



Department  
of Energy &  
Climate Change

# SME Guide to Energy Efficiency

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# Is this guide for you?

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The advice and ideas in this guide will help any business become more energy efficient, but it will be especially helpful if:

You're an SME



You haven't looked at reducing your energy bills for a while



You have little to no experience in identifying areas where you can save on your bills



Your energy bills are not a large proportion of your overall cost base



Energy management is not a core part of your job



You're a large company



You have an ongoing programme of energy management



You're experienced in identifying energy cost savings



Your energy costs are a large part of your overall cost base



Energy management is part of your job



We know every SME is different, so some of the opportunities in this guide will be more applicable than others.

But if you don't like wasting money on energy you don't really need and you want to cut your energy bills, improve your working environment and meet your customers' environmental expectations – read on because **this guide will have something for you.**



# Introduction

“ Almost a **third** of small firms highlight the cost of energy as a barrier to the growth and success of their business. Finding energy efficiency savings is the single best way of **reducing these costs** over the long-term. Small businesses need all the support and information they can get to help to make these savings wherever possible.”

John Allan, National Chairman of the Federation of Small Businesses.



# Introduction

No-one likes to waste things, whether it's time, money or energy – especially when profits are under pressure and margins are tight. This guide aims to save you all three. While gas and electricity may not be your biggest bills, price volatility means it's an area well worth looking at.

The Government's energy projections suggest energy price increases between now and 2020. By installing energy efficiency measures, businesses can take control of their energy use, reduce avoidable loss and cut their energy bills.

Based on experience, the average SME could reduce its energy bill by 18-25% by installing energy efficiency measures with an average payback of less than 1.5 years. And it is estimated 40% of these savings would require zero capital cost.<sup>1</sup>

**This practical guide is based on the real world experiences of a team of professionals who've been helping companies improve their energy efficiency for decades, so everything here is tried and tested.**



“M&S has benefited significantly from reducing energy use in its built environment in terms of carbon and operating cost reductions. We engage our supply chain partners so that they can enjoy these benefits for their own businesses and help **reduce the carbon impact** of the products and services they supply M&S.”

Munish Datta, Head of Plan A and Facilities Management at Marks and Spencer.



# Know the benefits

One of the great things about energy efficiency is that, once you make savings, they go straight to the bottom line and they stay there, year after year. Even if the return on some measures might not seem overly impressive at first, it's worth considering how many extra sales you'd need to make the same amount of profit.

And it doesn't stop there – energy saving comes hand-in-hand with other benefits. To the right are just some of the widely recognised benefits of energy efficiency.<sup>3</sup>

However limited your time, this guide is designed to give you the knowledge, ideas and tips you'll need to start reducing your bills today, even if you have never done this before.

The rest of the guide looks at where you might be using energy, what you might have already thought about and what you could be doing next.

Increased productivity
Ability to win new contracts, especially with the public sector
Attracting and retaining the right quality of staff
A more comfortable working environment
Reduced energy bills can be used to fund new jobs
Increased competitiveness
Increased profitability
Improve your SME's green credentials
Reducing your exposure to future energy price rises
Improve your cash flow
And wider benefits to society from reduced carbon emissions and improvements in air quality

For a company with a **5%** profit margin over 3 years, a **£500**-a-year saving from energy efficiency makes the same profit as **£30,000** of extra sales.<sup>2</sup>

- **Where to start?** covers simple no and low cost actions to help start you off.
- **What next?** helps you to identify where to make the right investments to take your savings to the next level.

The guide also looks at how to engage the workforce, how to identify energy saving opportunities and how to source funding for making improvements. And there is an easy-to-use glossary and FAQ reference included towards the end of the guide.

**So, if you want to find out more about how to reduce your energy bills, improve relationships with your customers and employees, win new contracts and reduce your exposure to future energy price costs – read on!**



“With energy prices (electricity) for a medium-sized user predicted to rise by almost **30%** in the next **5 years**, many businesses are looking to manage future risks by investing in energy efficiency.

Reducing energy use doesn't always mean spending a lot. Business can cut costs through low to medium cost measures such as replacing lights or heating systems or encouraging employees to change behaviour.”

Michelle Hubert, Head of Group, CBI



# Where to start

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There are lots of simple, straightforward actions you can take that **won't cost you anything** and will **start saving you money straight away**. You may be doing some of these things already, while others might be completely new ideas.





# Heating

Whatever method you use to heat your premises, this section covers a number of simple steps

that will save you money on energy and make staff more comfortable.

# Let's start with the obvious

## Timers and thermostats

The longer your heating is on and the higher the thermostat is set, the higher your bills will be. But too often timers and thermostats are installed and forgotten about. A few simple steps can make all the difference:

### Make sure

Timers are set to the right date and time, especially when the clocks change – you can add a reminder to your calendar.

Different working hours on weekends and Bank Holidays are taken into account when setting controls.

The heating in offices is set at the recommended 19°C<sup>5</sup> and cooling set at 24°C or higher.<sup>6</sup>

The temperature is set lower than 19°C in corridors, storerooms and areas of higher physical activity.

Controls are not tampered with – if you haven't already done so, identify a member of staff to take responsibility for the controls.

Everyone is aware how expensive air conditioning (AC) is: it can double your energy bill.<sup>7</sup>

Ensure air conditioning is turned off in meeting rooms when people leave.

Either open windows or use AC – never both, or you'll just be cooling the neighbours.

AC in IT server rooms is set as recommended by the manufacturer.

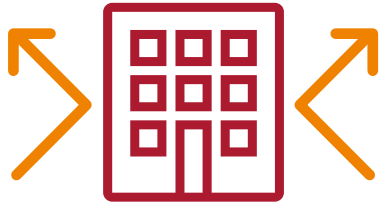


Heating costs increase by around **8%** for every **1°C** increase.

Turning it down **2°C** would save **£140** on a **£1,000** bill.<sup>4</sup>

Turning the temperature up high on your thermostat does not warm the room up quicker!





## Doors and windows

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Up to 30% of heating costs can be saved by preventing cold air entering a building,<sup>8</sup> so controlling this is one of the simplest ways to reduce energy bills. The following steps **won't cost you a penny**:

### Make sure

Staff are aware of the cost of wasted heat

Draughts, unused doors and flues are sealed up

Doors are not propped open for convenience

Staff are encouraged to turn the thermostat down before opening doors or windows



## Office layout

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Where people sit can make a big difference to how warm they feel. A clear sign that there is a problem is the use of plug in electric heaters; these are expensive to run and are a possible health and safety risk.

