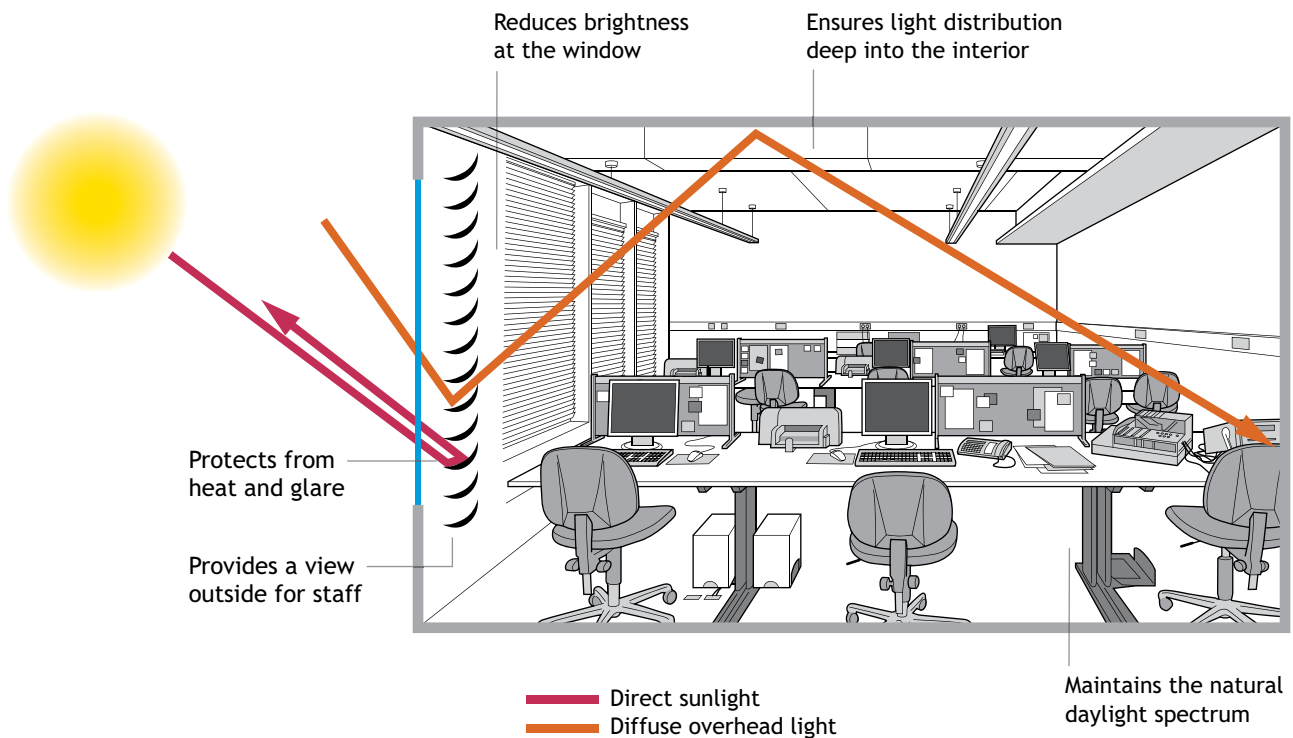
A familiar scene in many local authority buildings is the use of blinds to control glare when it is bright outside. Inappropriate usage of blinds can result in occupants turning on internal lights unnecessarily, resulting in energy waste.

Encourage staff to use blinds to direct daylight onto the ceiling and walls instead which should reduce solar heat gains along with the need for electric lighting in the area. Once the sun moves away, turn the lights off and open the blinds.

fact:

Lighting a typical empty building overnight wastes enough energy to heat water for 1,000 cups of coffee.

Figure 4 The benefits of daylight blinds



Label light switches

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

Maintenance

Lighting is essential for providing a pleasant and productive working environment so it is important to keep windows, skylights and light fittings clean. Encourage staff to report failing lamps and replace them promptly. This will help maintain the desired light output and, in turn, provide a safer working environment. Keep controls in good working order by ensuring timers are set to match occupancy hours and that occupancy sensors are clean.

Install low-energy lighting

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

Replace blackened, flickering, dim or failed 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.

➤ **MYTH** – It is better to leave fluorescent lights on as starting them up wastes more energy than if they remain permanently switched on.

REALITY – 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.

top tip:

Always make the most of natural daylight. Most people prefer this compared with artificial lighting and it can have a positive effect on morale and wellbeing. This could be particularly pertinent in residential care homes, shelters and schools. Exercise caution in museums, however, as excessive sunlight could damage some displays.

Occupancy sensors

Installing occupancy sensors in areas where staff occasionally work late or where there is irregular usage, could reduce energy bills. These will help to ensure that 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.

They are not appropriate for areas where people may not be moving frequently enough for the sensors to keep the lights on, such as in offices.

Sensor



Switching in parallel


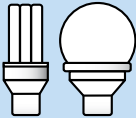
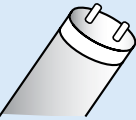
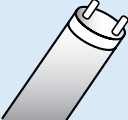

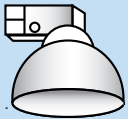
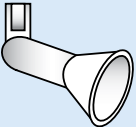

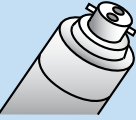
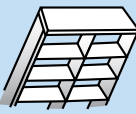
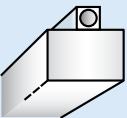
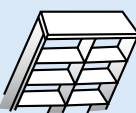
Consider wiring light switches to control lights that are parallel to windows. This enables occupants to make the most of natural daylight without leaving those spaces further away from the windows in shadow. As a result, less lighting is used which reduces energy consumption and also cuts down on additional heat generated by the lights which means that less cooling is required.

Building services

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, and also, how they work and interact with each other. Taking an holistic approach to all the building services will ensure consistency in the management of a property portfolio.

To be effective, controls need to be user friendly and accessible for building occupants. Building control systems, coupled with a building management policy have a major influence on the energy performance of individual structures and buildings across the whole estate.

