



Hospitality

Saving energy without compromising comfort



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Preface

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

The Carbon Trust provides simple, effective advice to help businesses take action to reduce carbon emissions, and the simplest way to do this is to use energy more efficiently.

This overview introduces the main energy saving opportunities for the hospitality sector and demonstrates how simple actions save energy, cut costs and increase profit margins.

Introduction

Saving energy is one of the simplest ways to increase profits.

Within the hospitality sector, energy costs may only be a small percentage of turnover, but reducing them can directly increase revenue without the need to increase sales. Money saved on energy goes straight to the bottom line which makes businesses more competitive – and with rising energy prices, this is more important than ever. Purchasing energy sources that are recognised as 100% renewable will help achieve long term cost savings, alongside ensuring that the company's carbon footprint is being reduced. The implementation of simple energy efficiency measures can further increase levels of staff and customer comfort as well as improving general morale.

Fact:

Energy used in catering accounts for between 4 and 6% of operating profits. Saving energy can directly increase revenue and profitability without the need to increase sales.

In addition to financial and customer service benefits, there are of course, social and environmental advantages to reducing energy consumption, such as mitigating climate change. Increasing awareness about these issues has seen customers and guests becoming more discerning about the environmental credentials of the businesses they deal with. Being energy efficient can enhance business reputation and help to attract more customers.

Controlling energy use often makes conditions more comfortable for guests and customers – and comfortable customers will be encouraged to return.

Who is this publication for?

Managers and staff in most hospitality organisations including pubs, restaurants, hotels and guest houses can benefit from the advice in this publication. Focusing on low and no-cost measures with quick paybacks, this overview demonstrates the best energy saving opportunities for hospitality businesses and will help managers to:

- Assess the potential for energy savings and highlight areas where businesses can improve.
- Raise awareness of energy conservation amongst staff and motivate them to reduce waste.

Energy consumption in hospitality businesses

Annual energy costs for this sector are in excess of £1.3 billion, resulting in carbon emissions of more than 8 million tonnes per year

Hospitality businesses are expanding rapidly with a number of leading brands experiencing significant growth. This means that the relative energy consumption of the sector could increase dramatically unless a proactive approach is taken to improve energy efficiency.

Did you know?

- A range of modern controls exist to switch energy consuming services down or off.
- Controls can be implemented to save energy in a number of cases e.g. when an individual vacates a room, storeroom, office and back of house areas.

The hospitality sector is diverse, comprising hotels, guest houses, pubs, bars, restaurants and other catering establishments. Despite the diversity, there are several common areas where energy is wasted. The pie charts on the next page show where hotels and pubs use the most energy and where the biggest savings can be made: which are in heating, lighting, hot water, and catering.

In each of the areas identified in the pie charts, 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, or by using automatic switches or building control systems.

Maintenance

A number of energy efficiency measures can be carried out as part of routine maintenance.

Refurbishment

The hospitality industry renews and refurbishes premises on a regular basis. Most professional establishments refurbish every 7–10 years and this provides a significant opportunity for energy savings.

Some hospitality businesses have seen energy costs reduce by as much as 40% when energy efficiency opportunities are maximised during refurbishment.

Within the hospitality sector, an establishment can typically achieve a 10% or more reduction in energy use by implementing some simple efficiency measures. With additional investment in energy efficiency, Carbon Trust surveys indicate that potential carbon savings of 6% are achievable from measures with a payback period of less than one year, rising to 12–13% for measures with payback periods of 1–2 years.

Figure 1 Indicative breakdown of energy use within the average hotel

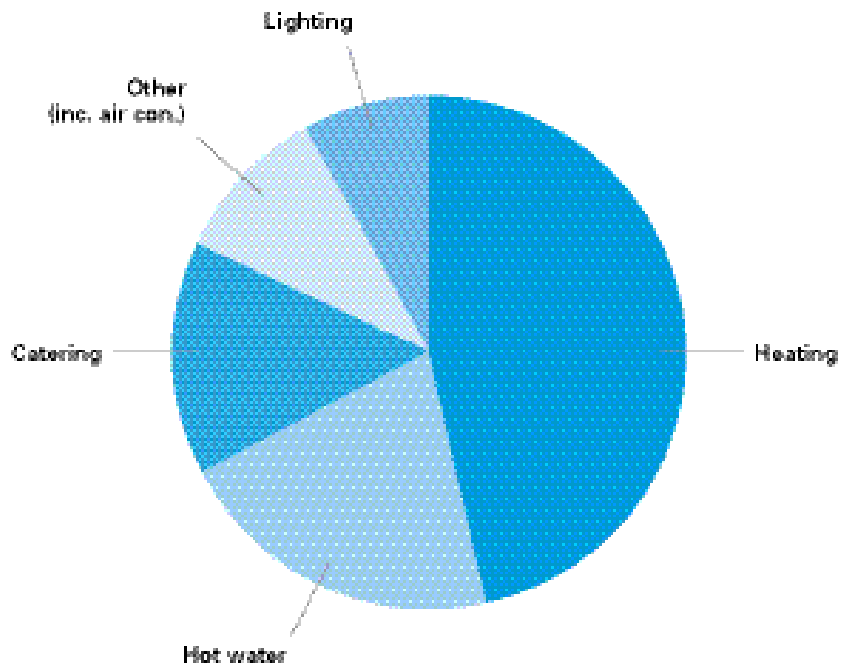
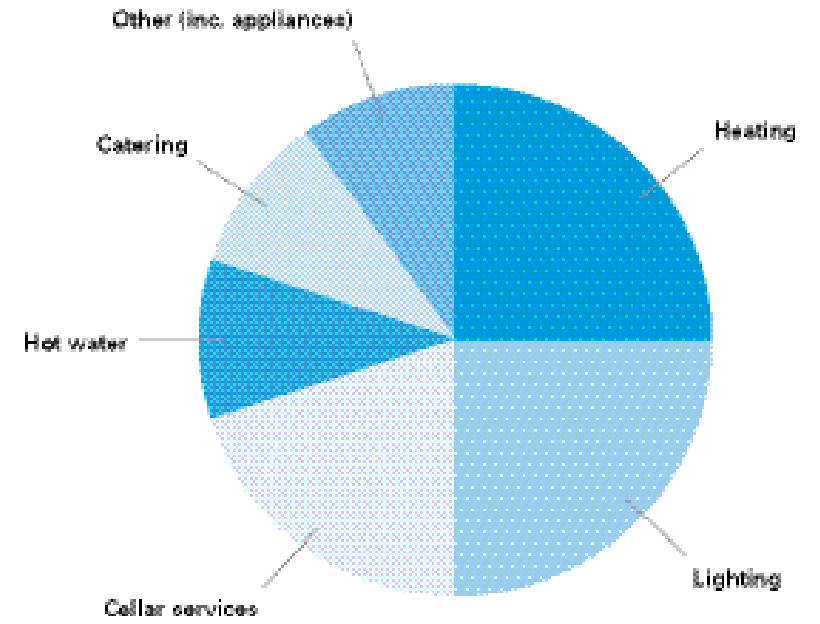


Figure 2 Indicative breakdown of energy use within the average pub



Opportunities for energy saving

Businesses should focus on implementing a variety of both short and long term energy saving strategies. Whilst low cost 'Quick Wins' can deliver immediate efficiency improvements and reduce costs by up to 10%, longer term solutions can deliver greater cost savings of up to 20-25%.

