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# Office equipment

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Introducing measures to help businesses reduce their energy consumption



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# Preface

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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 organisations take action to reduce carbon emissions, and the easiest way to do this is to use energy more efficiently.

This technology overview introduces the main energy saving opportunities for office equipment. By taking simple actions you can save energy, cut costs and may increase profit margins.

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# Introduction

At many commercial and public sector sites, office equipment is one of the biggest consumers of energy – and one that staff have direct control over. It therefore represents a great opportunity to involve staff in saving energy and improving efficiency.

This guide looks at some typical energy-consuming items of equipment, and how you can minimise the amount of energy they can use. We have covered the following in this guide:

- IT equipment & working practices
- Appliances
- Portable heating & cooling

Since the launch of the Green Business Fund in 2016, the Carbon Trust has delivered over 500 fully funded opportunity assessments for SMEs across Great Britain. This guide is part of a series that aims to help you improve energy efficiency and reduce your organisation's carbon footprint.

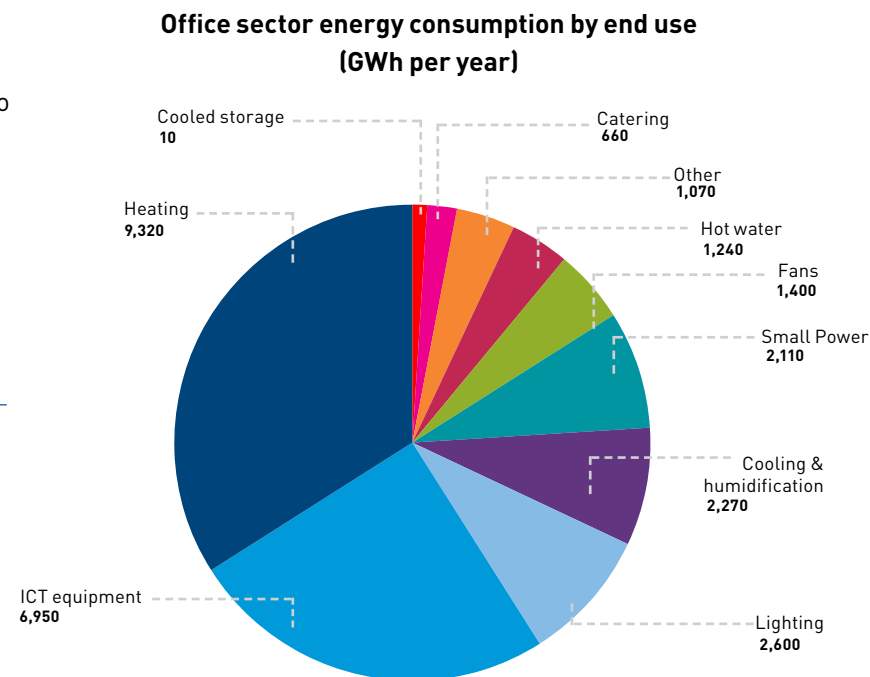
In addition, 900 SMEs in Great Britain have also received capital contributions towards projects which have saved up to £115 million, at the same time reducing lifetime carbon emissions by 430,000 tCO<sub>2</sub>.

A variety of additional guides will also complement the advice given within, further assisting with the implementation of energy efficient technology and

behaviours. Each guide includes real-life examples of savings made by local companies and will set out simple steps to help you save energy and improve your competitiveness.

Other guides available from the Carbon Trust include:

- [Lighting overview guide](#)
- [Heating, ventilation and air conditioning \(HVAC\) guide](#)
- [Carbon footprinting guide](#)
- [Renewable energy sources](#)
- [Building fabric guide](#)
- [Office based companies](#)



**Figure 1** Breakdown of total energy use within air-conditioned offices highlighting the importance of addressing ICT equipment efficiency. Source: Building Energy Efficiency Survey 2016.