Table 1 Energy efficient lighting options

Existing lamp type	Uses	Energy efficient option	Energy saving/benefits	Application notes
 <p>Tungsten light bulbs</p>	General lighting and task lighting. Also commonly used in domestic applications	 <p>Replace with compact fluorescent lamps (CFLs) in the same fitting</p>	75% saving plus longer lamp life	General lighting – attractive modern CFL replacements may also be acceptable for display and feature lighting
 <p>38mm (T12) fluorescent tubes in switch-start fittings</p>	General lighting commonly used in civic buildings, care homes, community centres and libraries	 <p>Replace with equivalent 26mm (T8) triphosphor fluorescent tubes of lower wattage</p>	8% saving plus longer lamp life	General lighting throughout local authority buildings, but even better used with modern fittings (see below)
 <p>High-wattage filament lamps or tungsten halogen lamps as used in floodlights</p>	Commonly used to light external areas, ornamental features and building facades	 <p>Replace with metal halide or high wattage compact fluorescent lighting</p>	65-75% saving plus longer lamp life	Flood lighting, external lighting and some general lighting situations
 <p>Mains voltage reflector lamps, filament spot and flood types</p>	Commonly used for spot lighting and display lighting in areas that require bright light and good colour rendering. Commonly found in reception areas, public areas and also widely used in museums	 <p>Replace with low-voltage tungsten halogen lighting or metal halide discharge lighting</p>	30-80% saving for equivalent lighting performance	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>Fluorescent fittings with the old 2ft 40W, and 8ft 125W fluorescent lamps</p>	General lighting, commonly used in civic buildings, care homes, community centres and libraries	 <p>Replace with efficient fittings using reflectors/louvers or efficient prismatic controllers with high-frequency electronic or low-loss control gear</p>	30-45% saving with much improved lighting quality. The use of high frequency electronic control gear eliminates flicker, hum and stroboscopic effect	Reduction in flicker and hum can remove distractions
 <p>Fluorescent fittings with opal diffusers or prismatic controllers which are permanently discoloured</p>	General lighting, commonly found in older buildings requiring refurbishment such as civic offices, town halls, libraries, community and other centres	 <p>Replace with new prismatic controllers or replace complete fittings as above</p>	No reduction in energy consumption but increases the amount of light by between 30% and 60%	General lighting levels can be improved leading to a more attractive environment

Public lighting

The provision and maintenance of public lighting is the responsibility of the larger local Highways authorities, and of the Highways Agency. Public lighting can be a significant area of energy spend and it is usually the responsibility of a specialist manager or department.

Key areas that a specialist should address include:

- ▶ The selection of more energy-efficient lamps and equipment, reducing the energy used, whilst keeping the light output at an appropriate level
- ▶ Consideration of the hours public lighting is in operation. As lights may take less time to warm up, there could be an opportunity to revise the start times
- ▶ Installation of photocells to illuminated road signs when they need replacement.

Street lighting can be a significant cost for local authorities



Before any action is taken, detailed study is required to calculate the actual potential for energy savings and the barriers of implementation.

Relevant guidelines available from the British Standards include:

- ▶ BS EN 13201-2:2003 *Road Lighting – Part 2: Performance requirements*
- ▶ BS 5489-1:2003 *Code of practice for the design of road lighting – Part 1: Lighting of roads and public amenity areas*
- ▶ BS 5489-2:2003 *Code of practice for the design of road lighting – Part 2: Lighting of tunnels and underpasses.*

facts:

- Without regular maintenance, light levels can fall by 30% in 2-3 years. Establishing a basic lighting maintenance programme can reduce costs by up to 15% as well as improving internal ambience and appearance.
- Specify high-frequency fittings with mirror reflectors to help 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 by plastic diffusers.

► Ventilation and air conditioning

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

Mechanical ventilation is increasingly specified for new local authority buildings, or retrofitted to older buildings during refurbishment. This is predominantly to counteract the increase in heat-gains from lighting, staff and office equipment. The more heat that is generated, the harder the ventilation and cooling systems have to work to maintain the desired temperature, which in turn consumes more energy.

It takes energy to heat and cool the air inside a building. If that air escapes through inefficient ventilation systems or through opened windows or 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.

Is air conditioning really necessary?

Full air conditioning, as opposed to comfort cooling, is not often required in most UK buildings and should only be considered when careful control of humidity is required, for example in leisure centres with swimming pools, or where temperature fluctuations are potentially damaging, such as in computer server rooms. Cheaper cooling options are available and should be investigated before the decision to install full air conditioning is made. For more information about alternatives to air conditioning, order the Carbon Trust's technology guide to *Air conditioning* (CTG005).

REMEMBER

Effective ventilation is essential for the comfort and safety of occupants, and is in some cases subject to legislation. Always seek professional advice when planning changes to ventilation systems.

Naturally cool for free

As simple as it sounds, natural ventilation and cooling relies on 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 local authority buildings it may be 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.

Night cooling

Use the lower external temperatures at night to cool the building ready for the following day, thus delaying the switching on of air conditioning. This is known as 'night cooling'. This technique can be especially useful in offices that rely heavily on air conditioning, or alternatively in older buildings, such as Victorian-era civic buildings, provided the security of the opening vents or windows has been fully considered.

► **MYTH** – Leaving air conditioning on overnight reduces energy costs as the system stays at the required temperature.

REALITY – The result is a much higher energy consumption than necessary. An office building only needs a fraction of overnight energy to reach adequate temperatures for the start of the day.

REMEDY – Air conditioning may not be needed at all at this time if 'night cooling' is used.

Maintain system components

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. Review the performance of the whole system annually and replace parts as necessary. Always consult a maintenance technician.

Set a dead band

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. In an office environment, for example, the heating should switch off when a temperature of 19°C has been reached and cooling should not come on until the temperature exceeds 24°C. (See Figure 5 below.)