### Make sure

Radiators are free from obstructions – don't block these with cupboards or filing cabinets

Staff desks are in the 'goldilocks' position – not too close or too far from radiators

Thermostats are set correctly and are in the right location



# So you've got the ball rolling, what next?



## Timers and thermostats

Not only does over-heating and cooling waste money, it also has an impact on staff morale and productivity, so it's worth a little investment. Unfortunately, sometimes thermostats are just in the wrong place and they'll need to be relocated. These **low cost** actions are worth investigating:

### Why not?

Relocate thermostats to areas that aren't affected by local heating or cooling from radiators, draughts or direct sunlight.

Upgrade to modern electronic thermostats which are much more accurate. These thermostats can be wireless, making fitting easy.

Fit additional thermostatic controls in problem areas where comfort levels are difficult to maintain.

If you can't keep warehouse doors closed, **PVC strip curtains** can be cut to provide a fork-lift truck sized opening while still significantly reducing energy losses.<sup>10</sup>



## Doors and windows

Put simply, the larger the opening, the bigger the cost. A systematic look at all the windows, doors and other sources of draughts will enable you to significantly reduce the amount of cold air entering your building at **low cost**, while still ensuring adequate ventilation where needed.

### Why not?

Identify all sources of draughts and fit appropriate draught proofing.

Separate areas which have different temperatures with swing doors that allow easy access, or fit PVC strip curtains to reduce draughts.

Fit spring-loaded door closures to minimise the amount of time doors are open.

Interlock heating controls with warehouse door opening, so heaters only work when doors are closed.



# Case study

By installing a **£100** timer to its existing heating system, the Chinese Contemporary Arts Centre in Manchester is saving **£4,363** and **17.6 tonnes** of CO<sub>2</sub>e a year.<sup>9</sup>

£100 investment =

**£4,363**  
**saving**





## Operational maintenance

Like your car, a bit of regular maintenance can make all the difference to your boiler or air conditioning – it keeps it working smoothly and so keeps your costs down in the long-term. You might need to get someone in to help you, but it will keep your equipment working at its best, and may save on future maintenance and repair bills.

**Why not ask your engineer to modify the control system so that the timer/thermostat switch shuts off both the circulating pump and the boiler itself.<sup>11</sup>**

### Why not?

Check that your boiler stops firing when the thermostat or timer shuts off the circulating pump. Boilers that continue to fire when the pump is off are wasting you money.

Regularly check and maintain any air conditioning units you have and ensure air filters are free from dust. Even a small reduction in airflow will increase running costs, so keep them clean and replace as necessary.

Ensure annual boiler services include a combustion efficiency check and adjust the burner air/fuel ratio to ensure maximum efficiency (in line with manufacturer's instructions).



## Pipework

Uninsulated pipework can be a significant source of heat loss and wasted energy – it acts as an uncontrolled heating source in areas you might not want it, and takes useful heat away from areas that need it. Simply **insulating pipework can reduce energy losses by 70%**<sup>10</sup> and ensure the levels of comfort you want.



## Extraction systems

While adequate air extraction is often necessary, taking excessive air away is expensive and can create uncomfortable working conditions. The simple solution is to **control the operation of extractors through timers or interlocked controls** to prevent unnecessary extraction.





# Lighting

Having sufficient lighting is important and relevant to every business. For many, it is one of the most energy intensive parts of the business and can be

responsible for up to 40% of a building's electricity use.<sup>12</sup> However, a few small changes can significantly reduce your costs. This section covers a

number of suggestions that could help to save you money, as well as improve your working environment.





# Let's start with the obvious

## Switch it off

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You know the longer your lights are on for, the more energy they will use, but it's an easy thing to miss nonetheless. Meeting rooms, storage areas and corridors in particular are often lit unnecessarily, as there is often no one person responsible for them. **The following measures won't cost you a penny:**

### Make sure

You are aware of unoccupied areas, store cupboards, and corridors where lights can be left on.

The people who are last to leave (whether it's daytime staff, cleaners or security) agree the rule: last one out turns the lights out.

You create reminders and promotional materials to raise awareness so that staff are clear that lights should be turned off when not required.

Switches are labelled so it's clear which switch relates to which lights – you can only control what you know.

It's a myth that turning lights off and then back on uses more energy than leaving them on all the time. It's always best to turn them off when not required, even if it's just for a short time.

Why not take a quick survey at the end of the day to quickly identify places where lights are being left on and action is required.





## Natural light

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It seems obvious, but there may be areas where natural light from windows and skylights is not being used to its full potential. It could be that by making simple zero or low cost changes, you won't need as many (or any) lights on, therefore saving energy as well as creating a more pleasant working environment for staff:

### Make sure

You relocate any objects that block windows, such as filing cabinets.

Your office plan maximises natural light by arranging desks near windows without causing natural glares.

All window blinds are open during daylight hours where possible.

Windows and skylights are cleaned regularly.



## Lighting maintenance

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Lighting is often overlooked in the day-to-day maintenance and cleaning of buildings. As a result, inadequate fixtures can lead to inefficient lighting. It is important to review and then incorporate lighting maintenance into your overall maintenance procedures.

### Make sure

You organise for light fittings to be regularly dusted and cleaned, at least once a year. This will improve lighting without increasing energy use.

Lighting in non-working areas such as corridors is minimised. This can be done by removing tubes from multi-tube fittings or disconnecting surplus bulbs, but don't go too far – the HSE has clear guidance on safe lighting levels in HSG38.

You replace discoloured lights to avoid more lights being turned on to compensate.

You check your security lighting. This can be high-powered and energy intensive, so make sure the timer and any daylight sensor controls are set accurately.



# So you've got the ball rolling, what next?

## Lighting controls and sensors

Beyond the simple action of switching off lights when they're not needed, there are a number of other easy-to-implement measures you can take to gain more control over your lighting costs. Installing timers and sensors are an excellent low cost solution – occupancy sensors alone could cut energy use from lighting by 30%.<sup>13</sup> This is especially important for areas that are often left unoccupied, that only require lighting when it's dark, or even for just making sure everything gets turned off at the end of the day. Don't forget external flood lights can be very expensive – a single 500w flood light will cost around £250 a year if it's left on for 12 hours overnight.<sup>14</sup>

### Why not?

Install timer switches to make sure lights are turned off outside working hours. Timers are easy to install and are very low cost – they can payback within a matter of months.<sup>16</sup>

Review external/security lighting and install movement sensors to reduce costs whilst maintaining security.

