CTV005 Technology Overview

Office equipment

Introducing energy saving opportunities for business

CARBON TRUST

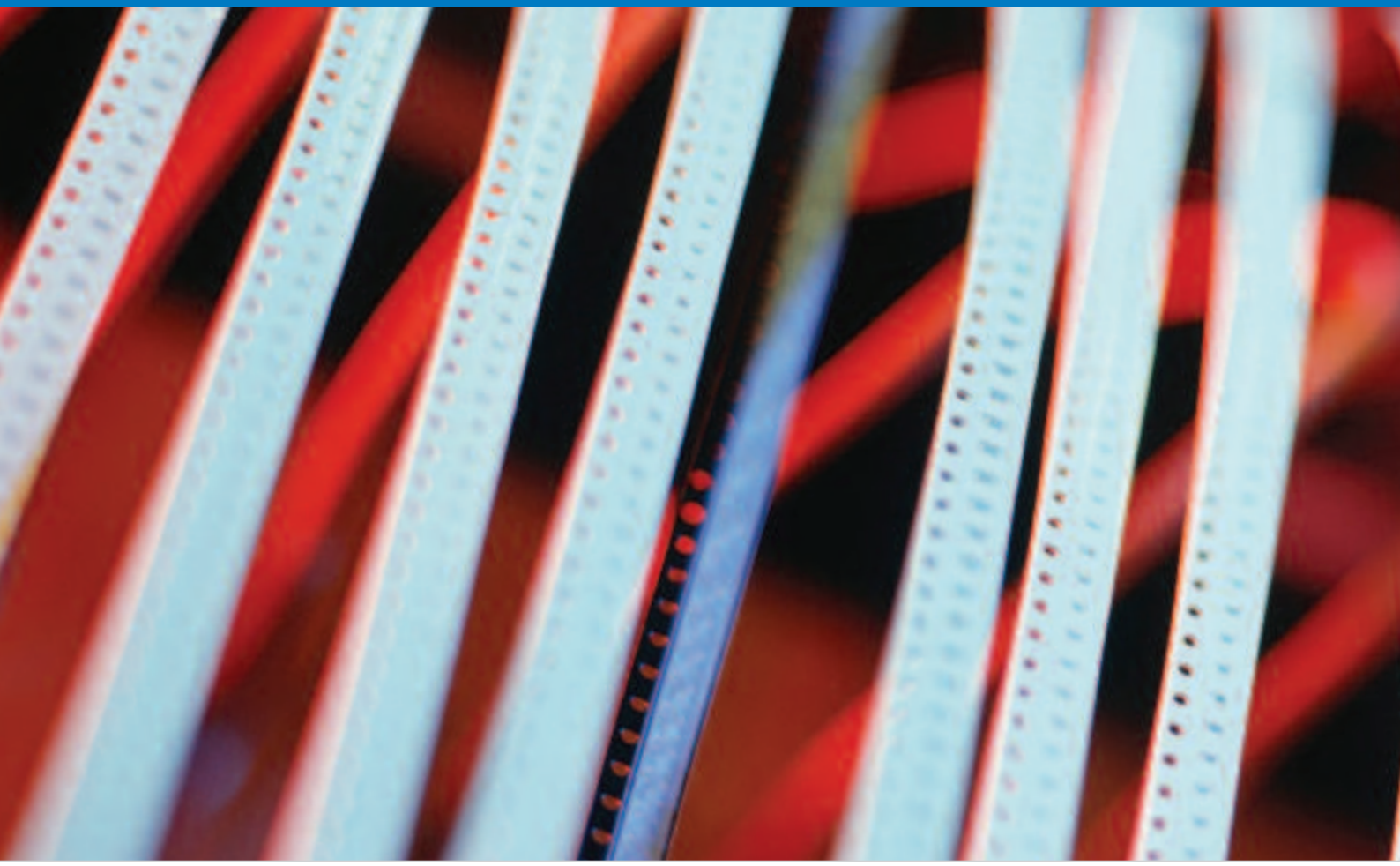
Making business sense of climate change

Contents

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 technology overview for office equipment introduces the main energy saving opportunities for businesses and demonstrates how simple actions can save energy, cut costs, improve comfort and increase profit margins.



Introduction

Most businesses rely on a range of office equipment in order to function. From the basic essentials such as computers, monitors, printers, fax machines and photocopiers to projectors, scanners and teleconference facilities, it is widely recognised that these items have become integral to daily activity. But it is not always appreciated how much these cost a company.