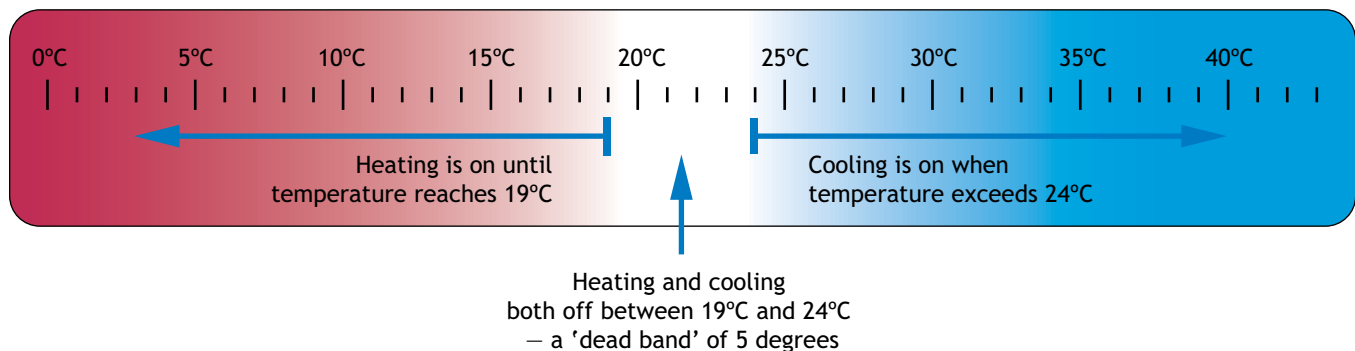
Consider fitting variable speed drives (VSDs)

Local authority buildings incorporating ventilation systems may not need fans operating at full speed all of the time. VSDs can help to reduce costs by enabling the output speed of the fans to match requirements at different times of the day. This reduction in speed saves energy and there are corresponding heating and cooling cost savings too. More information can be found in the Carbon Trust's *Motors and drives* (CTV016) guide.

Recover heat from exhaust air

It costs money to heat the air in a building and it may be possible to reclaim some of that energy. The simplest way to recover heat from exhaust air is to simply recirculate a proportion of the exhaust air along with fresh air. More advanced solutions are available which allow the heat from exhaust air to be used to pre-treat fresh incoming air. This is a worthwhile technology, particularly for larger local authority buildings.

Figure 5 'Dead band' control providing recommended temperatures

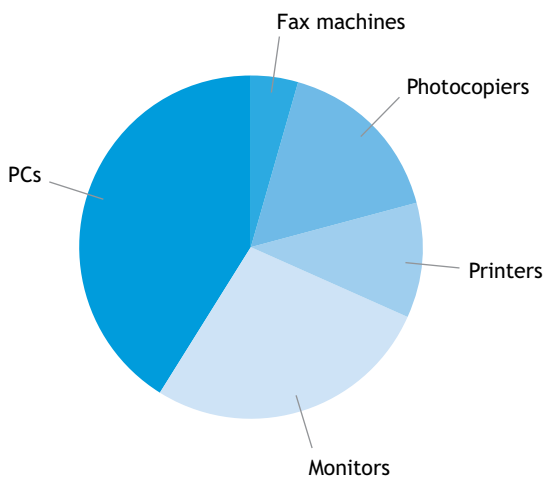


▶ Office equipment

The growth of ICT equipment within local authorities accounts for a significant proportion of electricity bills. Although office and service buildings will be the biggest candidates for energy saving, the presence of computers in most types of institution means that there are big opportunities to make savings in all departments.

The chart below shows the proportion of total energy used by facilities in a typical office environment. As equipment is often left on when not being used, significant savings are achievable.

Figure 6 Energy use of business equipment in the typical office



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 reduced.

Match equipment to the task

Using the most appropriate equipment can make a difference. For example, 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 disabling the standby feature, thereby missing out on savings.

Minimise cooling loads

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.

Maintain equipment for optimum performance

Check and clean office equipment regularly. Keep parts clean and free of dust and blockages and follow manufacturers' advice on servicing schedules in order to maintain optimum efficiency.

Raise awareness

Ensure all staff members are aware of switch-off policies and inform them of the cost and environmental benefits of putting this into practice. The Carbon Trust has materials and publications that can help, such as *Creating an awareness campaign* (CTG001), which includes posters and stickers, while *How to operate your office equipment efficiently* (CTL005) contains practical tips for staff. Some local authorities have been especially innovative in awareness-raising – see the case study opposite.

facts:

– Office equipment is one of the fastest growing energy users in the business world, with electricity representing 15% of total energy consumption in office buildings. This figure is expected to double by 2020.

– A single computer and monitor left on 24 hours a day will cost around £45 a year. Switching them off out of hours and enabling standby features could reduce this to less than £10 a year and prolong the lifespan of equipment.

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 check with the supplier first about service agreements.

Purchase for your requirements

Choose equipment that caters for current business needs and predicted requirements only. Do not over specify – high-spec PCs with large screens and fast processors use more energy. Always take running costs into account.

Ensure that all new equipment has energy saving features meeting at least ENERGY STAR performance specifications. Check the purchasing guidelines regularly, and update them if necessary.

When computers need to be replaced, look for newer, more energy-efficient varieties before purchasing new machines. Flat screen (LCD) monitors can reduce monitor energy use by over two thirds. There are also obvious space advantages.

See the Carbon Trust *Office equipment* technology overview (CTV005) for further information or visit www.eu-energystar.org to find out more.

top tip:

Consider using laptops as 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.

Note: Although laptops are a convenient and efficient alternative for mobile or intermittent working, there are health and safety issues related to prolonged usage, such as cramped hands and posture.

CASE STUDY

What are other local authorities doing? – Kent County Council



Image courtesy of Kent County Council

Kent County Council ran a 'switch off' campaign encouraging staff to turn off their electrical equipment when not in use. They left fairtrade sweets for those that had turned off monitors and computers. This generated a lot of interest, especially from those who did not get a sweet. When they re-ran the programme six months later, they had a far better response with 98% of computers and 86% of monitors being turned off.