Heating and domestic hot water

Heating can account for more than 40% of energy use in non-domestic buildings which means that there are big opportunities to make savings.

Most managers recognise the importance of keeping customers and guests comfortable, but many do not realise that it is possible to improve the efficiency and minimise the cost of heating and hot water.

Heating

Costs can be reduced by maintaining appropriate temperatures and ensuring that heating equipment and controls are operated and managed correctly. In fact, it is possible to save up to 20% on heating costs through the implementation of some simple energy saving measures.

Appropriate internal temperatures

A good starting point is to know the recommended temperatures for specific areas in hospitality businesses and use that as a guide.

Table 1 Recommended temperatures for specific areas in hospitality businesses

Room Type	Temperature (°C)*
Bars, lounges	20-22
Guest bathrooms	26-27
Guest bedrooms	19-21`
Restaurants & dining rooms	22-24
Corridors	19-21
Kitchens	16-18

*Source: Adapted from Environmental Design CIBSE Guide A, 2006.

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 could potentially save 5% on annual heating costs, and ensure the continued smooth operation of the boiler and heating system.

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 additional savings in subsequent years.

See the Carbon Trust's technology overview of [Heating, ventilation and air conditioning \(HVAC\) \[CTV046v3\]](#) for more detailed information on HVAC opportunities.

Case Study

What other hospitality businesses are doing

A luxury hotel in the West Midlands was identified to have two inefficient gas water heaters that were only operating at 60% efficiency. With the help of the Carbon Trust, two new water heaters were identified with an improved performance efficiency of over 90%. Alongside further improvements to existing boiler systems across the hotel, it is expected that these changes will help contribute towards an annual saving of £5,500.

Controlling systems

Often, simple adjustments to the location and setting of controls can reduce costs without affecting staff and customer comfort. Some signs of poor control include:

- Heating being on in unoccupied areas, because timers are not set correctly.
- Heating being on too high or not high enough, because the thermostat is located where sunlight, radiators or other heat sources affect the reading.

Ensure controls match building and room occupancy. Check that the system is operating only during hours when staff and customers need heating, ventilation and cooling. Requirements will vary throughout the day. Use programmable time switches to help automate this process so that nobody forgets – 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.

Thermostats

The location of thermostats is very important. Check they are not influenced by draughts, sunlight or internal heat sources like radiators or fireplaces. Discourage staff from using thermostats as on/off switches

heating process; the space simply overheats, making customers uncomfortable.

Thermostats should be regularly checked to ensure that they are working correctly. Some businesses use separate room thermometers to double check that thermostats are turning the heating on when required. Heating should only be on if the temperature drops below the recommended minimum (see the table on page 7). If heating is on above these temperatures, check thermostats and adjust accordingly. If they are already set correctly and the heating is still on, ask a qualified heating technician to check or replace them.

Thermostatic radiator valves (TRVs)

A TRV is a simple control valve with an air temperature sensor, used to control the heat output from a radiator by adjusting water flow. Correctly fitted and operated TRVs can provide efficient, localised control. In a large room with several radiators and a variety of activities and heat gains, control of individual radiators can provide the correct level of localised heating. For example, in crowded pubs, restaurants and common areas of hotels, TRVs will reduce the amount of heat output from radiators as the space fills with people – and their own body heat. It is therefore important to check settings regularly and adjust appropriately to provide optimum comfort conditions. Tamper-proof TRVs will prevent customers from altering the setting.

Upgrade controls

Heating systems with old, inefficient time controls can be problematic. Upgrades are well worth implementing as they can pay for themselves quickly through energy and cost savings.

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 outside conditions. 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.

Night setback controls can also be used to effectively reduce or 'set back' space temperatures during specific time periods. For example, hotels can make savings by allowing temperatures in common areas such as corridors, lounges and stairwells to fall to 16°C between midnight and 5am when most guests will be in their rooms.

These types of controls can save hundreds or thousands of pounds and often result in a more comfortable environment for customers and guests. They could pay back their investment in just a couple of years. Consult a qualified heating technician to discuss the range of options available.

More information is available in the Carbon Trust's technology guide on [Heating, ventilation and air conditioning \(HVAC\) \[CTV046v3\]](#).

Zoning

Some areas in larger buildings such as hotels 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.
- A number of floors (particularly where top floors are poorly insulated).

Zoning Tips:

- **Hotels with zoned areas could turn heating down or even off on unoccupied floors.**
- **Restaurants could zone their building to take into account the different temperature requirements of the main restaurant, kitchen and storage areas.**
- **Pubs could zone the main lounge areas and function rooms separately.**

Smart control systems also represent a cost effective way to reduce energy bills across larger buildings. Depending on the occupancy levels of the building, smart controls work to automatically regulate temperatures based on those areas identified as 'occupied', whilst turning down heating in vacant areas.

Heat Pumps

Buildings with consistently high heat demands throughout the year – such as hotels with swimming pools – may benefit from the installation of [air to water heat pumps](#), which offer a cost effective method through which hot water is produced for both heating and domestic water use.

Hot water

Provision of hot water is essential for hospitality businesses but it can lead to considerable energy costs. Water is a metered and controllable resource and it is possible to save on both water and energy costs by implementing some inexpensive efficiency measures.

Excessive heating of hot water is wasteful and could scald staff or guests. The optimum temperature for stored hot water is 60°C which is adequate to kill Legionella bacteria and is sufficiently warm for staff and guests to use.

Save water – save energy

Wasting heated water is throwing money down the drain. All hospitality businesses could benefit from the installation of water conserving devices such as:

- **Tap controls** – these switch taps off after a certain time and are useful in communal areas such as toilets and leisure facilities in hotels.
- **Spray taps and water efficient showerheads** – these reduce the volume of water coming out of a tap or shower and can reduce consumption without diminishing the service to the customer, provided the water pressure is adequate.
- **Urinal flush controls** – these help to reduce unnecessary flushing in toilets, saving on cold water.

Before investing in these technologies, a trial is recommended to ensure that savings are achievable whilst maintaining the customer experience.

Sub-sector hints

Hotels and guest houses - bedrooms

Avoid overheating guest bedrooms as this can cause discomfort and affect the quality of guests' rest and relaxation. 18-21°C is a good temperature for a comfortable night's sleep so ensure your controls are set accordingly. Advanced controls now allow temperatures to be reduced at night, whilst allowing guests to temporarily override the set-points to their individual preferences.