Consider using movement sensors in infrequently used areas such as storerooms, toilets and corridors – to prevent lights being left on unnecessarily. Alternatively, timed switches can be used to switch off lights a few minutes after a push switch is activated.

Look at installing daylight sensors in areas that use both natural and artificial light. These can automate lights to turn off when there is sufficient daylight in the room.

Review your lighting switches – is there just one switch for all of your lights? Consider splitting them up with more switches so you have more control over individual areas of your workspace.

**It doesn't need to be a case of all on or all off – lighting could be zoned so that every other fitting switches off on sunny days. Doing this will ensure that lights nearest to the windows switch off first.**



By adding occupancy sensors to its store area and toilets, an electronic components manufacturer is saving **£813** and **5 tonnes** of CO<sub>2</sub>e a year. The initial **£225** investment paid for itself in three months.<sup>15</sup>

**£225 investment =**

**£813**  
**saving**

## Case study



# So you've got the ball rolling, what next?



## Office refurbishment

Don't miss out on other opportunities to maximise your use of light during periods of refurbishment. This is a great time to build in new ideas and more efficient equipment, and often **it won't cost you any more money.**

### Why not?

Consider a light reflective paint colour to maximise light gains when repainting your workspace.

Consider horizontal rather than vertical or roller blinds if your installing window blinds to cut glare. Vertical and roller blinds can block out too much natural light, requiring more artificial lighting. Horizontal blinds can be set to protect computer screens while directing light onto the ceiling to maximise its benefits.

If desks, production equipment or storage racking are moved, make sure lights are relocated to their ideal location to match the new workspace layout – there's no point lighting up the top of a shelf.



# Office equipment



Office equipment – computers, printers, and kitchen utilities – can be big energy users. The great news is that there are some really simple steps to cut down on these energy costs just by

raising awareness and changing bad habits. **46%** of electricity in businesses is used outside of standard operating hours,<sup>17</sup> so whether it's leaving on monitors or vending machines keeping

things unnecessarily cool at night, this section arms you with the right knowledge to minimise unwanted energy use.



# Let's start with the obvious

## Switch it off

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If a piece of office equipment isn't being used, it doesn't need to be turned on – you're only paying for energy which isn't being utilised. Even leaving things on standby can still be a big waste – each little red dot costs around £1 a year for every watt of power used.<sup>18</sup> It all adds up and can make a noticeable difference to your energy bill.

### Make sure

Staff turn their computer monitors off if they are away from their desks for more than 10 minutes, and that both PCs and monitors are turned off at the plug at the end of the day.

The brightness of monitors is optimised – having them too bright not only uses more energy, it can cause eye strain.

All communal equipment is turned off at the end of the day, including printers, copiers, vending machines and coffee machines.

Infrequently used printers and photocopiers are only turned on when required and are set to go to sleep after a few minutes of inactivity.



Leaving equipment on can also reduce the lifetime of the equipment so you'll need to replace it more often.



An engineering firm is now saving £596 and 3.5 tonnes of CO<sub>2</sub>e a year just from implementing a 'Switch Off' campaign to ensure all office computers are turned off at the end of the day and at weekends.<sup>19</sup>

## Case study

£596  
saving





# Let's start with the obvious

## In the kitchen

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Kitchens are one of the easiest places in the office to make energy savings, but when people are busy it's all too easy to forget about communal areas, with staff only focusing on the task at hand and the energy use from their own desks.

### Make sure

All electrical kitchen items, such as microwaves and kettles, are switched off at the plug at the end of the day.

Dishwashers are fully filled before being switched on, and that an energy saving cycle is used if available.

Kettles are only used to boil the amount of water that is needed. Making rounds of hot drinks is more efficient than making them separately.

Space in fridges is maximised – they work most efficiently when about three quarters full, so that cool air can still circulate.

Freezers are regularly defrosted to work more efficiently.

Any electrical items that are not used regularly are unplugged.

A washing-up bowl is provided if washing up is done at the sink so that the hot tap isn't left running.

Damaged door seals on fridges and freezers are repaired or replaced – if the door isn't shutting properly, it's costing you money.

The dials on fridges and freezers are set at the appropriate levels. Fast-freeze can increase electricity demand unnecessarily.



DJS Research, a market research company, has installed timer switches to turn off its two water coolers out-of-hours, saving **£144** a year (paying back in 35 days).<sup>20</sup>

## Case study

**£144**  
**saving**



# So you've got the ball rolling, what next?

## Timing it right

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Not all office equipment comes fitted with a timer device, but they can be purchased from DIY stores for only a few pounds and help to remove 'human forgetfulness' from the equation. There are also software packages that allow you to shut down PCs with a single click.

### Why not?

Install a plug-in seven-day timer on your vending machines and any drinks fridges – if the contents aren't perishable, they don't need to be chilled at nights and weekends.

## Replacement

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When your equipment needs to be replaced, consider the energy efficiency ratings of replacement options – more energy efficient products will most likely be cost competitive but even where they do cost a little more in purchase price this will be outweighed by the savings you make in lifetime running costs.

### Why not?

Write a policy which commits you to look at both the initial purchase and lifetime running costs of any new equipment you purchase. Spending a few pounds more at purchase could save you more money in the longer term.<sup>21</sup>

Consider where your replaced equipment is going - it could be valuable to someone else so think about donating or recycling before treating it as waste.

## In the kitchen

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Items such as microwaves and kettles are cheap to replace and newer models are much more energy efficient – buying the most efficient models won't necessarily cost any more but will save you money in the long-term.

### Why not?

Identify the most frequently used items and upgrade them to a more energy efficient model.

Consider installing a dishwasher if you do a lot of catering – it's more energy and water efficient to run a full dishwasher on an eco-cycle than it is to wash the same amount of crockery by hand.





# Production equipment

Process and production equipment is vital to operations. Whether you're using motors as part of your manufacturing process, compressed air in your garage or refrigeration equipment

as part of a retail business, energy use from production equipment is everywhere. It's important to understand where you're using energy, and smart meters can help you do this.

Older, poorly maintained and inefficient equipment is one of the biggest culprits for energy wastage, so this section covers some simple steps to help you minimise it.