▶ Building fabric

With buildings ranging from retrofitted offices to purpose-built care homes, the local authority estate is as diverse as the savings opportunities available.

Regardless of the age or purpose of the building, most managers find room for energy efficiency improvements in the building material itself. In fact, around two thirds of heat lost from government buildings escapes through the building fabric (walls, floors and ceilings). It therefore makes sense to improve the fabric prior to investing in improving or replacing any existing heating, cooling or ventilation systems.

Some general guidance applicable to the wide range of local authorities buildings is outlined below, but remember, it is always worth seeking specialist advice for individual buildings.

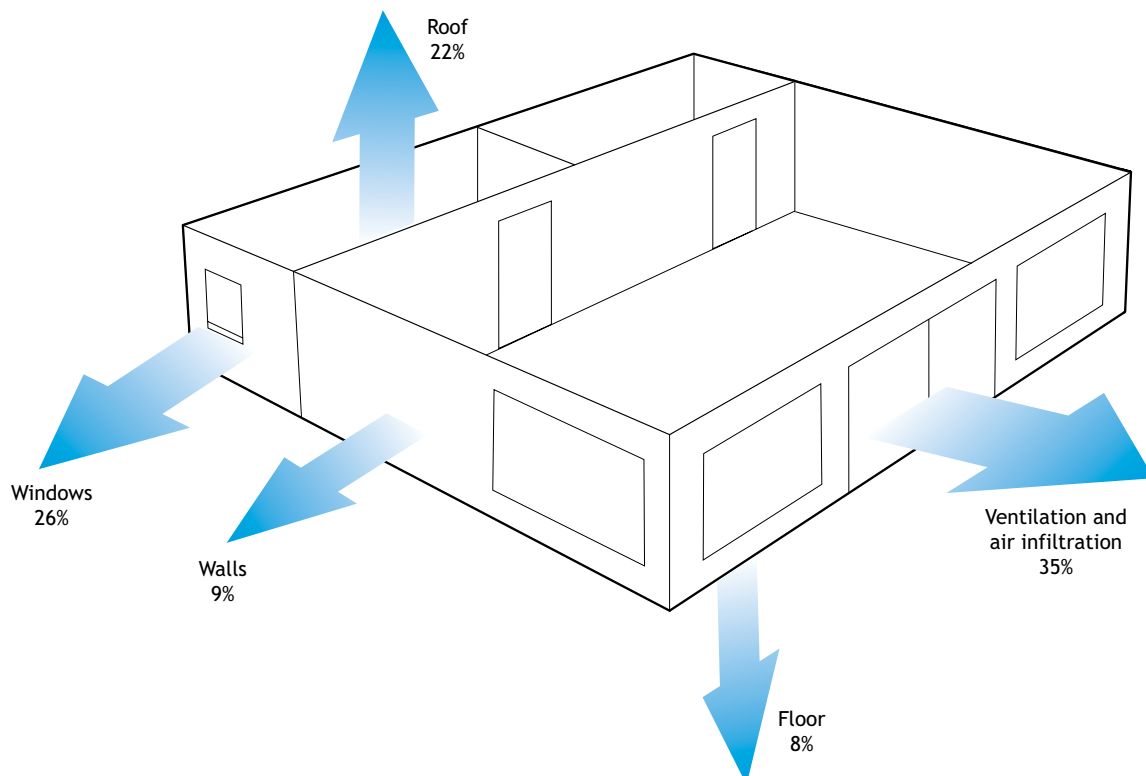
Improving building fabric makes good sense for many reasons:

- ▶ 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 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.

Some local authority managers 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 being sensitive to the original aesthetics and integrity of the structure.

Figure 7 Typical heat loss from a building



Establish a housekeeping schedule

Compile a checklist to address areas where energy is lost via the building structure. A comprehensive schedule should include regularly checking roofs, walls, window panes and frames, skylights and doors. The larger a building, the more beneficial it would be to appoint a staff member to carry this out. Ask staff to report any problems and ensure these are promptly dealt with.

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 buildings. Fit horizontal blinds or external shading to windows to direct light away from workstations and onto ceilings and walls. This will allow more daylight into the space, whilst minimising heat and glare from sunlight.

Undertake regular maintenance and avoid expensive problems later on.

fact:

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

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 (infrared) can be particularly effective at reducing overheating from direct sunlight.

Highly glazed spaces are a particularly common feature of 1960s buildings, many of which are part of the local authority portfolio. 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 the heat-gain and glare associated with a large area of windows.

Insulate to accumulate

Up to a quarter of a building's heat can escape via an uninsulated 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.

Loft and pipework insulation



► Combined heat and power (CHP)

CHP can offer an economical method of providing heat and power which is less environmentally harmful than conventional methods.

Combined heat and power (CHP) is the simultaneous generation of heat and power in a single process. CHP equipment usually burns fossil fuel such as natural gas or diesel oil to generate electricity onsite.

At a power station, the heat generated when electricity is produced has to be dissipated via cooling towers. With CHP, the heat is recovered onsite, and used for space heating, domestic hot water, or heating swimming pools. This means that overall, the process is more efficient, so less fuel is used.

With year-round requirements for electricity and hot water, some local authority sites are well suited to using CHP. Residential care homes and sports facilities with heated swimming pools would be good candidates.

However, not all sites are suitable for CHP, nor will they have a good pay back. Make sure that the site is investigated properly, including a complete financial and technical appraisal from an expert. Consultancy support is available from the Carbon Trust to help evaluate the feasibility of CHP.

fact:

In an appropriate application, CHP can reduce energy bills by around 20-30%, provided the unit is designed to meet the building's seasonal demands for electricity and heating. The fuel input of 'good quality CHP' is exempt from the climate change levy (CCL). Contact the Carbon Trust for more information.