Pubs and restaurants

Businesses with set working hours can benefit from the installation of a seven-day electronic time switch to permit different settings for each day. This will enable unnecessary usage to be cut dramatically and yield significant energy and cost savings.

Timers can be adjusted in pubs and restaurants so that buildings reach optimum temperature just as people arrive and begin to cool down as people leave. This can be achieved by gradually altering settings over a number of days and checking the response of the building and its occupants. If a building is occupied for different periods over the week, install seven-day timers to allow systems to operate only when the building is likely to be occupied.

Hotels

In hotels, staff and guests should be encouraged to report any areas that are too hot, cold or draughty. Investigating problem areas can help to identify maintenance issues. If these issues are promptly resolved, people are less likely to waste energy by opening windows when heating or cooling is on or request portable electric heaters or fans to make the space more comfortable. This improves the customer experience whilst saving energy and money.

Myth

Energy conservation in hotels can undermine quality, reduce guest comfort and deter customers from returning.

Reality

Properly implemented energy management programmes often improve guest comfort, for example, by ensuring that room and water temperatures are appropriate. They can also enhance quality of service through the identification of potential faults before they become major problems. This can increase the incentive for customers to return.

Green Business Fund

Investing in energy efficient equipment makes sound business and environmental sense, especially with the help of the Green Business Fund, which provides a combination of advice, and training. To find out more visit: <http://www.carbontrust.com/greenbusinessfund>

Did you know?

Surveys consistently illustrate that customers are more inclined to choose a hotel that actively minimises its environmental impact, and some are even prepared to pay a premium to ensure this.

Ventilation and air conditioning

For all hospitality businesses, the provision of fresh air at a comfortable temperature is critical to guest comfort and satisfaction.

As well as creating a comfortable atmosphere, supplying regular volumes of fresh, uncontaminated air is a legal requirement under some building and health and safety regulations. In specific areas of a building, such as kitchens, adequate ventilation is essential to deal with the unpleasant side effects of odours and smoke inhalation.

For further information, visit the Health and Safety Executive website at www.hse.gov.uk or the Ministry of Housing, Communities & Local Government at www.communities.gov.uk.

Mechanical ventilation and air conditioning is increasingly specified for new hospitality businesses or retrofitted to older buildings during refurbishment. This is partly due to an increase in heat-gains from

lighting, staff and equipment, and also because of higher expectations amongst customers and guests.

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. See the building fabric section (page 19) for more tips and advice. Further opportunities regarding ventilation can be found in the catering section of this guide (pages 21-23).

Natural ventilation and free cooling

As simple as it sounds, natural ventilation and cooling relies on natural airflow 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. 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. This method can save on ventilation costs in pubs and restaurants and also be employed in hotel hallways, corridors, meeting rooms and common areas. When opening vents, doors and windows, always consider security implications and fire regulations.

Match ventilation to 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.

Is air conditioning really necessary?

Full air conditioning is not usually necessary in the majority of UK buildings and should only be considered where careful control of humidity is required, such as in hotels with large swimming pools. Cheaper cooling options based on comfort cooling and adequate ventilation are available and should be investigated before the decision to install full air conditioning is made.



See the Carbon Trust's technology overview on [Heating, ventilation and air conditioning \(CT V046\)](#) for more information.

Maintain system components

Regular cleaning of ventilation systems can increase efficiency by as much as 25% compared with un-maintained systems. 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.

Do not let heating and cooling operate at the same time

This is a common problem in hotels, pubs and restaurants and can be avoided by setting a temperature 'dead band' – a wide gap between the temperatures at which heating and cooling cut in. For example, the heating system in a hotel might switch off when a temperature of 19°C has been reached and cooling would not switch on until the temperature exceeds 24°C.

Hospitality businesses that have installed air conditioning units retrofitted alongside a separate heating system need to be especially vigilant that heating and cooling are not 'fighting' each other.

Did you know?

The true definition of an 'air conditioning system' is one which has the ability to control temperature, humidity and air quality within precise limits, yet the term is often applied to systems which simply cool the space. These cool air systems are more correctly referred to as 'comfort cooling'.

Myth

Turning air conditioning thermostats as low as they can go cools the building more quickly.

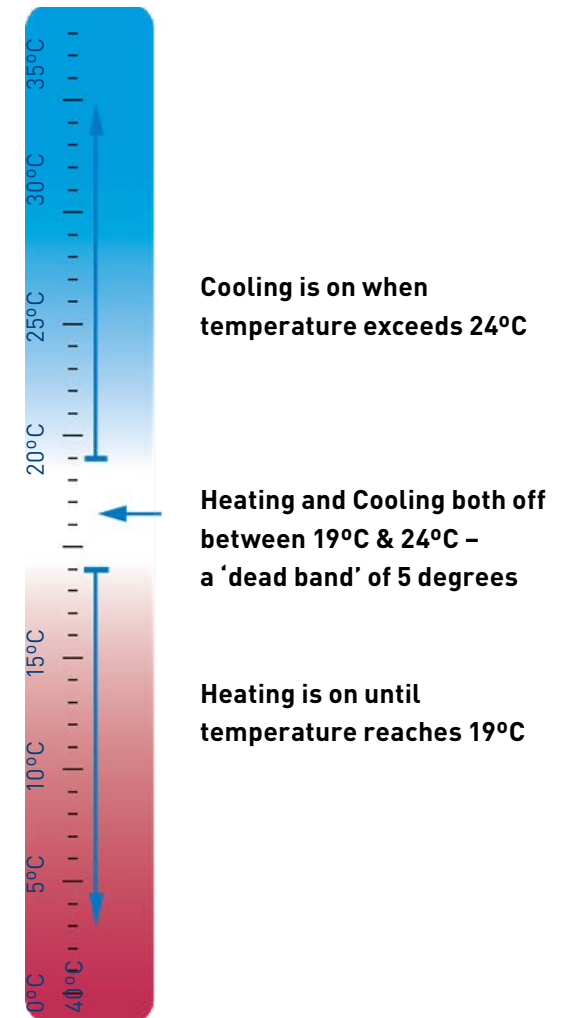
Reality

The temperature drops at the same rate but then overshoots, using more energy than necessary and creating discomfort for guests. If controls are not coordinated, the temperature could even go low enough for the heating system to be switched on. Both systems then operate at the same time.

Remedy

Set thermostats correctly and educate staff to dispel this myth. As a last resort, protect thermostats to prevent tampering, where possible.

Figure 3 Diagram of 'dead band' control providing recommended temperatures



Did you know? - Mixed mode

Some hospitality businesses use what is known as a 'mixed mode' ventilation system, which uses a combination of both natural and mechanical systems. The building uses natural ventilation, heating and cooling where possible, with mechanical systems being used only when necessary. This means that the building becomes more adaptable to a wide range of requirements and that occupants have more control over their environment. It also cuts down on energy costs and carbon emissions.