# Let's start with the obvious



## Motors and drives

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You know that motors are integral to your process, and the longer they run and the hotter they get, the more it costs you. A few simple zero-cost steps can help reduce both costs and the risk of breakdowns:

### Make sure

Motors are switched off when not in use, i.e. during breaks and at lunch.

All machines are turned off at the end of the day – don't forget fans, pumps and conveyors.

Switches are labelled and staff are trained in the correct procedures for operating machinery so they know what they can turn off.

You establish the optimum settings for equipment, such as the speed of fans, and communicate this to staff.

Motors are kept clean – a dirty motor will get much hotter than a clean one and is more likely to fail.

Over **80%** of manufacturers cite energy affordability as a key concern for the coming years.<sup>23</sup>

Reducing the speed of a motor by just **20%** can half its energy consumption.<sup>24</sup>

A 4kW motor turned off for an hour a day could save around **£114** a year.

Doing the same with a 50kW motor could save over **£1,425**.<sup>25</sup>



# Let's start with the obvious



## Compressed air

Compressed air is essential to the operation of many processes and is often considered as the 'fourth utility'. But it is very expensive when looking at its cost per unit of energy delivered, especially when it leaks. Not only does a leaky compressor create a noisy working environment, a single 3mm hole can cost you nearly £700 a year.<sup>26</sup> The following simple no or low-cost changes can reduce the cost to you and improve safety:

### Make sure

Compressed air is turned off when you don't need it. An idling compressor still uses between 20 – 70% of its full load power.<sup>29</sup>

Pressure is set at the lowest possible level for each application. Reducing air pressure by just 10% can lead to 5% energy savings.<sup>30</sup>

You listen for and fix compressed air leaks.

Unused runs of pipework are isolated to help eliminate leaks.

Condensate traps are checked to ensure none are left open.

There's adequate ventilation around the compressor – this will improve its efficiency.

Compressed air can be responsible for **10%** of your energy bill, half of which can be due to leaks.<sup>27</sup>



By fixing just 9 leaks in its compressed air system, a small printing machine manufacturer, is saving **£1,265** and **7 tonnes** of CO<sub>2</sub>e a year.<sup>28</sup>

## Case study

**£1,265**  
**saving**



# Let's start with the obvious



## Refrigeration

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You know that the more heat that gets into refrigerated and cooled space, the more energy it will take to cool it. For refrigerators to work efficiently, air needs to circulate freely both inside and out – if not, running costs can increase by up to 10% and products won't be sufficiently cooled.<sup>31</sup> The following simple measures will ensure heat gains are kept to a minimum and the system operates efficiently:

### Make sure

Doors are kept closed to keep warm air out.

Lights inside cooled spaces are switched off when not needed.

Areas are only cooled to the temperature you need. Every 1°C increase reduces energy use by 2%.<sup>33</sup>

Refrigeration units aren't overfilled so that cooling air can circulate.

Freezers are defrosted regularly to avoid ice build-up.

Condensers (external) are regularly cleaned to help prolong life, hill faster and therefore reduce costs, and evaporators (internal) are regularly defrosted.

There is space around refrigeration unit vents to allow air to be drawn in and expelled more efficiently.

Fridges and vending machines containing non-perishable items are switched off when they are not in use, like at the weekend.

Up to **20%** of energy use in refrigeration can be cut with little or no investment.<sup>32</sup>

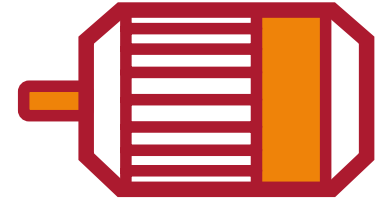




# So you've got the ball rolling, what next?

## Motors and drives

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Motors represent around two thirds of all electricity used by UK industry.<sup>34</sup> The energy cost to run a motor for two months alone can outweigh the initial purchase costs, so a little time and investment in this area can make a big difference. A systematic look at three Cs – Consumption, Control and Cleanliness – will increase the efficiency and lifespan of motors and help you identify when it's time to replace them.

### Why not?

Monitor the energy consumption of motors to see if they need replacing or to optimise the use of the best performing ones.

Automate and interlock control so that motors only run when other equipment is switched on, and are isolated when switched off.

Take into account the whole life costs of motors, e.g. consider replacing smaller motors after several repairs, as each repair will reduce efficiency.

Ensure units with the highest possible efficiency are selected when replacing motors – the Energy Technology list is a good starting point. Any extra capital costs are likely to pay for themselves over the life of the motor through energy savings.<sup>35</sup>

When replacing motors, ensure units with highest possible efficiency are selected; the **Energy Technology list** is a good starting point.



# So you've got the ball rolling, what next?



## Compressed air

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It can take up to ten units of electricity to deliver just one unit of compressed air,<sup>36</sup> and most of this energy is lost as heat. Implementing some of the next steps in compressed air management – considering how it is used and maintained – can realise greater savings with minimal up front cost:

### Why not?

Draw cold clean air from outside into the compressor. A four degree drop in air intake temperature will improve efficiency by 1%.<sup>37</sup>

Change filters regularly to ensure maximum efficiency.

Install automatic isolation valves on machinery so that air is not wasted when machines are not in use.

Use cordless power tools instead of air tools, these are far cheaper to run.

Install automatic drain valves to get rid of condensate in the air lines and reduce air losses.

Fit pressure gauges to compressed air filter housings to help identify when a filter element needs to be replaced.

Think about the life cycle costs of compressors. Over five years, energy accounts for around 75% of the cost of ownership,<sup>38</sup> making an efficient next purchase vital.

**Don't oversize your kit – it will cost you more to run. A motor only needs to be as powerful as its intended use requires.**



# So you've got the ball rolling, what next?



## Refrigeration

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Refrigeration can represent up to 50% of electricity costs for some businesses.<sup>39</sup> If you rely heavily on refrigeration, a closer look at the regular maintenance and management of cooled spaces and units is one of the most effective ways to cut your costs. Poor maintenance alone can increase energy use from refrigeration by up to 10%.<sup>40</sup>

### Why not?

Repair door seals. This is a simple and cheap way to prevent warm air from entering display cabinets and cold stores. In frozen cabinets, check whether ice is building up around the door.

Relocate refrigeration units if they are close to direct heat and draughts. For open fronted display cabinets, bad draughts can increase energy use by up to 95%.<sup>41</sup>

Fit strip curtains if cold stores need to be open for loading/unloading for long periods, or if these are used for frozen goods.