# Quick view

## Good practice

- ✓ People take responsibility for the equipment that is under their control
- ✓ All office equipment has energy saving features enabled
- ✓ Where possible, IT equipment is centrally monitored and controlled
- ✓ Only equipment with a high energy efficiency rating is purchased
- ✓ Any vending machines are controlled to minimise out of hours energy use – suppliers are encouraged to provide energy efficient units

**Plug loads can represent up to 50% of the electricity use in buildings with high efficiency systems.<sup>1</sup>**

<sup>1</sup> <https://newbuildings.org/resource/plug-load-best-practices-guide/>

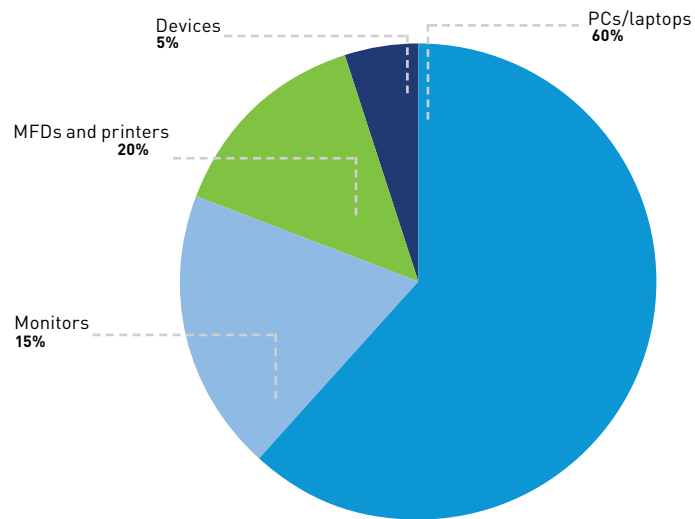
## Bad practice

- × Equipment is left on overnight
- × Equipment with an energy saving mode does not have it enabled
- × The energy performance of new equipment is not considered when buying it
- × The opportunity to upgrade old monitors and PCs to flat screen monitors and low power PCs/laptops has not been taken
- × There are no options for PIN controlled double-sided printing
- × Photocopiers and MFDs are next to temperature controls and thermostats
- × Staff are allowed to bring electric heaters and kitchen equipment from home without restriction
- × Fridges are under utilized and/or old and in poor condition
- × Vending machines are left fully operational outside working hours

# IT Equipment & working practices

As Figure 2 shows, PCs and laptops are typically responsible for 60% of the energy consumed by office equipment.

**Carbon Trust analysis of average IT office equipment energy use 2018**



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

**Figure 2** Energy use of business equipment in the typical office

Servers and networks also represent a significant proportion of office/commercial energy use. These are not covered here, but there are techniques to reduce the energy use of the IT infrastructure, from virtualisation to low energy cooling systems. The Carbon Trust's [Office based companies guide](#) is a good place to find further information on these techniques.

PCs, laptops and monitors are an ideal opportunity for individual staff to take responsibility for energy management, as their computer is usually the one item of workplace equipment each person has individual control over. Studies have shown that the average computer is only used for a small fraction of the time that it is on, as people leave them on while making tea, attending meetings or undertaking work that does not require it.

People are often reluctant to switch their computers off during the day, as they can take

time to reboot. But most operating systems will allow you to switch off different parts of the system to save power. Modern systems have increasingly fast boot up times so consider completely turning off PC's and laptops during extended down periods such as lunch breaks.

In large organisations the IT department may be responsible for setting power saving profiles, while in smaller companies it may be up to individuals. Consider using network software that can monitor and control PC usage – for example, by sending automatic emails to people who leave their computers on overnight. Some organisations install power management software that will automatically enforce shut down of PCs and laptops that ensure equipment is turned off overnight and when not in use for extended periods.

To reduce the energy consumed by equipment, your IT department will need to collaborate with staff to find the best way to minimise energy use.

## Printers and photocopies

Network printers and photocopiers are usually shared within an office, so people don't feel as much responsibility for them as they do their own computers. Most modern photocopiers and network printers have energy saving or hibernation modes – if yours do, make sure you enable them. A simple way to save energy and cost is to try and minimise the amount of printing or photocopying that is done.

Many organisations add a “don't print unless necessary” footer when referring to general reports, agendas and spreadsheets. Where printing is necessary, ensure that PIN controlled technology is available to prevent unauthorised use, and always print double sided/multi-sheet where possible. Encourage staff to reduce habitual printing of notes and agendas by adopting digital notetaking tools.