This publication covers each of the main types of electrical appliance found in offices and explores opportunities for more energy efficient operation. Energy labelling schemes are also addressed.

Because most businesses have some form of office equipment, the energy efficiency measures in this publication are relevant to many sectors.

Benefits of increased equipment efficiency

- **Reduced cost of energy.** As office equipment runs more efficiently, there will be a drop in energy consumption — meaning a drop in the running costs too
- **Longer useful life of equipment.** Equipment that operates at full power for less time will usually last longer. It will also have less chance of overheating and failure
- **Increased mobility.** Increased use of laptops allows for more flexibility and mobility of staff, provided users are aware of health and safety issues
- **Reduced mechanical ventilation requirements.** Equipment on standby mode runs at lower temperatures which reduces the need for mechanical ventilation and cooling
- **Protecting the environment.** Lower energy consumption means reduced carbon emissions which are a major contributor to climate change.

Energy consumption

Office equipment is the fastest growing energy user in the business world, consuming 15% of the total electricity used in offices. This is expected to rise to 30% by 2020.

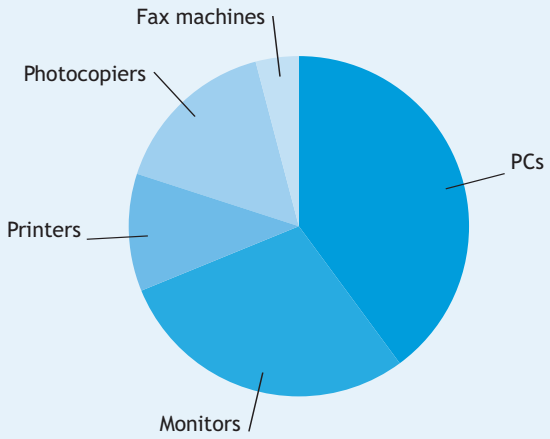
The cost of running this equipment is around £300million p.a. in the UK alone and this is increasing every year. There are also associated costs which are often overlooked, specifically those of increasing cooling requirements to overcome the additional heat this equipment produces. As ventilation and air conditioning are major energy consumers themselves, it makes good business sense to ensure they are only used when absolutely necessary.

Making even small adjustments to the way office equipment is used can significantly improve the working environment and at the same time, save money. It is essential to promote the benefits of energy saving to the entire workforce in order to get the best results.

In addition to economic benefits, there are of course, social and environmental advantages to reducing energy consumption, such as preserving fossil fuel supply and minimising climate change.

As the chart below demonstrates, around two-thirds of the energy consumed by office equipment is attributed to computers (PCs and monitors) as there are more of these in offices than any other piece of equipment. However, all office equipment is a potential source of energy waste.

Energy use of business equipment in the typical office



Based on 10 PCs with monitors, plus 1 photocopier, fax machine and 1 laser printer, all with average consumption and no standby enabled.

Key opportunities for energy saving

Computers and monitors

Most offices now have a computer for each member of staff. Training staff on how to use their equipment efficiently can achieve significant savings with relatively little effort or cost.

Low-cost, quick wins

Switch off. A monitor can account for a large amount of a computer's energy consumption (85 Watts on average for older screens) and since these are often left on when users are away from their desks, there are big opportunities to make savings.

Ensure monitors are turned off if users are to be away from their desk for more than ten minutes and that computers are switched off at the end of each day. Enable any standby features to limit energy consumption.

Raise awareness. Ensure all staff members are aware of switch off policies and inform them of the financial and environmental benefits of doing so.

Policy

Small to medium-sized companies typically rely on employees to set their own PC profiles whereas this is often centrally controlled in larger companies. Encouraging IT departments as well as individual users to activate standby modes will result in energy savings.

It is a good idea to establish a policy that not only covers energy efficiency tips but also guidelines for purchasing new equipment. As some brands of office equipment use less energy than others, it is important to consider the running costs of all options, and not just the purchase cost.

MYTH – Screen savers save energy

FALSE! – Screen savers can use more energy than normal operating applications, such as word processing. The most energy efficient solution is to switch off the monitor manually or through activating the 'ENERGY STAR' automatic monitor switch off. Refer to a manual for instructions as each model will be different.

Some energy efficient appliances may cost more to buy but will recoup savings over the lifetime of the equipment. Look out for the 'ENERGY STAR' label to identify more energy efficient products. See page 11 for more information.

fact:

Modern computer components tend to be more energy efficient than older equivalents, but because they are faster and more powerful, they can end up using more energy.