Fitting transparent panels to retail display cabinets has been shown to cause no noticeable loss of sales and means a warmer and more comfortable shopping environment.<sup>42</sup>

Regularly service your units by checking that condensers and evaporators are kept clean and defrost systems are working correctly.



# What next?

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By implementing this guide's simple steps to help maintain and maximise the efficiency of your existing equipment, you will already be in a position to achieve impressive cost savings. But with some extra time and investment in new technology – and a more structural and long-term look at your building fabric – you can make an **even bigger difference to your bottom line.**



# What next

## Heating



Taking the simple steps at the beginning of this guide will have put you well on your way to reducing your energy bills and

creating a more comfortable working environment. But you don't have to stop there...



# Why not think about...

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## Computer controlled heating systems

Computer controlled systems automatically switch heating systems on later during mild days when shorter warm-up times are required, saving up to 10% of heating costs.<sup>44</sup> They can also be programmed to come on earlier during cold mornings to make sure the desired level of comfort is reached.

## Insulate, insulate, insulate

Uninsulated lofts, cavity walls and roof spaces can be a major cause of heat loss. Simply installing 100-150mm of glass fibre insulation in lofts can reduce these losses by up to 90%,<sup>45</sup> and insulating cavity walls can reduce losses from walls by two thirds.<sup>46</sup>

## Fantastic fans

Everyone knows hot air rises, so if you are heating areas with high ceilings the temperature at the roof will be significantly higher than where people are working. This is a double cost – not only does it mean you have to use more energy to heat the workspace, the high roof temperature means you lose more heat through the roof. Install circulation fans controlled by a thermostat – they'll drive warm air back down to the working areas.

## Suspended ceilings

Suspended ceilings make the volume of space you need to heat smaller and, therefore, cheaper. They also provide additional insulation and make fitting of new lighting systems cheaper and quicker.

## New windows

Double or secondary glazing can reduce heat loss through windows by up to 50%,<sup>47</sup> while at the same time increasing the value of the building. When thinking about replacing windows consider that it might be possible to put new glazing units into existing frames. Having them argon-filled will also help save you more and remember – the lower the U-value the more you'll save.



A Cheshire-based housing trust reduced its heating bills by **30%** – saving **£1,796** and **13 tonnes** of CO<sub>2</sub>e a year – after installing a Building Management System. By automatically responding to outside temperature and occupancy levels, the system paid for itself in less than **4.5 years**.<sup>43</sup>

## Case study

**£1,796**  
**saving**



# Why not think about...

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## Replace that boiler

The fact is, sometimes boilers are just old. A non-condensing boiler with limited controls will be 10-30% less efficient than a modern condensing boiler,<sup>48</sup> so changing your boiler could reduce your bills by 10-30%. It could also save you space too. The Governments Energy Technology List is a good place to start with equipment benefitting from Enhance Capital Allowances. It's also worth considering renewable sources of heat as you may be eligible for long term financial support via the Renewable Heat Incentive. See this guides FAQs for more information.

## Get the right type of heating

Trying to heat large areas where few people work can be inefficient so consider using spot heating in a localised area or radiant heating which heats objects and people rather than air.

## Waste not, want not

Sometimes it's just too warm in the wrong place. Compressor ovens and refrigeration systems all produce waste heat – this can simple be ducted (with filters if needed) to provide space heating elsewhere; or – you could use heat exchange technology to convert it into useful heat for hot water.





# What next

## Lighting

There are a number of effective quick wins and simple behavioural changes that can make a big dent in your lighting costs, but there is no need to stop there.

Up to **75%** of lighting installations are thought to be out-of-date and unable to meet current design standards.<sup>49</sup> Here are a few further steps you can investigate.



# Why not think about...

## More efficient technology

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Many traditional lighting products, such as older fluorescent tubes and sodium high bay lighting, are very inefficient in comparison to more modern high frequency T5 fluorescent tubes or LEDs. These upgrades do require investment, but many providers offer finance options that can make the solution case positive from month one.

### T5

High frequency T5 fluorescent lights can last up to 20,000 – 30,000 hours (3.4 years) and can save 45% in energy costs compared to older T8s and T12,<sup>50</sup> without the warm up time associated to comparable sodium lamps and other high bay fittings.

### LED

LED lights require more investment than other lighting alternatives, but are by far the most energy efficient – they use up to 90% less energy than traditional lamps.<sup>51</sup> They also last up to three times longer than compact fluorescents (CFL),<sup>52</sup> saving you more money in the long term and reducing associated costs such as maintenance, downtime and access equipment hire. LED lights can now be used to replace halogen spotlights, and as they produce a lot less heat, they can help to prevent cooled areas from overheating.

### Dimmable fittings

More modern light fittings, such as LEDs, can be purchased in dimmable versions. These usually operate in conjunction with a daylight sensor switch and automatically dim to emit less light – and therefore use less energy – when natural light levels increase.



Upgrading old spotlights with more efficient LEDs in communal areas is saving a medium-sized hotel **£1,533** and **10 tonnes** of CO<sub>2</sub>e a year. The energy saving measure paid for itself in just under a year and, due to the longer life of LEDs, requires less maintenance than previous lighting.<sup>53</sup>

## Case study

**£1,533**  
**saving**



# Why not think about...

## Update building infrastructure

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While general maintenance, such as cleaning windows and lights, is an excellent way of improving lighting efficiency, further investment in your building infrastructure is worth exploring and can provide effective results.

### Skylights

Skylights are an effective use of natural light. If retrofitting your building, consider installing double glazing skylights to considerably reduce the need for artificial lighting.

### Reflectors

An effective method of increasing efficiency without replacing all of your lights can be to install light fittings with reflectors so that light is directed to specified areas. In some cases, this measure has improved efficiency by up to 20%.<sup>54</sup>



# What next

## Office equipment



Modern office equipment can be a lot more efficient than older models, both when in use and when on standby. When you're thinking about buying new

equipment, make sure you consider its energy costs. Over the lifetime of the kit, the energy costs are often greater than the initial purchase price.



# Why not think about...

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## Laptops

If possible, consider using laptops instead of desktop PCs as they use a lot less energy. This doesn't mean you have to live with a smaller screen – laptops can be hooked up to a normal desktop monitor and can be easily moved around, resulting in a more flexible working environment. They are also much quieter and emit less heat.

## Monitors

Replace any cathode ray tube (CRT) monitor with modern flat screen technology. They will reduce monitor running costs by at least 50%<sup>55</sup> and are less damaging to the eyes.