Information for sites without CHP installed

When to consider CHP installation

The best time to consider CHP in existing buildings is when the heating plant is being replaced, so that the CHP unit can be integrated with the heating system.

Understand existing heat and electricity loads

When considering CHP, it is important to carefully assess its application and feasibility. Space requirements should be considered, along with a detailed evaluation of the system's engineering, economics, reliability and operation. To justify the cost of investment, the aim should be to maximise the use of all the heat and hot water that the system can produce. Every building is different and therefore a detailed cost calculation is essential. This assessment should be made only after other, more simple energy efficiency measures outlined in this guide have been implemented.

Investigate funding opportunities

If budgets cannot stretch to investing in CHP, explore options for third party funding. Energy services and contract energy management options absorb the initial cost and risks associated with installation, maintenance and operation of a CHP unit. Charging arrangements vary but under certain contracts it is possible to only pay for fuel used by the CHP unit and receive the heat for free, as well as paying a reduced price for electricity.

Information for sites with CHP installed

Maintenance issues

CHP systems require regular maintenance to ensure efficient operation and reduce risk of breakdown. Major maintenance should be carried out as part of a planned shutdown. When deciding on the timing and duration of a shutdown, always consider cost implications such as for labour and materials required to carry out the planned work as well as additional costs of meeting the site's heat and power requirements from other sources. For smaller installations, shutdowns are normally undertaken by the CHP supplier who also maintains the unit.

Monitor to ensure performance is as designed

A CHP system should be monitored to ensure it is operating correctly. Look out for factors that affect performance such as changes in output and fuel consumption, air temperature and pressure in gas turbine installations. It is also important to monitor the rate that system performance changes as this provides a basis for planning maintenance tasks and plant overhauls. Always explore why performance is failing to meet the specification as this could indicate maintenance requirements. It will also be reducing the cost effectiveness of the system.

CCL Exemption

Exemption from the CCL for 'Good Quality' CHP is based on certificates issued by the Government CHPQA programme. Good quality CHP is CHP which meets the threshold criteria in the Combined Heat and Power Quality Assurance (CHPQA) programme standard. The standard is intended to ensure that the energy efficiency and environmental performance of a CHP scheme are superior to the generation of the same amounts of heat and power by separate conventional means. For more information, and for details of the monitoring requirements for the CHPQA programme, visit www.chpqa.com.

Meet CHPQA requirements and avoid paying the Climate Change Levy (CCL)

Monitoring data collected can be used to demonstrate compliance with the necessary quality standards for exemption from the CCL. Metering installed for CCL registration must be able to differentiate between heat used by the site and heat rejected to atmosphere via a cooling system so ensure meters are positioned correctly to achieve this. See the box below left.

Community heating

The potential for community heating with CHP and renewable energy is significant, both in existing and new buildings. Community heating is defined as 'where a number of buildings or dwellings are heated from a central source'. A community heating scheme provides heat from a central source to more than one building or dwelling via a network of heat mains. Heat can be supplied to the scheme from conventional boilers, renewable-fired boilers, or can utilise the waste heat from power generation (CHP). A community heating scheme may also provide the facility of cooling (or chilled water) for air conditioning via an absorption chilling plant.

Local authorities and other public authority departments have the opportunity, through the planning system, to request that developers consider community heating as part of the planning and design of their construction projects.

fact:

CHP can have financial, environmental and strategic benefits. A well-designed and operated CHP plant can reduce carbon dioxide emissions. However, CHP schemes represent a significant long-term investment and so the economics need to be studied carefully before a decision is made.

▶ Renewable energy and green technologies

Energy generated from renewable sources can be a viable alternative to conventional methods of supplying electrical power and heat to some local authority buildings.

What is renewable energy?

Conventional fuels such as oil, gas or coal are extracted from finite reserves, whereas renewable energy sources:

- ▶ Come from a source that can be readily replaced, such as wood or another organic material
- ▶ Are a natural flow of energy that will not run out for millions of years, such as sunlight and the movement of the wind and sea
- ▶ Add very little or no 'new' carbon dioxide to the atmosphere, for example, wind or solar power generate no emissions at all and the CO₂ from burning sustainably managed wood fuel is 'neutral' because it is balanced by the amount that the tree removed from the atmosphere as it grew.

As well as reducing greenhouse gas emissions, there are other good reasons for using renewable energy technologies:

- ▶ The growth of renewable energy increases diversity in the UK's energy supply and increases the lifetime of fossil fuel reserves
- ▶ Renewables help to 'future-proof' energy supplies because they are not subject to the price fluctuations of globally traded commodities such as oil and gas
- ▶ A growing renewables sector creates jobs in manufacturing, installation, operations and maintenance and in the case of biomass energy, a local fuel supply.

The type and age of a building, as well as any additional land requirements need to be considered before incorporating renewable energy solutions. Many technologies function best when integrated in new buildings from the design stage; however, there are others which can be retrofitted on existing property.

Supplying energy for local authority buildings – the options

Since the main objective is to minimise the amount of energy needed to run building services, careful design of new buildings or refurbishments should take full advantage of 'passive' measures such as:

Passive (solar) heating

Heat from the sun directly warms the building fabric and reaches the interior surfaces through windows. A good design will trap useful heat in the building (particularly in winter) and minimise summertime overheating whilst reducing or eliminating the need for mechanical ('active') heating or cooling. A good design will also make effective use of the heat generated by the building's occupants and electrical equipment.

Passive ventilation

A carefully planned design can take advantage of the natural buoyancy of warm indoor air plus air movement outside to maintain a comfortable flow of air through a building without the need for fans or air conditioning.

Natural daylighting

Another application for passive solar energy would use a well-planned natural daylighting strategy that incorporates moveable shades to minimise glare, reflective blinds to throw light further into a building or even reflective 'light pipes' to supply daylight where previously electric lights would have been used. Straightforward use of sunlight coming through windows can be improved by giving careful consideration to the direction in which windows face. Interior finishes in pale colours and paint textures help by allowing diffusion of the reflected light. In bright sunlight, shading and control of glare are important for comfortable working conditions.