Invest to save

Consider upgrading existing equipment. Most computers can simply be upgraded with newer, more energy efficient components. Look into this before purchasing new equipment.

Explore modern alternatives. Upgrade to flat screen (LCD) monitors to reduce monitor energy use by over two-thirds. These screens emit less radiation than standard monitors and there are also obvious space advantages.

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 working, there can be health and safety issues related to prolonged usage, such as cramped hands and posture.

Match the computer to the task. Bear in mind current and predicted business requirements and purchase equipment that meets these. High spec PCs with large screens and fast processors use more energy. Remember, different staff roles will have different requirements, so specify accordingly.

Take running costs into account. Always compare equipment running and standby costs and insist that products have an energy label. See page 11 to find out more.

MYTH — Leaving a computer on uses less energy than switching on and off.

FALSE! — Start-up current surges use the equivalent energy as the machine would use in a few seconds of average running time.

The benefits of low energy equipment and standby modes

- Switching off or enabling power down mode reduces the energy consumption and heat produced by equipment, which in turn lowers cooling costs
- Low energy equipment will often have standby modes already enabled which will activate whenever machines are not used for a period of time
- Equipment lifespan will be extended and maintenance costs and risk of breakdown will be reduced.

fact:

A single computer and monitor left on 24 hours a day will cost around £45 a year. Multiply that by the number of computers your business has to understand what this might be costing you. Switching them off out of hours and enabling standby features could reduce this to less than £10 a year each and prolong the lifespan of equipment.

Printers

Unnecessary printing does not just waste paper; it wastes energy too. Managing your equipment and usage properly will allow you to save both.

Energy consumed by printers varies widely but in general, the faster the print speed and the higher the print quality, the greater energy consumption.

Printers can consume 30-40% of their peak power demand when idling between printing and standby modes so minimising this time can result in good cost savings, reduce heat output and increase the operating life of the printer.

Low-cost, quick wins

Switch off. Switch off equipment at the end of every day and only switch on when required the following day. Enable printer standby modes and print in batches where possible to allow the machine to spend more time in standby than idling. Newer printers start up faster, so employees are more likely to be happy about turning them off.

Install a plug-in **seven-day timer** to reduce the likelihood of machines being left on out of hours. These can be bought for a few pounds from most DIY stores.

Use the right printer for the job. Print internal documents with no immediate time requirements on slower black and white machines. Only use colour when absolutely necessary. Encourage staff to use print preview functions for checking layout and style instead of printing.

Default to meet most likely demand. Make it company policy to set default printing to double-sided (duplex). Reduce the default print quality for internal documents and draft outputs to increase print speeds and reduce toner use. Decrease print margins to minimise paper use.

Raise awareness. Keep staff informed of the energy that printers use. Encourage them to question their printing habits such as printing unnecessary documents and forgetting to collect them from the printer. Staff should be made aware of the amount of paper used each month and encouraged (or incentivised) to reduce this.

Purchase for your requirements. As laser printers are often the highest energy users both in active and standby modes, consider a high specification inkjet printer. Although they are slower, inkjet printers use less energy in standby and print modes and the print quality is usually just as good.

Some businesses use lower-specification printers, like inkjets, for internal documents. Labelling them 'low energy printers' on the network can encourage staff to select these for day-to-day use. This could be made company policy or set as the default.

Standby to save energy. For regular printing, purchase a machine with the lowest operating consumption as it is unlikely to be idle for long enough to go into standby. Select a printer with the lowest standby consumption for occasional printing and where usage fluctuates, consider a machine with multiple standby steps so it can enter a higher level of standby between uses.

Consider printer functions. When buying new equipment, ensure printers have options for duplex printing, reducing print quality and using lower melting point inks.

DID YOU KNOW?

— Laser printers use the same technology and consume similar amounts of energy as photocopiers. You can achieve savings by:

- Purchasing a machine with a slower print speed
- Printing in batches to reduce the time printers are idling
- Turning the printer off when it is not in use.

— A laser printer in sleep mode could use double the energy of a similar specification inkjet printer.

— Energy efficient printers can drop to 15-45 Watts or less in standby mode, depending on type and specification.

Photocopiers

The office photocopier is likely to be the highest single energy-using piece of equipment.

Copiers use between 40-70 Watts during standby and 1,400-1,600 Watts when operating. High volume copiers use more energy so should be used sparingly.

The majority of electricity consumed by photocopiers is used to heat components which fuse the toner to the paper and these are often kept hot whilst the machine is in standby mode. It is possible to reduce energy consumption by using low melting point inks so equipment can be held at a lower temperature. These should be available from your stationary supplier.