Recover heat from exhaust air

It costs money to heat the air inside 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 re-circulate a proportion of the exhaust air along with incoming fresh air to maintain air quality. The ratio of re-circulated air to incoming fresh air will be dependent on the air quality requirements and this can be controlled using an indoor air quality sensor. Alternatively you may wish to invest in an exhaust air heat recovery system that provides heat to the incoming ventilation air from the warmed outgoing air-stream.

Variable speed drives (VSDs)

In most ventilation systems in hospitality buildings, fans often do not need to operate 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. VSDs can be applied to a variety of situations where a fan or motor is used, from the large ventilation systems in large luxury hotels through to the kitchen ventilation and extraction in a small pub. More information is available from [the Carbon Trust](#).

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.

More information on this, and other control technologies, is available in the Carbon Trust's guide to [Heating control \(CTG065\)](#).

Lighting

Lighting is a fundamental element of any hospitality business and is often seen as an uncontrollable cost. Yet by implementing lighting controls and efficient luminaires, lighting energy costs can sometimes be reduced by up to 50%.

Effective and attractive lighting is essential for customer comfort and satisfaction as well as for the health and safety of staff and visitors. Judicious 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.
- Theme or mood lighting for pubs, bars, restaurants and in guest bedrooms.
- Security and safety lighting.
- External lighting for car parks and signage.

'Switch off' policy

Promote a 'switch off' policy on lighting, so that only lighting that is being used is left on. Raise staff awareness by placing [stickers above light switches and posters in staff areas \(available from the Carbon Trust\)](#).

Lights in unoccupied areas should be switched off, but remember to consider health and safety implications particularly in corridors and stairwells. If in doubt, always seek professional advice.

As part of the policy, label light switches to help staff and guests to select only those lights they need.

Maintenance

Lighting is essential for providing a pleasant guest experience so it is important to keep windows, skylights and light fittings clean. Without regular maintenance, light levels can fall by up to 30% in 2-3 years.

Employees should be encouraged to report failing lamps and these should be replaced immediately. This will help maintain the desired light output and in turn, provide a safer, more attractive environment for both staff and customers.

When checking lights also ensure that timers are set to match trading hours and that occupancy sensors are clean.

Fact:

Lighting equipment can also be 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 – a double saving. The same is true for refrigeration equipment.

Install low-energy lighting - Light Emitting Diodes (LEDs)

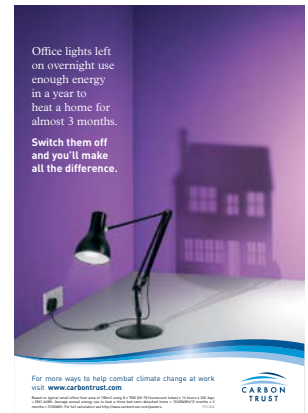
LEDs were developed for use in electronics over 60 years ago, and in the last ten years have become the light source of choice, providing illumination at a fraction of the cost of legacy sources.

LEDs have the highest efficacy and lamp life of all widely used lighting types, are easy to control and have no warm up period.

The cost of LEDs has come down significantly in recent years whilst in parallel, technological developments have improved light output, efficacy and reliability. These factors have made LED technology the mainstream solution for the vast majority of lighting applications in the UK. As with legacy lighting, LED luminaires vary in style, shape, size and importantly light output. LED technology can therefore be applied to provide a variety of bespoke solutions:

- Both down and wall lights are commonly found in communal areas such as corridors/common rooms, and LED fittings can be applied to ensure greater efficiency.
- LED fittings can also be applied to replace incandescent tungsten bulbs, which are often used in pub and restaurant environments. Not only will LED alternatives improve efficiency, but available options also mirror the look of existing filament bulbs.

LED lighting sales have now overtaken legacy lighting sales in the commercial market and this progress is expected to continue, with manufacturers turning their product development focus away from legacy light sources towards LED innovation.



Always consult a qualified lighting technician before upgrading lighting systems and specify lighting that complies with the criteria on the [‘Energy Technology List’](#) to ensure it is efficient.

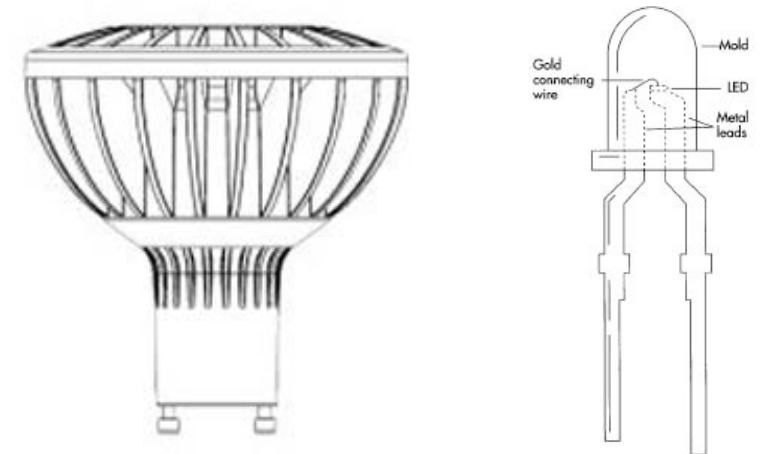
Figure 4 LED technology can be used for a range of applications, including down lights as shown



Did you know?

A new generation of LED lighting exists which will soon be viable for commercial use as a lamp technology: organic light emitting diodes (OLEDs). OLED lighting is composed of thin organic layers sandwiched between two electrodes and will be able to provide incredibly thin and flexible lighting solutions.

Figure 5 Example of LED fittings



The benefits of switching to LED

The relative performance of LED fittings in comparison to existing lighting sources

Lamp Type	Lamp Life	Colour Temperature	Colour Rendering	Efficacy*
Standard Incandescent	2,000 - 3,000 Hours	2,500 - 3,000K	100 Ra	5-20 lm/W
Tungsten Halogen	2,000 Hours	3,200K	100 Ra	15-24 lm/W
Tubular Fluorescent	10,000 - 12,000 Hours	2,700 - 6,500K	>85 Ra	60-105 lm/W
Compact Fluorescent	6,000 - 15,000 Hours	2,700 - 4000K	>85 Ra	45 -80 lm /W
High Pressure Sodium	12,000 -30,000 Hours	2,000 - 2,700K	25-85 Ra	25-85 lm/W
Metal Halide	6,000 -20,000 Hours	3,000-6,000K	65-93 Ra	50-113 lm/W
LED	25,000 -75,000+	2,700 - 8,000K	65-97 Ra	70-150+lm/W

*For a description of efficacy measures, please refer to [The Carbon Trust lighting guide](#).

Case Study: Leisure / Charity Centre

Carbon Trust supported this company by providing:

- The impartial design and specification of a low energy lighting project
- A shortlist of lighting suppliers from the Green Business Directory
- An independent review of resulting proposals

Lighting Project Summary

Existing system consisted of 134 fluorescent light fittings (T8, halogen, 2D) with no automated control

Best Proposal Summary

- Total Project Cost: £11,487
- Capital Contribution: £1,723
- Energy Savings: £2,818 p.a.
- Project Payback: 4.1 years
- Project Payback with capital contribution: 3.5

Table 1: High proportion of lighting use across the Hospitality sector indicates large cost savings can be achieved.