Example of a 'light pipe' replacing a fluorescent tube



The next step is to consider using a renewable source to supply electricity or thermal energy. Options include:

- ▶ **Photovoltaics (PV)**, particularly on the roofs of public buildings; useful in remote locations and as a stand-alone power supply
- ▶ **Small wind turbines** where enough suitable land is available to make viable. Wind projects could be a result of combined public/private ownership and service supply agreements
- ▶ **Solar thermal systems** to heat hot water and augment space heating
- ▶ **Heat pumps** for space heating
- ▶ **Biomass heating**, perhaps coupled with combined heat and power (CHP) plant and possibly as part of a community heating system
- ▶ **Small-scale hydro** installations at suitable coastal sites.

The following table indicates the type of renewable energy that would be worth considering for a variety of applications.

CASE STUDY

What are other local authorities doing? – Milton Keynes Council

Following extensive consultation on the Local Authorities Carbon Management (LACM) programme, Milton Keynes Council are investigating the use of renewable energy, for example biomass boilers, biodiesel fuel and more efficient bulbs for street-lighting. The council realises that cutting-edge technology has a central role to play in helping it to become more 'green'.

Table 2 Selecting a renewable energy source: by building and project type

Technology	Wind	PV	Solar hot water	Biomass	Heat pumps	Hydro	Energy	Wave/tidal from waste
Office estate								
Existing buildings		✓	✓✓	✓			✓	
Refurbishment		✓✓	✓✓	✓✓	✓✓		✓	
New build		✓✓	✓✓	✓✓	✓✓✓		✓	
Adjacent land	✓✓					✓		
Accommodation								
Existing buildings		✓	✓✓✓	✓	✓			
Refurbishment		✓✓	✓✓✓	✓✓	✓✓		✓	
New build		✓✓	✓✓✓	✓✓	✓✓✓		✓	
Adjacent land	✓✓		✓	✓ (supply)	✓	✓		
Larger estates with land resource								
General	✓		✓	✓	✓		✓	
Remote locations	✓✓	✓	✓	✓				
Site specific	✓			✓		✓✓		✓✓

- ▶▶▶ For more information on these technologies, see *Renewable energy sources* (CTV010) and other relevant publications available from the Carbon Trust (details inside the back cover).

► Catering

Catering can be a major area of energy consumption, particularly in sheltered housing, residential care homes and schools. However, energy use can almost always be reduced – without compromising hygiene, safety or quality standards.

Preparing food onsite has a significant effect on energy consumption so it is important to implement as many efficiency measures as possible. In fact, these can often have the additional benefit of improving the quality of the food produced as well as the working environment for kitchen staff.

Raise awareness amongst kitchen staff

Every member of staff should be involved in reducing energy consumption, so raising awareness and providing training is an excellent starting point. The following simple, quick-wins can have substantial paybacks:

- ▶ Do not switch on too soon – most modern catering equipment reaches optimum temperature quickly. Label equipment with its preheat time and educate staff to switch on only when required
- ▶ Avoid using kitchen equipment to warm the space on staff arrival – the building's heating system should do this effectively. If it does not, find out why
- ▶ Switch off grills, fryers and hobs immediately after use
- ▶ Avoid overfilling saucepans and kettles and use lids where possible
- ▶ Keep fridge and freezer doors closed and defrost at manufacturers' recommended intervals to save energy and prolong equipment lifetime
- ▶ Switch off equipment, lights and extraction fans when they are not being used
- ▶ Move storage fridges and freezers out of kitchen areas into well-ventilated, uncooled spaces.

Purchase equipment with running costs in mind

Although gas-fired equipment is often more expensive to buy than electrical or steam equivalents, savings made on running costs make them an attractive option. Equipment that automatically switches off, such as pan sensors on hobs, can save 25% on energy costs. Select ovens with large double-glazed viewing windows to reduce the need to open doors to inspect contents.

Sub-metering

Sub-meters will help identify cost savings and justify any investments required in order to lower running costs in catering departments. If catering is provided by a separate contractor, there is also the additional benefit of allowing for budget allocation and charging to take place. This acts as an incentive for kitchen managers to reduce energy costs by providing some financial reward for doing so.

Consider heat recovery

Large volumes of warm air are expelled from kitchens. Over 50% of this heat can be re-used using heat recovery devices. An air-to-water recovery device is often the most effective method of recovering heat because it can then preheat hot water, a necessary year-round resource.

top tip:

If items are centrally purchased, ensure the facilities team incorporates environmental awareness in its policies and that energy saving equipment is specified across the whole site.

▶ People solutions

Savings are easily achievable in all local authority departments 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.

Remind everyone that good energy management helps to achieve:

- ▶ Environmental benefits
- ▶ Healthier and more productive working conditions
- ▶ Cost savings
- ▶ An enhanced corporate image 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, which are described below.

Responsibility and commitment

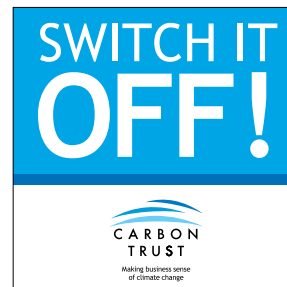
To effectively implement a change in practice, senior management through to front-line staff must be committed to energy efficiency. This should be backed up by a personalised mission statement and energy policy. It is also important to appoint an 'energy champion'. In very small organisations, this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

Involve staff

All staff 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.