You should also remember that in an air- conditioned office the heat generated by IT equipment has to be removed by the cooling system. So you pay twice; once to generate the power and again to remove the heat it creates.



## Laptops and devices

Across the commercial sector, laptops are now becoming the desired technology and workstation of choice. Not only do laptops have lower power requirements which will contribute towards cost and energy saving, the use of laptops also facilitates more agile working practices and cultures. In addition to laptops, the introduction of smart phones and tablets, which can be used in a variety of ways, can offer suitable alternatives to existing desktop PCs at much lower power requirements.



## Smart working / equipment

As technology continues to develop, businesses more than ever have a wide variety of smart working tools available to improve productivity and efficiency. Homeworking, alongside the use of virtual meeting technologies, can help to reduce both business costs and carbon footprints. More information can be found in the [Carbon Trust Homeworking guide](#).



# Appliances

Most offices have some provision for refreshments and comfort facilities but these can vary from simple sink areas and toilets to fully equipped kitchens and bathrooms. Staff can save energy in the same way they would at home by:

- Using energy efficient hot and cold water systems such as smart hot water taps, which can use up to 55% less power when on standby. Use of these taps can be combined with scheduled controls to maximise cost savings.
  - Provide microwaves for food preparation rather than energy intensive cookers and hobs.
  - Keep fridges closed, well-sealed and make sure they are defrosted. Reduce numbers of fridges by rationalizing space where possible.
  - Only run dishwashers at the lowest effective temperature and when completely full.
  - Install high speed low power hand-dryers to contribute towards substantial cost savings, and favour these over the use of paper towels, as they usually have a lower overall carbon footprint.
  - Where provided, consider carefully the use of electric showers over gas fired hot water tank storage types. Depending on actual use, one system can be more efficient than the other.
- Smart control systems can now be used on vending machines, which ensure machines can be monitored remotely and powered down when necessary. Alternatively, seven day timers can also improve machine efficiency particularly when wired (rather than “plug-in” types). Be careful about removing plugs from vending machines as this might invalidate the warranty – use a time controlled socket instead. Timers with battery backup are a good idea to avoid losing time in case of power interruptions. Remember also to reset the timer when the clocks change. Only fit time clocks on machines that are safe to turn off outside working hours. Talk to your vending machine supplier to see what control systems are most favorable for your machine.

## Further reading

[Carbon footprinting guide \(CTV043 v3\)](#)

[Energy saving opportunities for office based companies \(CTV007\)](#)



**Fitting a time clock to vending machines such as this can payback in under a year**



# Portable heating & cooling

## Portable fans

Portable and stationary desk fans are now becoming increasingly prevalent across many offices, as both the UK climate warms and insulation on office buildings improve. The PAT process should be applied and labels distributed to ensure that fans are used appropriately in the workplace.

Although power usage in comparison to heaters is minimal, if a number of office based fans are allowed to multiply, then overall energy wastage can still be significant. Portable fans should be seen as a last resort to cooling comfort controls. There may be a problem with the cooling systems if a number of fans are required to improve comfort. Consider the option to utilise natural ventilation (if centralised systems are off/not in place) over the use of portable cooling systems.



## Portable heaters

All portable heaters in the workplace should be subject to Portable Appliance Testing (PAT), which enable policing of their use. The PAT label can be used to distinguish between official and 'illicit' heaters. You can then keep a log of PAT labelled heaters issued and unlabelled items can be removed from the workplace.

In one hospital where the Energy Manager was also the Fire Officer an extreme version of this system was in action – he had an official mandate to unplug and cut the leads off any illicit heaters on site!

Portable heaters can affect an office's general temperature control. If you genuinely need one, there is probably a problem with your heating system. If it's not possible to fix the heating, make sure that any supplementary heating is correctly installed and operated.