Sector	Lighting Use (Percentage Site Electricity)
Retail (Food)	30-70%
Retail (Non-food)	50-80%
Commercial office	60-80%
Hospitality (Hotel)	40-60%
Hospitality (Restaurant)	50-70%
Light Engineering	20-50%
Manufacturing	10-30%
Industrial	5-15%
Logistics/Warehousing (Ambient) (Ambient)	80-90%

Occupancy sensors

Most hospitality businesses will benefit from occupancy sensors. These help to ensure lights only operate when there is somebody there to require them. Sensors can achieve savings of 30% to 50% on lighting costs and are especially useful in:

- Storerooms, offices and back of house areas.
- Toilets.
- Cellars.
- Function rooms and banqueting suites.
- Areas where lighting is zoned.

Occupancy sensors can also be used to lower light levels in corridors when guests are not present, which can be an effective cost-saving measure. Always maintain minimum light levels so as not to compromise health and safety.

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 can achieve substantial savings. They can be particularly useful externally for lighting car parks or signage and can often pay back their costs in less than a year.

Photocells can also be combined effectively with time switches and/or occupancy sensors to ensure even more precise control.

For further advice download our [Lighting overview guide \(CT V049\)](#)

Sub-sector hint

Hotels - Consider occupancy linked controls

A range of modern controls exist to switch energy consuming services down or off when a guest vacates a room. Some systems can be controlled from the front desk, enabling activation of lighting, heating and ventilation when guests arrive. Other systems are based on key-card access or occupancy sensors that manage services based on room occupancy. Many of these systems achieve significant savings and can pay back their installation costs within 1-3 years.



Top Tip - Exit signs:

Many hospitality businesses achieve savings by using light-emitting diode (LED) or luminescent exit signs that have approximate paybacks of less than two years.

Building Fabric

Improving building fabric makes sense for many reasons – it saves energy, increases guest comfort and can improve the appearance of the business.

Around two thirds of heat from a typical hospitality building is lost through the building fabric (walls, floors and ceilings). It therefore makes good sense to make improvements in this area during a major refurbishment project, and/or prior to replacing or upgrading any existing heating system.

Many pubs and hotels in the UK occupy old or dated sites so a well-designed refurbishment project, whatever the size or nature, will provide an ideal opportunity to integrate energy efficiency into the fabric of the building. There are many technologies available which can help gain the greatest benefits and most efficient use of the energy required to run a hospitality establishment. Whilst some of these technologies may increase the overall project cost, the benefits will show a good return on the extra capital investment and will continue to provide savings for many years after the payback has been achieved.

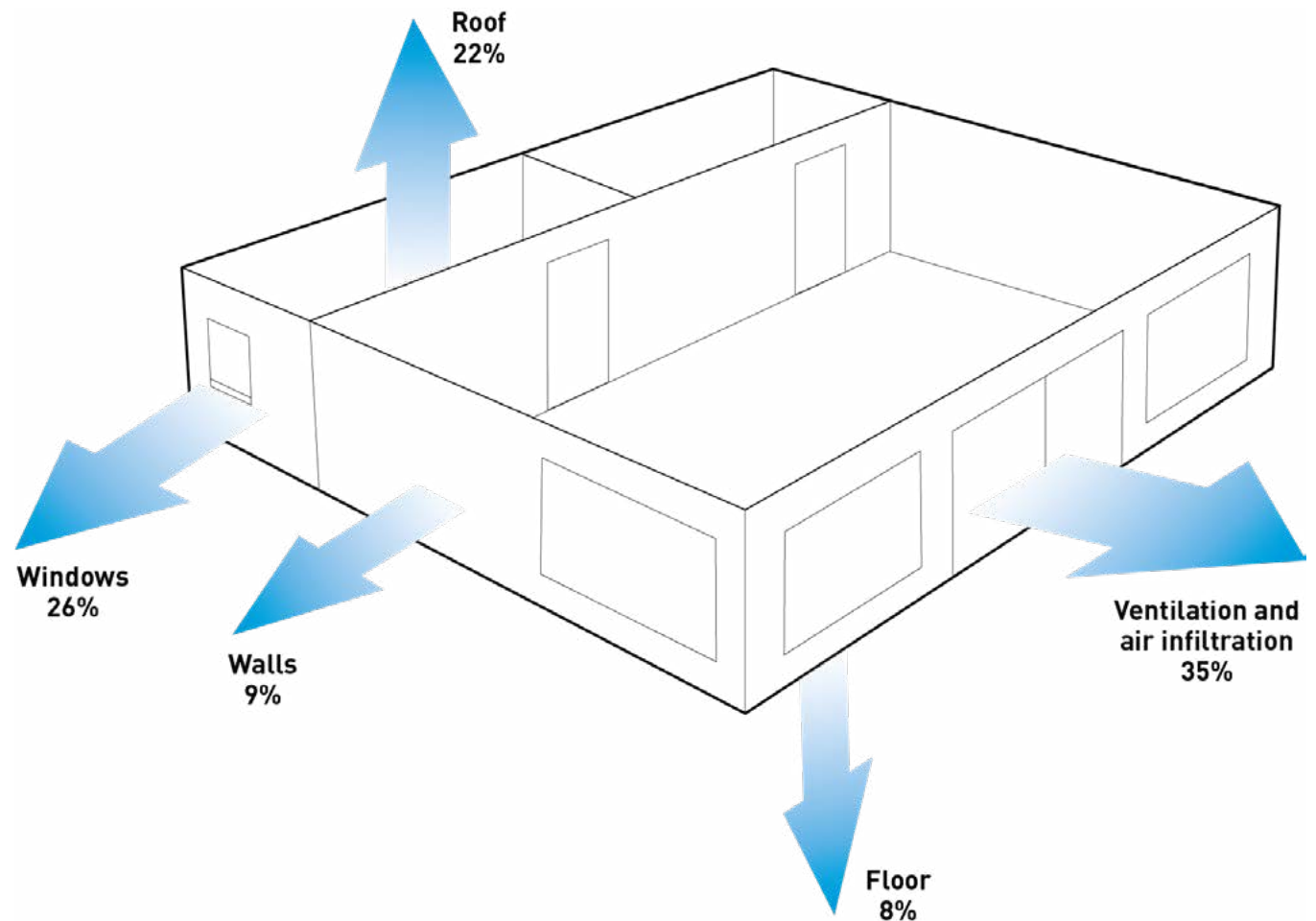
Improving building fabric can result in:

- Better temperature control – it can lower ventilation costs and prevent overheating.
- Improved comfort for customers – the guest experience can be enhanced by providing a more comfortable environment through reducing draughts, solar glare, overheating and noise.