Low-cost, quick wins

Switch off. Allocate responsibility for switching off machines to one person to ensure this is carried out at the end of each day. Consider installing plug-in seven-day timers to automatically switch off photocopiers out of office hours and reduce costs.

Maximise standby savings. Always ensure standby features are enabled. Try to encourage staff to copy in batches where possible, to allow the machine to spend more time in standby than idling.

Match the copier to the job. Stick to black and white copiers and only use colour when absolutely necessary. Use high volume machines for large jobs but if high volumes of small copying jobs are more common, use low volume, fast response machines with low melting point inks.

Default settings. Set default copying to double-sided and ask staff to think carefully about the number of copies actually required so as to save on energy, paper and waste disposal costs.

Invest to save

Purchase for your requirements. Choose equipment that caters for current business needs and predicted requirements only. Consider:

- How fast the machine can return from standby to copy modes. The faster this is, the more energy used but the less likely it will be by-passed by impatient staff. Newer machines tend to have faster start up times
- The copy speed. The faster a machine copies, the more energy used
- The machine's ability to resize and copy at different print qualities
- The machine's ability to two-sided (duplex) copy and use low melting point toners.

Fax machines

Fax machines are frequently left on 24 hours a day to receive incoming messages but they may only be in use for 5% of the time.

Savings are achievable by following a few energy saving measures.

Invest to save

When purchasing a fax machine, consider:

The types of fax machine available

Machines that use laser printing have the highest print resolution but use the most energy. Machines that use thermal paper are the least expensive to buy but the paper is expensive, has a short shelf life and is difficult to write on. Inkjet faxes might prove the best solution as they can print at relatively high resolution on plain paper and use less energy than their laser printing equivalents.

Standby energy savings

Because fax machines will be in standby mode for most of the day, it is a good idea to choose a machine with the lowest standby energy use. Some machines have a buffer which allows them to store messages and print them all at the same time which will increase the time that the machine is in standby.

Operating options

Choose a machine with a toner or ink-saving option, often called 'draft mode'. Ensure machines can scan double-sided pages.

Combined machines or multi-function devices

In smaller offices or where workloads allow, it may be appropriate to purchase a combined machine that operates as a printer, fax and photocopier. Having only one machine switched on will significantly reduce energy consumption and reduce the amount of heat produced. This will lead to a more comfortable working environment and it also has added space advantages.

When considering such machines, consider the average power consumption and standby consumption figures for the whole machine to ensure it will be more efficient for your business needs.

DID YOU KNOW?

– Emails are cheaper and save more energy than sending a fax. If a fax is really necessary, then consider sending it electronically. There are many software options enabling faxes to be written and sent via a PC. Ask your IT department, look on the internet or consult your PC user manual for more information.

– If faxes are rarely received outside office hours and your machine has a buffer, it may be possible to switch it off out of hours. If in doubt, check with the equipment supplier or manufacturer.

– If there is more than one fax machine in the office, you can leave only one switched on and divert all calls to that machine, especially when the office is closed.

Vending and hot drink machines

Whether refreshments are provided for staff using a kettle, fridge or vending machines, there are cost and energy savings to be made.

Vending machines can contain a heating element and/or chiller to dispense drinks and food items. Their energy consumption varies depending on the insulation of the casing, temperature settings, internal lighting and the overall size of the machine; however, there are always savings to be made.

Low-cost, quick wins

Adjust temperatures to reduce costs. Drinks machines can often hold water at a different temperature to when the drink is made. Ask your equipment supplier or manufacturer whether the holding temperature can be reduced for hot water and/or increased for cold water.

For vending machines containing cold food, check whether the holding temperature can be increased without reducing food product quality or shelf life.

Turn equipment on in time. Find out how long it takes for equipment to reach the right temperatures for office hours and switch machines on just in time to meet this. Where products do not require continual temperature regulation, consider installing plug-in seven-day timers to more closely match demand.

See the light. It may be possible to reduce lighting in a vending machine by removing one or all of the fluorescent tubes. This will also decrease the amount of heat that the equipment has to deal with, which could reduce costs further if refrigeration is in operation. Always consult your manufacturer or equipment supplier for advice.

Reduce, reuse, recycle. Supply reusable mugs and cups. This will reduce waste from paper cups which are usually only used once.