## Printers

If you have several individual printers – consider replacing them with one large communal printer to increase efficiency and reduce idle energy costs. If you already have one main printer, check its age and consider replacing it with a more efficient version.

## Fridge/Freezers

As fridges and freezers are on 24 hours a day, upgrading to a top energy-rated model can result in impressive energy savings over its lifetime. A model which uses 10W less will save you £10 a year.<sup>56</sup>



# What next

## Production equipment

If your existing operational and production equipment is well maintained, clean and being used in the most efficient way possible, you will already be achieving significant cost savings

on energy use. The next step is to consider investment in the most up-to-date machinery and plant to make a much larger long-term difference to your bottom line.



By installing inverter drives on its six production lines, a textile bobbin manufacturer is saving **£6,570** and **36 tonnes** of CO<sub>2</sub>e a year. The newly installed equipment will pay for itself in just four months.<sup>58</sup>

## Case study

**£6,570**  
**saving**





# Why not think about...

## Variable Speed Drives (VSD)

If the load being driven by your motor has a varying demand, a variable speed drive (VSD) could save you money – a small speed reduction can lead to substantial reductions in energy use. The same applies to compressed air: if the demand for air varies significantly over a day, or a shift, there may be merit in installing a variable speed compressor to match speed output to demand and reduce idling costs.<sup>57</sup>

## Integrated motors

If you are planning to replace a motor, consider installing an integrated motor drive. These units are a motor and VSD in one, with the following advantages:

Lower total cost if you are replacing the motor anyway

Reduced wiring time

Does not cause interference with other electronics, cables or cabling

Allows for optimum matching of the motor to the VSD

## Reusing heat

Over 90% of the energy that goes into a compressor comes out as heat<sup>59</sup> – it would be a shame to let it go to waste. A manual valve can be used to duct warm air out of the compressor outside in summer. If there is a significant demand for hot water, say for showers, a heat exchanger can also be fitted.

## Re-lighting refrigerators

Lighting can add about 10% to the heat load in refrigeration systems.<sup>60</sup> LEDs work very well at low temperatures and give off very little heat, so they are perfect for cooled spaces. They are also very low maintenance, therefore reducing lifetime costs.



By recovering heat from a compressor to warm its painting bay in winter, a vehicle repair and maintenance firm has identified annual savings of **£900** and **3.7 tonnes** of CO<sub>2</sub>e.

## Case study

**£900**  
**saving**





# Workforce engagement

You can't drive energy efficiency on your own – you need your colleagues to be on board as well. This may seem easier said than done, particularly with the

many pressures faced in the workplace, but the following hints and tips will help you to win over most staff and maintain an effective awareness campaign.

# Why not think about...

## Timing

It may sound like common sense, but don't start a staff engagement campaign when morale is low, during your busiest time of year as a business or during holiday periods.

## Senior management

Make sure you've got management buy-in to endorse and, if necessary, enforce the actions you want to take. Having a strong business case will help. See the FAQ section for more details.

**If there is resource to do so, consider setting up an energy team with staff from all departments and levels of hierarchy to generate ideas. Try the ideas out and communicate good practice.**

## Key staff

Encourage a sense of shared ownership by involving key staff – managers, team leaders and those responsible for equipment – from the outset. Ask them if they can link any of the areas where energy could be saved (they know their team, job and equipment better than you do).

## Motivations

Think about individual motivations and channel your messages accordingly. These motivations may be financial, ethical, linked to job security or the workplace environment, or could involve other business benefits (such as the marketing/sales potential of prioritising energy efficiency). Be clear about the benefits of energy efficiency to all of these avenues.

## Consultation

Ask for suggestions from all staff members – people will respond better to this rather than simply being told what to do without any consultation.

## Information

Educate staff on the size of the problem and try to bring it to life by calculating how much energy waste staff could be saving.

**Keep staff informed on which suggestions are being taken forward and why, and don't forget to publicly acknowledge good practice.**



# Case study

Fort Vale Engineering, a precision manufacturer, ran a series of 'Bacon Butty' competitions in its staff newsletter to get staff thinking about the best ways to save energy. The incentive of bacon butties for the team suggesting the most energy saving ideas was highly successful and nearly 200 suggestions were made.

# 200 suggestions



# Why not think about...

## Communication

Don't reinvent the wheel – use existing communications channels such as staff briefings, intranet and staff newsletters, to engage with staff.

## Reporting

Start measuring and reporting on energy performance:

Use simple graphs or diagrams to demonstrate your point and show progress over time.

Encourage some healthy competition, for example by using graphs to compare different sites or departments.

## Rewards

Consider reward schemes for staff. For example:

Challenge teams to come up with as many different energy saving opportunities as possible in the first hour of the day. The team with the most ideas per head wins a free lunch.

Commit to donating an percentage of annual cost savings made through energy efficiency to a local charity chosen by staff.

Spend one night a week placing treats on desks where monitors have been turned off, and putting stickers on monitors left on to let staff know they missed out.

## Easy does it

Don't do everything at once: you need to maintain momentum and you don't want to overwhelm people with information.

## Integration

Encourage staff to include energy considerations in other aspects of their work. For example:

Modify operating procedures to include energy efficient actions.

Include energy efficiency actions and expectations at inductions for new staff.

Consider energy consumption when new equipment is purchased.





# Identifying opportunities

By now you'll have gained a good insight into where you can start cutting energy waste from your business. This section will help you

understand a bit more about what to look out for and how to go about calculating potential savings from the opportunities you've spotted.

# Identifying opportunities

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Having a good idea of the potential savings you could achieve from different measures will not only make saving energy easier, it will also help you to make a stronger business case to senior decision makers and allow you to celebrate your successes with real confidence. As more and more large companies and public sector bodies begin to look in detail at the environmental credentials of their supply chains, this information can also help you to win new contracts and stand out from the competition.

The more information you have, the more accurately you'll be able to work out the savings. But you don't need huge amounts of data to get started – just a few key pieces of information will go a long way.

Take a meter reading before you start to make changes – that way you'll know how much you've saved and it makes it easier to gain wider support for future actions.





# Identifying opportunities

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This is the first place to start when calculating your opportunities. Take regular meter readings for your gas and electricity – this could be daily, weekly or monthly, but try to take them at the same time. Making a simple graph of energy use over time will help you see trends and monitor the savings you're making. And remember: never pay estimated bills – always use your meter readings.