- Lower running costs - reheating the space to offset heat losses can be an expensive waste of energy
- 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 to staff, guests and prospective buyers of the business.

Figure 6 Heat loss from a typical building



Establish a housekeeping and maintenance schedule

Compile a checklist to address areas where energy is lost via the building structure. The Carbon Trust has a good starting checklist and offers tips in [Conducting a walk-around energy survey \(CTL172\)](#). It is a good idea to appoint a specific staff member to conduct regular walk rounds using the checklist – a comprehensive schedule should include checking window panes and frames, roof lights, roofs, skirting and eaves.

Maintaining hospitality buildings properly will lead to potential issues being identified early, which will help avoid expensive problems later on. Deal with building fabric issues immediately, particularly where there are gaps and holes. Install draught stripping to windows and doors, check for signs of damage and replace when required.

Regularly check buildings 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.

Keep in the heat

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

Close curtains and blinds at the end of the day during

winter months to reduce draughts and help rooms retain more of their residual heat overnight. This same process can help in summer to reduce heat in rooms that receive early evening direct sunlight. Guest and staff areas will be more comfortable as a result.

Top Tip:

Install removable insulation 'jackets' to flanges and valves – these should be replaced after any maintenance. An un-insulated valve loses the same amount of heat as a metre of un-insulated pipe.

Insulate to accumulate

Up to a quarter of a building's heat can 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. Improvements like these are most cost effective during refurbishment projects and should always be considered when the opportunity arises.

Hot water pipes should also be insulated to prevent heat loss. Insulating pipes can also improve internal comfort by reducing the risk of overheating.

Regularly check the condition of insulation as part of standard maintenance.

Lobby for fewer draughts

Installing a draught lobby in hotel, pub or restaurant

entrances can not only reduce heating costs and draughts, but can also improve customer comfort on site. In the winter, it can help keep warm air in and cold air out, and the reverse is true during summer months. Lobbies should be large enough to provide unrestricted access and enable one set of doors to be closed before the other is opened. Where possible, the two sets of doors should have automatic control to ensure that they are closed properly.

Improve glazing

Windows can make a business look attractive to potential customers (see box on the next page), but they can also let out heat.

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.

High performance glass is available that has a coating applied to it 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 which can lower mechanical cooling requirements.

For more information on all of these points, see the [Building fabric technology overview \(CT V069\)](#) from the Carbon Trust.

Top Tip:

Large, clean windows in pubs and restaurants can help entice passing trade, but make sure they are properly glazed to minimise heat loss. Guests already inside the building will benefit from maximum use of natural daylight and enhanced views, particularly in hotel rooms and recreational areas.

Catering

Kitchens consume large amounts of energy in hospitality businesses and they are also one of the highest areas of waste.

Typically, 65% of the energy supplied by cooking equipment will be extracted through the canopy as convected heat, 5% will be retained in the food being cooked, and 30% will enter the kitchen area as radiant heat. Effective energy management in hospitality catering can provide substantial savings, as well as improving working conditions in the kitchen, leading to improved staff productivity and morale.

Fact:

Simple actions such as raising awareness amongst kitchen staff and providing energy management training can reduce catering energy use by up to 30%.

Equipment**Switching for savings**

Switch off, or at least turn down equipment when it is not required. Catering equipment generates heat and as well as wasting energy, it will make the kitchen less comfortable to work in if left on. Switch off grills, fryers and hobs immediately after use, along with lights and extraction fans when they are not being used.

Similarly, switching on at the right time can make a big difference. Most modern catering equipment reaches optimum temperature quickly. Label equipment with its preheat time and educate staff to switch on only when required.

Clean and maintain cooking equipment

Seals and gaskets on oven doors should be checked weekly to ensure a snug fit and minimal heat loss. Gas burners should also be checked weekly for a blue flame and efficient combustion. If the flame is yellow, this could indicate a problem so the unit should be investigated immediately.

Use kitchen equipment properly

Avoid using catering equipment to warm the kitchen when staff arrive – the building's heating system should do this effectively. If it does not, find out why and rectify the problem.

Address other common misuses of kitchen equipment by:

- Choosing the correct saucepan size for the job and use lids where possible.
- Using a frying pan rather than a griddle for one customer.
- Keeping chiller and freezer door openings to a minimum.
- Using dishwashers at full loads, including those used for glasses.
- Shortening the drying times in dishwasher cycles and using the residual heat in the dishwasher to dry the contents instead of using expensive power drying cycles.

Purchase equipment with running costs in mind

Consider replacing any kitchen equipment over 15 years old with newer, more efficient models. When purchasing equipment, always consider the costs of the energy used over the lifetime of the product, not just the capital cost. Although gas-fired equipment can be more expensive to buy than electrical or steam equivalents, savings made on running costs make it an attractive option. Induction hobs can also be efficient and lower cost to run.

Equipment that automatically switches off, such as pan sensors on hobs, can save 5% on energy costs. When purchasing any domestic sized catering equipment such as fridges, freezers or dishwashers,

always look for the most efficient 'A' rated models using the European A-G rating system.

Suppliers should be able to provide information on the expected running costs of their equipment. If they cannot tell you, try another supplier.

Refrigeration

Maintenance schedules

Refrigeration is a significant energy user in hospitality businesses and will gradually use more energy and increase the risk of breakdown if not properly maintained. Establishing a simple equipment maintenance schedule will save on energy and costs.

Ensure that defrost procedures are followed. Defrosting should be carried out every two months as a minimum, or following manufacturers' recommendations. This saves energy and prolongs the lifetime of equipment.

Check door seals on cold rooms, fridges and frozen food stores and replace if damaged. Keep condensers and evaporator coils clean and free of dust and check systems have the correct amount of refrigerant.

Avoid overcooling

Keeping refrigerated produce at the correct temperature is better for food and it can make cost savings. Energy consumption of refrigeration equipment can be reduced by 2-4% if the set cooling temperature can be increased by 1°C. Ensure that the manufacturer's recommended operating temperature is set accordingly. See the table below for further guidelines.

Table 2: Correct temperatures for food products*

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

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

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

Keep non-perishables cool

Products such as canned drinks do not need to be in the refrigerator cabinet at all times. Before they are chilled for customer use, store them away from direct sunlight and heat emitting equipment to ensure they are as cool as possible before being put into chilled display cabinets. This means that the product will take less time to reach the desired temperature which will also reduce cooling equipment load.

Choose the most efficient equipment

When selecting new refrigeration equipment, whether it be under-counter bottle fridges, or kitchen fridges and freezers, purchasing the most efficient equipment will make savings over the life of the product, and may not be much, or any more expensive. Choose equipment from the Professional Refrigerated Storage Cabinets category on the [Energy Technology List](#).

See the Carbon Trust's technology overview of [Refrigeration \(CTG046\)](#) for more information.