**A 2kW heater might cost around 25p per hour to run. Running for eight hours a day each heater would use £10 worth of power a week, and over £350 a year (used for 8 months per year).**

# Checklist



	What?	Why?	How?
1	Are all computers, printers and associated equipment switched off when not in use?	Leaving computer equipment switched on for long periods when it is not in use wastes money. The heat given out by equipment when switched on may encourage the use of portable fans and add to air conditioning costs.	<p>Identify equipment, which can be switched off when not in use.</p> <p>Use green and red different shaped labels to indicate which equipment can be switched off and which must be left switched on.</p> <p>Make the appropriate people aware that green-coded equipment should be switched off when not in use.</p> <p>Consider using network software to turn off unused equipment.</p>
2	Are printers/MFDs switched to stand-by mode when not in use for long periods?	Many printer/MFDs have a stand-by mode (sleep mode) that will reduce the power without switching off the machine.	<p>Encourage people to switch printers/MFDs to stand-by mode during long periods when they are not in use.</p> <p>Where possible enable automatic use of stand-by mode.</p>
3	Do you check regularly whether there is any use of unauthorised portable electric heaters and desk fans?	Portable electric heaters and fans are very expensive to run. Often, they do not have time switches or thermostats and are often left running continuously. Added problems can occur if the area they are in is air conditioned or heated centrally.	<p>Check regularly for use of unauthorised portable electric heaters and fans. If people are regularly using portable electric heaters and fans, check the space heating/cooling arrangements for that area.</p> <p>Note: There may be an issue with Portable Appliance Testing in that unofficial heaters may not have been tested.</p>
4	Is a regular check made on the condition of seals on fridges and freezers?	Worn or damaged seals increase refrigeration costs by allowing warm air to enter into refrigerated space and cold air to leak out.	<p>Set up a programme for regular inspection of seals.</p> <p>Replace all seals that show any signs of wear or damage.</p>

# Checklist



	What?	Why?	How?
5	Is fridge space being correctly rationalized and filled?	Ensuring that fridge space is filled correctly will serve to minimise energy consumption and reduce wastage.	Implement a programme for regular inspection of fridge spaces. Glass bottles of tap water can serve as an effective item to fill fridge space.
6	Have you checked that tea urns are not left boiling continuously?	Continuous operation of tea urns is generally unnecessary and wastes money.	Check the way that tea urns are used. Install instantaneous water boilers where possible.
7	Have you installed smart tap hot water systems into the office?	Smart taps will use less power when in operation and can be managed through the implementation of scheduled controls.	Replace older kettles with innovative smart tap designs, which can provide both boiling and chilled water on demand.
8	Have you thought about moving away from PCs towards laptops and tablets?	Laptops and tablets will often have lower power requirements and greater energy efficiency ratings. The implementation of such alternatives will also allow for more flexible working cultures to be adopted.	Make sure that energy efficiency is always included in purchasing specifications. Consider upgrading office wide systems to achieve longer-term cost savings.

# Your next steps

Start with the following easy low and no-cost options to help save money and improve the energy performance of the office:

## Step 1: Understand your energy use

Look at the site and identify the major areas of energy consumption. Check the condition and operation of equipment and monitor power consumption over one week to obtain a base figure against which energy improvements can be measured. Also monitor relevant variables that affect energy consumption.

## Step 2: Identify your opportunities

Compile an energy checklist. Walk round the site and complete the checklist at different times of day (including after hours) to identify where energy savings can be made. See [Checklist](#).

## Step 3: Prioritise your actions

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

## Step 4: Seek specialist help

It may be possible to implement some energy saving measures in-house, but others may require specialist help. 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. Take the variables and driving factors into account when you come to verify savings. This will assist future management decisions regarding your energy priorities.

## Step 6: Continue to manage your office's energy use

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

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# 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.

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**Website** – Visit us at [www.carbontrust.com](http://www.carbontrust.com) for our full range of advice and services.

👉 [www.carbontrust.com](http://www.carbontrust.com)

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**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](http://www.carbontrust.com/resources)

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**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](http://www.carbontrust.com/events)

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**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/](http://www.carbontrust.com/small-to-medium-enterprises/)

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**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](http://www.carbontrust.com/our-clients)

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**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](http://www.carbontrust.com/greenbusinessfund)

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**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](http://www.carbontrust.com/resources/tools/sme-carbon-network)

The Carbon Trust is an independent company with a mission to accelerate the move to a sustainable, low-carbon economy. The Carbon Trust:

- 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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The development of this publication has been funded through the Carbon Trust **Green Business Fund**, an energy efficiency support service for small and medium-sized companies in England, Wales and Scotland.

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Published in the UK: December 2018. CTV005 v2

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