## Taking readings

Depending on how much energy you use, you may already have a meter that automatically sends half hourly readings to your energy supplier – a quick call to your provider will enable you to find out. If so, they will be able to provide you with your consumption data in a more detailed way. You can use this data to highlight and investigate anomalies such as high demand 'spikes' where usage and costs soar. It's also worth calculating your energy base load – that's the amount of energy you're using before you start to 'work' and can be calculated overnight or at the weekend.

If you don't have automatic readings, you can take manual readings at the end of the day and first thing in the morning to determine what you're using out-of-hours or over a weekend.

In some companies, energy use is driven in part by the amount of product produced, so it can sometimes be better to normalise energy use against output. This could be kWh of electricity used per widget produced, or it could be set against turnover – this ensures you are monitoring 'real' consumption as output varies.

1kWh of base load costs around **£1,000** a year.



# Identifying opportunities

## Smart meters

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The Government's vision is for every small non-domestic premise in Great Britain to have a smart or advanced electricity and gas meter installed. Most customers will have smart or advanced meters installed before 2020.

### This is about:

Ensuring you have access to the information you need on your energy consumption – expressed in pounds and pence to help you monitor and track energy use patterns and take control of your energy usage.

Bringing an end to estimated billing – you will only be billed for the energy you actually use, helping you budget better and avoid disputes over your bill with your provider.

Making switching supplier smoother and faster, so it is easier for you to access the best deals available through the market.

The Government has put in place protections and guidance so you know what to expect from your supplier when you're having your smart or advanced meter fitted.

If you want to find out more about smart meters, please visit:

**[www.gov.uk/smart-meters-how-they-work](http://www.gov.uk/smart-meters-how-they-work)**



# Identifying opportunities

## Third-party building assessments

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It may be that your building has had an energy review or assessment in the past. This might have produced a Display Energy Certificate (DEC) or an Energy Performance Certificate (EPC) that gives an indication of overall building energy efficiency and recommendations on how to reduce energy costs.

If you operate from a domestic property, the building may also have had an assessment for a Green Deal Advice Report. If so, this will have identified a potential range of energy efficiency measures and provided an estimate of the savings that would be generated – A Green Deal Advice Report can be used to access Green Deal Finance, a loan that remains with the building rather than the occupier. See FAQs for more details.

Some technology providers will also offer energy audits, although these may not be impartial and may be biased towards certain solutions. You can also bring in independent energy auditors to help you identify savings and there may be local business support projects, which can offer subsidised services.

If your building is to be assessed as a whole, this could be carried out either out-of-hours (to see what's being left on) or during production (to see elements of energy wastage in operation). A good idea is to use a simple check list when you do this, to ensure you're covering all the areas highlighted above.



# Identifying opportunities

## Lighting

Gathering data on lighting costs is relatively straightforward. If you know the power (watts) of the bulbs or fittings used, you can work out energy consumption in kWh by using the following calculation:

$$\frac{\text{No of bulbs} \times \text{power of the bulb} \times \text{hours lights are on per year}}{1000}$$

Multiply this by the price you pay per kWh and you have an estimation of the annual cost. This simple calculation can be used to estimate running costs for a whole range of equipment types.

## Motors

The rating plate on a fixed speed motor should give you a kW rating. By using the same formula as the lighting one to the left, you can work out annual energy consumption. Bear in mind that rating plates normally specify the output power so motors can consume in excess of this – the figure is likely to be an under-estimate.

## Office and kitchen equipment

Through a variety of schemes across Europe, energy-using equipment is labelled to provide information on energy consumption. Not only will this help you to determine running costs and what the savings might be if equipment is used more efficiently, it should also be used to inform future purchases. Doing this systematically for all items will allow you to build up a profile of key energy-using equipment to help you prioritise action.

## Compressed air

The simplest way to find compressed air leaks is to listen for them. Try walking around after-hours or over lunch when it's quiet and tag or mark Draft of Guide 44 leaks for repair. This will save money and reduce noise levels – creating a better working environment.



# Identifying opportunities

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## Safety first

When conducting any assessments, always have safety in mind. Ensure all safety procedures are followed, wear the correct safety equipment for the task at hand and take particular care around hot or hazardous machinery. If unsure, always err on the side of caution.

## Rented property

If you own your own building there's nothing stopping you from making improvements now. If you lease the building you might need to have a conversation with your landlord before making improvements to the fabric of the building or areas you share with other tenants.

While many landlords will be open to such improvements – after all it's making the building more rentable – it might be harder to engage others. This will become easier because from April 2018 landlords will be required to ensure their properties reach at least an EPC rating of E before a lease can be granted or renewed. Landlords will have to make improvements that are cost effective and will not face upfront or net costs for the improvement works, or if they can rely on another exemption set out in the regulations.





# Paying for improvements

This guide focuses primarily on the simple, low and no cost actions available to help you reduce your energy spend and consumption. While many of these actions will have a

positive effect on your cash flow, you might not want to invest your own funds to make this happen. Don't let the idea of borrowing money act as a barrier – there are lots of

funding sources to choose from and a wealth of advice available. The market for energy efficiency finance is growing all the time.

# Paying for improvements

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## Talk to your supplier

It's worth speaking to the companies who are quoting you for new equipment as they may already have their own finance options in place or be able to recommend alternative sources of finance for you.

## Talk to your bank

Most high street banks and some specialist providers offer dedicated energy efficiency loan products to SMEs. These are specifically designed to fund energy efficiency enhancements and will cover the upfront costs of installing energy saving measures. As the money you save from improved energy efficiency can often be more than the cost of the loan, this often creates a positive cash flow.

As a condition of your loan, your bank may request you first have an energy audit to identify exactly where the energy saving opportunities in your business are and which of these offer you the best value for money.

If you're not sure about how to approach your bank, the British Business Bank, set up by Government, can help you with tips and advice. See the FAQ section for more details.

## Energy Technology List

It's also worth remembering that, if the equipment you are buying is on the Energy Technology List, you can claim extra capital allowances from HMRC, which gives a cash flow boost of £1,968 for every £10,000<sup>61</sup> spent. See the FAQ section for more details.

## Renewable energy incentives

If you're looking to install renewable energy technologies you may be eligible for long-term income via Feed-in Tariff (FiTs) and/or Renewable Heat Incentive Schemes (RHI), making payback periods even shorter. See the FAQ section for more details.