Ventilation

Maintain kitchen extract ventilation

Ventilation units and extractor hood grease filters should be kept free from dust and grease and cleaned at regular intervals, as recommended by the manufacturer. Regular cleaning of ventilation systems can increase efficiency by as much as 25% compared with un-maintained systems. There is also a reduced risk of breakdown.

Consider heat recovery

Large volumes of warm air are expelled from kitchens. Many kitchen managers do not realise that over 50% of this heat can be recovered using heat recovery devices which can significantly reduce energy costs. An air to water recovery device is often the most effective method of recovering heat because it can then preheat hot water, providing a year round use for the recovered heat. Even small kitchens can make effective use of this technology.

Sub-sector hint

Pub cellar management

The energy used for cooling beverages in a typical public house is in excess of 10% of the total energy cost, and approximately half of this goes into cellar cooling. Installing efficient cellar coolers that are listed on the Energy Technology List will help to reduce overall energy consumption and running costs. Savings of 10-50% can also be achieved by following five main principles for reducing energy use in cellars:

1. **Improve layout** – Locate any heat-producing equipment, such as line coolers for beer and soft drinks, cooling cabinets and icemakers outside the cellar in a well-ventilated service area.
2. **Install thermal insulation and draught stripping** – Heating pipes should ideally not pass through cellars. Where this is unavoidable, pipes, fittings, flanges and valves should be insulated and draught stripping applied in any places where pipes pass through walls. Cellar doors and hatches should also be draught-stripped and insulated. Access doors should be self-closing and shut immediately after deliveries.
3. **Replace lighting** – Lighting produces a heat gain, related to the efficiency of the lights installed. 'Standard' tungsten bulbs should be replaced immediately with Light Emitting Diodes (LEDs). LEDs have the highest efficacy and lamp life of all widely used lighting types, are easy to control and have no warm up period. Lighting should also be turned off whenever possible to avoid excess heat production.
4. **Check refrigeration equipment** – Ensure pipework circuits are kept as short as possible and that the condenser unit is sited in a well-ventilated location. Locate cooling system temperature sensors where they can provide a reliable indication of the cellar temperature – ideally at the opposite end of the cellar from the evaporator and at the top of barrel height. Set the control to the recommended cellar temperature (usually between 11-13°C) and check regularly with a separate thermometer to ensure that the sensor is operating reliably. Overcooling the cellar by 1°C can add up to 10% to cellar energy costs.
5. **Maintain equipment regularly for optimum performance** – Ensure equipment is properly maintained so that it operates efficiently. Maintenance costs should always be considered when purchasing new apparatus. Evaporators and heat rejection coils require regular cleaning to allow free airflow and economic operation. Condenser trays should be emptied to avoid water fouling the coil.

Tax incentives

Enhanced Capital Allowances (ECAs) are a straightforward way for a business to improve its cash flow through accelerated tax relief. The ECA scheme for energy-saving technologies encourages businesses to invest in energy saving plant or machinery specified on the Energy Technology List (ETL) which is managed by the Carbon Trust on behalf of the UK Government.

The ECA scheme provides businesses with 100% first year tax relief on their qualifying capital expenditure. The ETL specifies the energy-saving technologies that are included in the ECA scheme, including professional refrigeration equipment and storage units. The scheme allows businesses to write off the whole cost of the equipment against taxable profits in the year of purchase. For further information please visit:

<https://www.gov.uk/guidance/energy-technology-list>

<https://www.gov.uk/energy-technology-list>

Case Study

What other hospitality businesses are doing

A large catering firm installed sub-meters in their kitchens and surveyed the facility to identify how energy use related to activity. Catering staff attended good housekeeping training workshops covering some of the actions in the quick wins section above. As a result, energy costs were reduced by 25% in the following year.

Leisure and fitness facilities

For those who have them, leisure facilities are a major source of energy use. Implementing a few simple energy efficiency measures can keep costs to a minimum whilst maximising guest satisfaction.

Heated indoor swimming pools, saunas and fitness suites have become popular additions to many hotels and guest houses. However, whilst such facilities enhance the guest experience, they can also dramatically increase energy consumption. For example, in a large hotel, the pool alone can account for a significant amount of the total energy costs.

Some hospitality businesses have these kinds of facilities as a central attraction, such as health resorts and spas.

Comfortable pool water temperatures maintain water temperature at the minimum level to meet comfort conditions. Swimming pool water is usually heated to 28-30°C. Maximum recommended pool water temperatures for hospitality businesses are as follows:

Table 3: Comfortable pool water temperatures

Pool type	Temperature
Conventional	28°C
Leisure	29°C
Hydrotherapy	32-40°C
Spa	40°C

*Source: CIBSE Guide G Public Health Engineering (2004)

It is also important to ensure that pool hall air temperature is controlled correctly. This should be maintained at 1°C above the water temperature to limit evaporation from the pool surface.

Staff should be trained to use controls effectively. With regards to both air and water temperature, 'too cold' can frequently cause as many problems as 'too hot'.

Schedule backwashes

To work efficiently, swimming pool filters need to be cleaned by backwashing all of the captured matter out of the filter. An effective backwashing system is one that only removes sufficient water from the pool to meet health and safety standards. In some cases, heat from backwash water can be used to heat pool make-up water through heat exchangers.

Always consult the pool equipment manufacturer when considering changing the maintenance regime.

Seek expert advice

Overheating of pool water can cause excessive condensation which may increase the risk of damage to the building fabric. Always consult a qualified expert.

Install a pool cover

Swimming pools and spas may only be used for a few hours a day yet maintain 24-hour heating and ventilation regimes that are only required when the pool is occupied. Using a pool cover when the pool is not in use can produce substantial savings through reducing the need for heating (water and pool hall air), pool hall ventilation and make up water.

Manual, semi-automatic or automatic covers are available in a variety of shapes to fit most pools. Ideally, the entire pool surface should be completely covered, although any significant reduction in exposed water surface area will result in savings.

Remember to put a cover on spa pools and jacuzzis too. Case studies have shown that where a full cover is fitted, ventilation can be switched off at night without condensation problems occurring. It also allows for the temperature of the pool hall to be decreased overnight without adversely affecting the water temperature. Initial installation costs are offset with a payback period of 18 months to three years.

Funding:

The Carbon Trust Green Business Fund can help to fund energy efficient capital measures e.g. pool covers or solar heating. Capital funding of up to 15% of the total implementation costs can be claimed through the GBF funding scheme:

<https://www.carbontrust.com/client-services/programmes/green-business-fund/>

Explore solar water heating potential

Solar water heating can be effective for swimming pools and changing facilities and is relatively easy to connect to a conventional heating system. Solar heating units can give a substantial contribution to pool heating throughout the year, with the remainder provided by a conventional heating system. Always investigate the projected payback period carefully to make sure that your investment will pay off.

Switch off fitness machines

Fitness equipment in this sector is used sporadically throughout the day. In quieter periods, ensure some machines and gym equipment are switched off to save on energy and costs. Where possible, switch apparatus off at night along with any air conditioning. For individual machines, simple time switches can automate this process. Moreover, when equipment is not in constant use, try keeping it turned off. Display clear instructions for guests on how to activate the equipment and check that these are implemented.