Invest to save

When purchasing or leasing a new vending machine, ensure that it:

- Requires the minimal amount of water and only heats it when required
- Can be controlled using a programmed seven-day time switch
- Has low idling power requirements, high levels of insulation and low levels of lighting
- Allows users to use their own mugs.

facts:

– It is cheaper to provide a kettle for staff who work outside normal business hours than to continue to run a drinks vending machine during these times.

– If left on continuously, a typical vending machine can cost around £120 per year in energy costs.

Energy labelling schemes

There are four main energy labelling schemes for office equipment and electrical appliances.

ENERGY STAR

ENERGY STAR is a joint EU and US programme for office equipment helping businesses and individuals protect the environment through energy efficiency. It is widely used and accepted across the commercial sector. ENERGY STAR models have the following benefits:

Computers — use 70% less electricity than computers without enabled power management

Monitors — use up to 60% less electricity than standard models

Printers — use at least 60% less electricity and must automatically enter a lower power setting after a period of inactivity

Fax machines — use almost 40% less electricity and may have the capability to scan double-sided pages, reducing both copying and paper costs.

For more information go to www.eu-energystar.org

European Ecolabel Scheme

This scheme promotes products and services with high levels of environmental performance. Electrical equipment has to achieve very high energy efficiency targets. Criteria for specific product groups are based on a 'cradle to grave' assessment of product impacts using life cycle assessment methodology.

More information can be found on http://europa.eu.int/comm/environment/ecolabel

Certification mark

Energy Saving Recommended

Energy Saving Recommended is an Energy Saving Trust initiative backed by the Government. The logo is only found on products that have been carefully selected for their energy efficiency. Although the scheme does not specifically cover office equipment, it does cover other items, such as kitchen appliances and integrated digital televisions, that may be used in offices. It also covers energy saving mains controllers which sense that computers have been turned off and automatically cut the power from computer peripherals. Buy where you see the sign and help save energy, money and the environment.

The Energy Saving Recommended logo is a certification mark.

For more information visit the website www.est.org.uk/myhome

Market Transformation Programme

The Government's Market Transformation Programme (MTP) helps reduce the environmental impact of products across the product life cycle. The Programme does this by collecting information, building evidence and working with industry and other stakeholders to develop a common understanding on how product-related impacts can be mitigated. In the information communications technology (ICT) area, MTP is currently actively involved in the revision of specifications for the EU ENERGY STAR programme which is a voluntary labelling scheme for office equipment.

For further information visit www.mtprog.com

Good housekeeping and people solutions

The level of achievable energy savings from office equipment is down to the everyday management by staff. This should therefore be the focus of all awareness raising campaigns.

It is important to ensure staff members are aware of the benefits that energy efficiency can bring to the office in order to get them involved and committed to an energy management programme. Everyone should be reminded that good energy management helps to achieve:

- Cost savings
- Healthier and more productive working conditions
- A better environment
- An enhanced corporate image which can be promoted to clients.

All of this means an improved competitive advantage for your business.

Whether starting an energy conservation programme from scratch or simply assessing the effectiveness of an existing one, 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 very small businesses, this may be the owner or manager but in larger companies, an appointed staff member will often improve involvement and awareness across the whole organisation.

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 for opinions and encourage people to review their own working practices to increase energy savings. The best ideas usually come from those that use the equipment on a daily basis. Competitions, campaigns and team projects are great ways to get buy-in. Reinforce the benefits of improving the working area and give staff a sense of ownership of energy management.

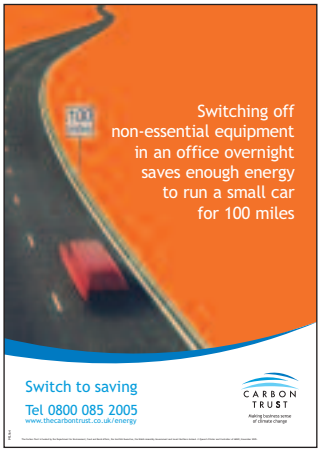
Set targets

Tell staff how much energy is currently being consumed. As the energy saving programme gathers momentum, it will be possible to track progress and highlight energy savings. Set targets — most businesses in the UK could reduce their total energy consumption by 10-40%.

However, be realistic: many companies start with 5% per year.

Get it in writing

Write guidelines on turning off equipment and use them to highlight how this makes the working environment more pleasant. Show management commitment by developing a policy whereby energy efficient products (especially with fast re-start times) are specified when purchasing.