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

Figure 8 Examples of free posters and stickers available from the Carbon Trust



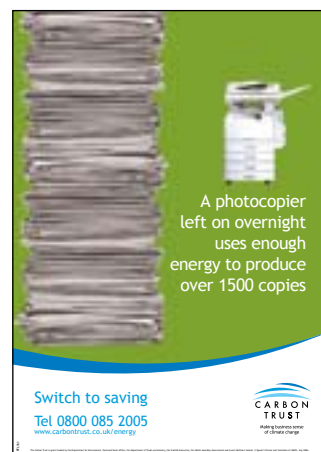
PFL170



PFL170



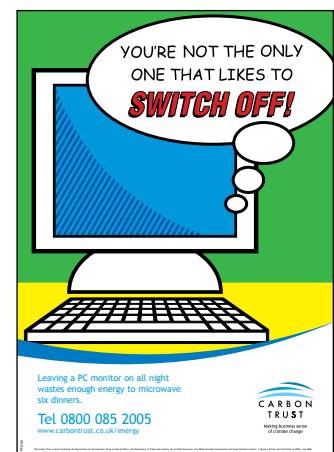
PFL160



PFL161



PFL162



PFL168

Undertake regular housekeeping walk rounds

Note down and act on any maintenance measures needed in order to avoid expensive problems later on. As patterns of energy use vary throughout the day, it is advisable to carry out a series of walk rounds at different times to get a better idea of where and when energy is being wasted. 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 raise awareness of the importance of reducing energy consumption
- ▶ Demonstrate commitment to improving performance.

A sample check list and tips on conducting an inspection of your site is available in *Assessing the energy use in your building* (CTL003), from the Carbon Trust.

Monitor energy use

Understand energy consumption by reviewing energy invoices over the last year to build a picture of monthly performance. Larger local authority buildings generally have meters recording half-hourly electricity consumption and this data should be available from the energy supplier for comparison with your bills. However, if the building does not have a half-hourly electricity meter, check and record monthly meter readings yourself. It is also advisable to check and record monthly gas consumption in the same way. Find out more by ordering the *Metering* technology overview (CTV027) from the Carbon Trust.

What are other local authorities doing? – Islington Council



Through the Carbon Trust's Local Authority Carbon Management Programme, launched in 2003, Islington Council and the Carbon Trust developed several key actions, one of which was raising awareness. Energy efficiencies achieved through campaigns aimed at staff and schools will save £43,000 and 196 tonnes of carbon emissions each year.

The Islington Ecology Centre, in Gillespie Park Nature Reserve is the home to Islington Council's Nature Conservation Team and provides an educational facility which welcomes school children and members of the public alike. It is designed and run as a model of green living, aiming to encourage people to live their lives in as green a way as possible. The centre offers advice on all aspects of nature conservation, green living, runs many events for the public, and has a curriculum-linked environmental education service for schools and colleges.



Purchasing and service contracts

Public Private Partnership (PPP) and Private Finance Initiative (PFI) projects are now well established within many local authorities. These allow the private sector to combine their resources and expertise with those of the public sector, to deliver enhanced service provision and value for money. The PPP/PFI approach has been used to deliver a diverse range of services and assets ranging from new IT systems through to complete and fully serviced buildings such as schools. PPP/PFI contracts can last upwards of 20 years so making the right decisions at day one can have a significant long-term benefit.

Almost all PPP/PFI contracts have energy implications. For example, new buildings will require heating and lighting, while IT systems will consume electricity and may require cooling. Because PPP/PFI contracts have such long terms, the value of the energy consumed over their life can be significant, although this may not always be recognised at the time that the contract is let.

Energy efficiency and PPP/PFI

PPP/PFI contracts should not be viewed as an opportunity for the wholesale transfer of all responsibilities to the contractor. For example, the contractor may be best placed to manage operation and maintenance (particularly of specialist plant such as CHP), but the local authority may be best placed to manage the energy use associated with occupant activity. Fortunately, most PFI contracts will be established under the 'negotiated procedures', as defined by the EU procurement regime encouraging open discussion between the procurer and the contractor in order to develop the most beneficial arrangements.

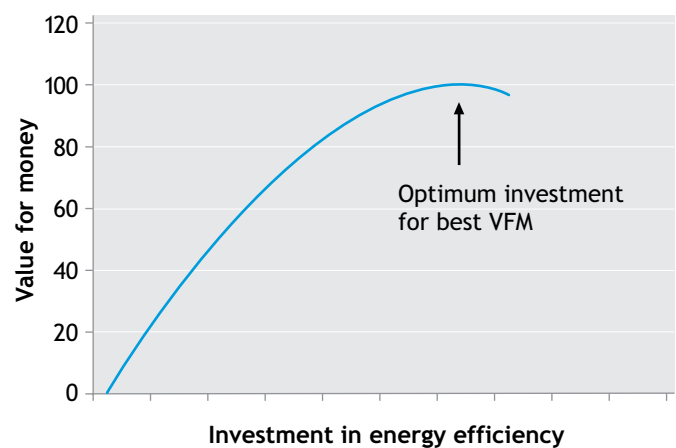
It is important to allow for innovation that may be offered by the contractor in order to improve the competitiveness of proposals. If full advantage is to be taken of the contractor's ability to influence energy use, it follows that the contractor should meet the energy cost of the service provided. In its simplest form, the agreement may require the contractor to pay for fuel purchased (gas, oil, etc) and sell useful energy to the local authority. In turn, it will probably be beneficial also to include incentives for the contractor to control the demand for useful energy around the site.

The link between energy efficiency and value for money

Value for money (sometimes abbreviated to VFM) must be assessed over the whole life of the PPP/PFI contract, taking into account not only initial purchase costs, but also ongoing running costs such as energy and maintenance. This can be done using whole life financial assessment methods such as discounted cash flow. Investment in energy efficiency both at the outset of the contract (for example, by installing more efficient plant), and over its life (for example, by adopting more rigorous maintenance regimes), will often deliver improvements in value for money. This is because over the life of the contract, the value of the fuel consumed by building services plant (for example, heating boilers) will be far greater than the initial purchase cost of the equipment itself. Therefore, a small additional investment in energy efficiency can yield far more substantial running cost savings.