Purchase the most efficient exercise equipment available

Generally, the more energy that is required to run apparatus, the more heat is emitted and the higher the energy costs will be. This will increase the cost of cooling the area too. Where possible, opt for equipment that is powered by user activity to achieve significant savings.

Action:

Turn off heating in saunas and steam rooms when not in use, as the electric heating in these facilities is expensive to run. Consider installing a timer to automate this process.

Fact:

When correctly scoped and installed, combined heat and power (CHP) can help to cut greenhouse gas emissions which are linked to climate change. Using CHP demonstrates a commitment to the environment – and this can be used to promote business as being environmentally friendly.

Energy management & people solutions

Many good housekeeping measures are simple to implement in hospitality businesses and need not require any initial outlay. Most opportunities are within the control of staff which is an ideal way of involving people and raising awareness of the importance of reducing energy consumption.

All staff members should be reminded that good energy management helps to achieve:

- Environmental benefits.
- Healthier and more productive working conditions.
- Cost savings.
- Enhanced social and environmental credentials which can be promoted to customers.

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

Commitment to energy efficiency has to come from the top and should be backed up by a personalised mission statement and energy policy. It is also important to appoint an energy 'champion'. In a very small business, this may be the owner/manager but in larger companies, a core staff member will often

improve involvement and awareness across the whole team. Either way, people responsible for energy management in an organisation need to have resources and time allocated to make a difference.

Get everyone involved

Everyone working in the hospitality industry has an impact on energy use, so it should be everyone's responsibility to use energy wisely. Appoint an energy team comprising management, cleaners and maintenance staff to help identify opportunities for savings.

- Encourage all staff to report any faulty lamps and to only use lighting where it is required.
- Ask staff to report areas that are overheated, where doors and windows are not closing properly, or where lighting or equipment is being left on unnecessarily.
- Ask maintenance staff to monitor and adjust control settings to meet but not exceed internal requirements for heating or cooling.
- Ask managers to investigate current and past energy use and to continue to monitor energy consumption.

Also, do not underestimate the information guests can provide. Many hospitality businesses actively collect feedback from guests, or at least, respond to customer requests. This information can help build a picture of energy use and suggest potential actions. For example, if rooms are reported as being too hot, perhaps the heating control needs to be addressed.

Or, if diners ask to be moved out of a draught, perhaps the building fabric needs to be improved, or staff trained in closing doors.

Record and understand your energy consumption

Review your energy bills over the last year in order to build a picture of past performance. Energy suppliers should be able to provide this information if it is not already available on-site.

Take regular meter readings once a 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 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 an energy saving programme gathers momentum, comparisons can be made between current and initial consumption to highlight energy savings. Set targets – most hospitality businesses in the UK could reduce their energy consumption by 10-40%, however, many companies start by aiming for a 5% reduction per year.

Successes should be reported in marketing material which is likely to have a positive impact on the business.

Undertake regular housekeeping walk rounds

Carry out regular good housekeeping walk rounds throughout the hotel, pub or restaurant. Note down and act on any maintenance measures needed in order to avoid expensive problems later on. As patterns of energy use will vary throughout the day, carry out a series of walk rounds at different times to get a better idea of where and when energy is being wasted. The checklist on the right might be a good starting point.

For further advice download the following publications:

[Energy management guide \(CTG054\).](#)

[Creating an awareness campaign \(CTG056\).](#)

Action Checklist



Action

<input type="checkbox"/>	Switch off all non-essential lighting out of hours. Install timers or occupancy sensors to help with this
<input type="checkbox"/>	Replace lighting with energy efficient LEDs to reduce operating and maintenance
<input type="checkbox"/>	Establish a basic lighting maintenance programme to keep lights and windows clean. Identify and replace failing lights
<input type="checkbox"/>	Ensure thermostats are set correctly. Increase temperature set-point for cooling and reduce for heating
<input type="checkbox"/>	Set a 'dead band' between heating and air conditioning control temperatures of 5°C to avoid them operating at the same time
<input type="checkbox"/>	Check insulation levels and increase wherever practical to reduce heating requirements
<input type="checkbox"/>	Install and use a swimming pool cover whenever the pool is not in use
<input type="checkbox"/>	Raise awareness amongst kitchen staff: label equipment with minimum warm up times, keep fridge and freezer doors shut, use correctly sized equipment and switch off unnecessary kitchen equipment and lights
<input type="checkbox"/>	Walk around your building at different times of the day and during different seasons to see how and when heating and cooling systems are working. Check time and temperature settings

Next steps

There are many easy low and no-cost options to help save money and improve the operation of hotels, guest houses, pubs and restaurants.

Step 1. Understand your energy use

Look at the 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 the building and complete the checklist at different times of day (including after hours) to identify where energy savings can be made. An [example checklist is shown on page 27](#) – and further examples are available from the Carbon Trust, such as [Conducting a walk around energy survey \[CTL172\]](#).

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. Where funding is limited, focus on energy intensive areas or those that are performing badly first.

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.

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 business for energy efficiency

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

Related publications

The following publications are available from the Carbon Trust:

Heating, ventilation and air conditioning (CTV046)

Building Fabric (CTV069 v3)

Lighting (CTV049 v2)

Renewable energy and combined heat and power (CHP) (CTV010 v3)

How to be a good supplier (CTV070)

Carbon footprinting (CTV043 v3)

Creating an awareness campaign (CTG056)

Refrigeration (CTG046)

Go online for more information

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.

Website – Visit us at www.carbontrust.com for our full range of advice and services.

➤ www.carbontrust.com

Tools, guides and reports – We have a library of publications detailing energy saving techniques for a range of sectors and technologies.

➤ www.carbontrust.com/resources

Events and workshops – We offer a variety of events, workshops and webinars ranging from a high level introductions to our services through, to technical energy efficiency training.

➤ www.carbontrust.com/events

Small Business Support – We have collated all of our small business support in one place on our website.

➤ www.carbontrust.com/small-to-medium-enterprises/

Our client 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.com/our-clients

The Carbon Trust Green Business Fund – is an energy efficiency support service for small and medium-sized companies in England, Wales and Scotland. It provides direct funded support through energy assessments, training workshops, and equipment procurement support.

➤ www.carbontrust.com/greenbusinessfund

SME Network - Join a community of over 2000 small and medium-sized businesses to discuss your strategy and challenges to reducing carbon emissions and improving resource efficiency. Sign up for free to share knowledge, exchange useful resources and find out about the support and funding available in your area, including the details of your local energy efficiency workshops.

➤ www.carbontrust.com/resources/tools/sme-carbon-network

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- advises businesses, governments and the public sector on opportunities in a sustainable, low-carbon world;
- measures and certifies the environmental footprint of organisations, products and services;
- helps develop and deploy low-carbon technologies and solutions, from energy efficiency to renewable power

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