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Examples of free posters available from the Carbon Trust

Conduct a walk-round

Carry out regular good housekeeping walk-rounds in your building to find out where energy is being used. Using a checklist (examples and templates available from the Carbon Trust), note down when equipment is being used and act on any wastage or maintenance measures needed. 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.

Walking round your office after everyone has gone home, or before everyone comes in, will give you an idea of what equipment tends to be left on out of office hours. Look around empty office areas for equipment left on during the day.

> It is better to switch off equipment overnight than to rely on standby features as these will still use energy.

Take meter readings

Meter readings can give a picture of the energy usage in the office.

Take an electricity meter reading at the end of the working day and another at the start of the following day. Deduct the first reading from the second one and divide this by the number of hours between the two readings. This will give you an idea of the energy used every hour the office is empty.

Multiply this by the number of unoccupied hours in a year to find out how much energy is used when no-one is in the building. By multiplying this by the price you pay per kWh (from your bill), you will discover how much this is costing you.

In most offices, the overnight energy consumption should only be a small percentage of the overall energy use. Take a third reading at the same time the following evening and deduct the first reading from this to get your 24-hour consumption. Divide the overnight consumption by the 24-hour consumption and multiply by 100 to find out how what percentage of your energy is used when no-one is around.

Contact the Carbon Trust for more information about meters and monitoring energy use.

Action checklist

✔	Action	Savings
☐	Switch off all non-essential equipment out of business hours	Approximately 60% of office equipment running costs
☐	Enable standby features on all equipment	Around 30% of costs associated with PC and monitor use
☐	Turn off unnecessary equipment during the day to reduce heat build-up	Improved comfort and reduced electricity use
☐	Fit seven-day time controls to equipment that is shared (e.g. printers and photocopiers)	Around 50% of costs associated with printers and copiers
☐	Set defaults on printers that are mainly used for internal documents to duplex and reduce print quality	Save on energy, toner and paper costs
☐	Raise awareness amongst staff of the benefits	Responsible staff achieve maximum savings
☐	Monitor out-of-hours electricity use by taking regular meter readings	Approximately 60% of costs associated with office equipment
☐	Use the right equipment for the job	Inkjet printers in sleep mode use 50% less energy than a laser printer
☐	Conduct regular walk-rounds to discover changes in user behaviour	Attitudes and behaviour change over time Timely action will maximise savings
☐	Purchase equipment with low energy options that match your requirements	This could save around 10% of your printing costs alone
	Contact the Carbon Trust for further guidance and support on improving energy use	

The Carbon Trust can provide stickers and posters. Call 0800 085 2005 or visit our website at www.thecarbontrust.co.uk/energy

Next steps

There are many easy low and no-cost options to help save money and improve the operation of your office equipment.

Step 1. Understand your energy use

Look at your office equipment and identify the amount of energy each equipment type is likely to use. Check the operation of equipment and monitor the power consumption over a week to obtain a base figure against which energy efficiency improvements can be measured. Take regular readings over this period to discover out-of-hours use. You will then be able to compare this with later readings.

Step 2. Identify your opportunities

Walk round your office and identify what equipment is present and how it is currently used. Doing this at different times of the day will help you to understand how staff use the equipment available to them.

Step 3. Understand staff attitude

Find out how staff use their machines and their attitude to energy saving. A simple questionnaire at the start and at the end of the first campaign can give an indication of whether you are achieving an increase in awareness and understanding amongst staff. This can be found in the Carbon Trust's free *Creating an awareness campaign* pack (CTG001).

Step 4. 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. It is a good idea to allocate overall responsibility for energy management to a named individual with senior management backing.

Step 5. Seek specialist help

It may be possible to implement some energy saving measures in-house but others may require specialist assistance. For example, if you want to control vending machines or equipment that is leased, speak to the supplier.

Step 6. Make the changes and measure the savings

Implement your energy saving actions and measure against original consumption figures. This will help you to identify savings and make the case for investing some money in further energy saving opportunities.

Step 7. 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.

Notes

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.thecarbontrust.co.uk/energy

All of our publications are available to order or download from the Carbon Trust website at www.thecarbontrust.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 Carbon Trust services.

receive free publications

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

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

CARBON TRUST

Making business sense of climate change

The Carbon Trust works with business and the public sector to cut carbon emissions and capture the commercial potential of low carbon technologies.

An independent company set up by the Government to help the UK meet its climate change obligations through business-focused solutions to carbon emission reduction, the Carbon Trust is grant funded by the Department for Environment, Food and Rural Affairs, the Scottish Executive, the Welsh Assembly Government and Invest Northern Ireland.

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