The diagram below illustrates how value for money can be improved by investing in energy efficiency. It should be noted that simply choosing the cheapest piece of equipment or undertaking only minimal plant maintenance is unlikely to deliver best value for money. Basic levels of investment in energy efficiency will yield excellent returns.

Figure 9 Value for money when investing in energy efficiency



Consider 'green' public procurement

Some local authorities are developing green public procurement programmes and take environmental factors into account when buying products and services. This can have significant benefits for the environment and can lead to savings through lower energy use and enhanced product lifetimes. 'Green' purchasing sets a good example for other businesses, as well as helping to develop markets for more environmentally friendly products and services.

Some factors to consider when developing a green purchasing policy include:

- ▶ Preference should be given to products that can be recycled and reused, and those that include recycled content as part of their manufacture
- ▶ The 'whole life' costs of energy use and the costs of operating equipment should be taken into account when purchasing
- ▶ The environmental impacts of goods should be assessed before purchase, including a preference for those which can be manufactured, used and disposed of in an environmentally responsible way
- ▶ A preference should be stated for suppliers who show a commitment to continuous environmental improvement, especially those who are members of a registered scheme such as ISO 14001.

Consider 'green' procurement for all products and services



Policy starts in the head office, but affects all parts of the organisation



Action checklist

Action	Progress
Take an holistic approach to building services – consider heating, ventilation and lighting as part of an overall efficiency strategy.	
Set internal temperatures appropriately.	
Check controls match occupancy, and consider investing in more sophisticated controls.	
Ask if air conditioning is necessary? Look for opportunities to use natural ventilation and cooling.	
Set a dead band so that heating and cooling do not operate at the same time.	
Keep lights switched off when not used, and maximise the use of daylight.	
Keep light fittings clean and replace failing lights immediately.	
Install low-energy lighting.	
Install lighting control technology, such as sensors which detect light levels or movement.	
Train staff to turn off computers and set equipment to stand-by.	
Purchase the right equipment for requirements.	
Maintain the building fabric to avoid expensive repairs later on.	
Improve insulation of walls, roofs and glazed areas.	
Train catering staff in good kitchen practice.	
Investigate new kitchen equipment to explore more efficient options.	
Consider sub-metering for energy intensive areas.	
Investigate CHP, or check if existing plant is maintained properly.	
Consider renewable options, such as wind, PV cells and biomass.	
Involve staff and raise awareness.	

Contact the Carbon Trust for further guidance and support on improving energy use.

Sources of help

Carbon Management from the Carbon Trust

The Local Authority Carbon Management (LACM) programme from the Carbon Trust provides technical advice and management support to help local authorities realise carbon emissions savings.

Carbon Management Programme

Carbon Management is a strategic, whole-organisation approach that integrates with an organisation's existing strategy, enabling the successful implementation of an emissions reducing programme. Consultancy and support from other local authorities on the programme is available. Successful applicants will need to be able to put forward a committed team and demonstrate that they are ready to take action.

Local Authority Carbon Management Toolkit

The Local Authority Carbon Management (LACM) Toolkit is a CD ROM guiding local authorities through a five-step process to create an organisation-wide strategy and implementation plan. The toolkit is flexible and full of information and resources. The success of the programme is dependent on the commitment of key individuals and on visible senior management support.

LA Network

The LA Network is an issues exchange forum for employees of local authorities working in energy management.

Contact the Carbon Trust on 0800 085 2005 for more information.

Salix

Salix is an independent, not-for-profit company that provides interest-free match funding to the public sector to invest in energy efficiency measures and technologies that will reduce carbon emissions.

Visit www.salixfinance.co.uk to find out more.

Next steps

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

► Step 1. Understand your energy use

Look at your buildings 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 the buildings and complete the checklist at different times of day (including after hours) to identify where energy savings can be made. The action checklist on page 29 could form the basis of the walk round. Further tips can be found in *Assessing the energy use in your building* (CTL003), available from the Carbon Trust.

► 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. Discuss the more complex or expensive options with a qualified technician. The Carbon Trust could help in providing support through the Local Authority Carbon Management programme (see page 30).

► 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 energy priorities.

► Step 6. Continue to manage business energy use

Enforce policies, systems and procedures to ensure that the local authority operates efficiently and that savings are maintained in the future.

Related publications

The following publications are available from the Carbon Trust:

Local authority specific information

Introducing Local Authority Carbon Management (CTX601)

Energy use in Local Authority Buildings (ECG087)

Sector overviews

Further and higher education (CTV020)

Heritage (CTV026)

Office based companies (CTV007)

Primary healthcare (CTV025)

Schools (CTV019)

Sports and leisure (CTV006)

Technology overviews

Building fabric (CTV014)

Heating, ventilation and air conditioning (CTV003)

Lighting (CTV021)

Office equipment (CTV005)

Guides

Air conditioning (CTG005)

Creating an awareness campaign (CTG001)

For further information...

▶▶▶ call the Carbon Trust on 0800 085 2005

You'll find 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 and deals with all kinds of energy saving topics for people at all levels of experience.



▶▶▶ www.carbontrust.co.uk/energy

All of our publications are available to order or download from the Carbon Trust website at www.carbontrust.co.uk/energy. The site provides a range of information suited to every level of experience including top tips, action plans, forthcoming events and details of the range of services available from the Carbon Trust.



▶▶▶ receive free publications

The Carbon Trust has a library of energy saving publications. For more information on your sector, and on the technologies listed in this guide, please visit our website or phone us.



www.carbontrust.co.uk/energy
0800 085 2005

The Carbon Trust is a UK-wide company, with headquarters in London, and bases in Northern Ireland, Scotland, Wales and the English regions.

The Carbon Trust is a private company set up by Government in response to the threat of climate change, to accelerate the move to a low carbon economy.

The Carbon Trust works with UK business and the public sector to create practical business-focused solutions through its external work in five complementary areas: Insights, Solutions, Innovations, Enterprises and Investments. Together these help to explain, deliver, develop, create and finance low carbon enterprise.

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Making business sense
of climate change

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