## The Green Deal

If you run your business from a domestic building you can apply for a Green Deal Finance loan, which will pay for a range of energy efficiency improvements. See the FAQ section for more details.



# Paying for improvements

## Switching supplier

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You can save money on your energy costs by shopping around to find the best energy product that suits your business. You can do this yourself by first asking your current supplier if it has any better offers. This will give you a benchmark when looking at other deals. Ask suppliers to explain the terms and conditions so that you can make sure you fully understand them before you sign-up.

An alternative way to shop around is by using energy brokers. These are organisations or individuals that give energy related advice or help you to procure energy or manage your energy needs.

They act as an interface between consumers and energy suppliers and can help you to make better energy choices. If you decide to use an energy broker, be sure to ask them:

Which suppliers they represent (so you know whether they will compare the whole market for you) highlighted above.

How their services are paid for (this may be commission included in the prices you are quoted, or a one-off fee for you to pay).

If you agree to a contract over the telephone you will **not** have a cooling-off period.







# FAQs

How can I find out more about what other businesses are doing?

# FAQs

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There are a number of online sources that showcase what other businesses have done to improve their energy efficiency. For example, the Carbon Trust, ENWORKS and Zero Waste Scotland have a number of case studies which can be viewed online.

For more information, go to:

## **Carbon Trust**

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

## **ENWORKS**

[www.enworks.com/case-studies](http://www.enworks.com/case-studies)

## **Zero Waste Scotland**

[www.zerowastescotland.org.uk/category/what-we-offer/case-studies](http://www.zerowastescotland.org.uk/category/what-we-offer/case-studies)

## **Federation of Small Businesses' Regional Networking events:**

<http://www.fsb.org.uk/networking-events>

## **Confederation of British Industry: M-Clubs:**

<http://www.cbi.org.uk/campaigns/future-champions/m-clubs/>

## **We are #BuildingBritain Tumblr:**

<http://wearebuildingbritain.tumblr.com/>

## **I have not changed energy supplier in a while, is switching hard?**

If you run your business from home, the Department of Energy and Climate Change's Power to Switch campaign outlines to consumers how switching energy supplier is now easier than ever before. Switching times have now been cut down from up to six weeks to just 17 days (a two-week cooling off period, plus three days for the actual switch).<sup>61</sup> Suppliers have also made their bills clearer, removed expensive so-called 'dead' tariffs and moved long-time customers onto newer standard rate tariffs. The Power to Switch campaign encourages consumers to be 'energy shoppers' – to search out the best deals and save money. For more information, go to: [www.goenergyshopping.co.uk](http://www.goenergyshopping.co.uk)



## I want more control / knowledge of my electricity use, what can I do?

Smart meters allow you to monitor your gas and electric usage simply and easily. The Government plans for all small businesses to have smart meters installed by 2020. Benefits of smart meters include:

- near real-time information on energy use, expressed in pounds and pence;
- the ability to manage your energy use, save money and reduce emissions;
- an end to estimated billing – you will only be billed for the energy you actually use, helping you to budget better; and
- easier switching – it will be smoother and faster to switch suppliers to get the best deals.

For more information, go to: [www.gov.uk/smart-meters-how-they-work](http://www.gov.uk/smart-meters-how-they-work)

## Are there any resources to help raise awareness in my business?

The Carbon Trust has various materials to download and engage staff within your business. These can be found at: [www.carbontrust.com/resources/guides/energyefficiency/employee-awareness-and-office-energy-efficiency#posters](http://www.carbontrust.com/resources/guides/energyefficiency/employee-awareness-and-office-energy-efficiency#posters)

## I'm in rented offices, what does my landlord have to do?

Under the Energy Act 2011, there are regulations to improve the energy efficiency of privately rented properties in the domestic and non-domestic sectors in England and Wales.

For non-domestic privately rented property, the regulations mean that:

- From April 2018, landlords will need to ensure their properties reach at least an EPC rating of E.

- The minimum standard requirements will apply in a phased manner, applying to new and renewed leases from 1 April 2018 before applying to all leases in scope from 1 April 2023.
- Local authorities will be empowered to enforce the provisions, including the power to impose compliance and penalty notices. Landlords will be able to request that a local authority reviews any penalty imposed for noncompliance, and will have the right to appeal a penalty at a tribunal.

Landlords will only have to make improvements that are cost effective and will not face upfront or net costs for the improvement works.



## What financial support is available for implementing energy efficiency improvements that require capital investment?

The Enhanced Capital Allowance (ECA) scheme is a tax incentive operated by the Government. It exists to encourage you to invest in energy efficiency plant and equipment and allows you to claim 100% of capital allowances when you purchase equipment (in the year of purchase). The piece of equipment must figure on the Energy Technology Product list, which details the products within each technology category that qualify for an enhanced capital allowance. The list currently has over 16,000 products, and you can find it here:

<https://etl.decc.gov.uk/etl/site/etl.html>

[www.gov.uk/government/policies/reducing-demand-for-energy-from-industry-businesses-and-the-public-sector--2/supporting-pages/enhanced-capital-allowances-ecas](http://www.gov.uk/government/policies/reducing-demand-for-energy-from-industry-businesses-and-the-public-sector--2/supporting-pages/enhanced-capital-allowances-ecas)

## How do I engage my senior managers?

Getting senior managers to buy into energy efficiency can often be make or break for long term success. Energy efficiency brings a range of benefits, and every company has its own goals so the key is to align the two. Areas to think about:

- Financial savings – turn your opportunities into annual cost savings, you can then show these as a percentage of last year's profit or the level of sales needed to make the same impact on the bottom line (see Know Your Benefits).
- If you are looking to spend money, talk about the payback period and both the annual and total lifetime savings, use today's energy price put point out in the future as prices increase the savings will be more.
- Find some easy wins and share success. Success breeds success

so shout about it, everyone likes to back a winner.

- Use case studies to show what other companies have done, especially your competitors, and what that would mean for your company.
- Point out energy efficiency is lower risk than many other investments and that there are fewer variables. The more efficient your equipment and the longer you run it, the less energy you will use and the more money you will save.
- Remind them that energy prices are increasing so saving energy now will reduce the company's exposure to higher prices in the future.
- If you supply into the public sector, or you want to, show how this can help improve the strength of your tender submissions and win or retain contracts.



## How can I fund the improvements that require expenditure?

If you're exploring external financing, there are a number of options available to you:

- Most high street banks and some specialist providers offer energy efficiency specific loans for SMEs.
- Some specialist companies provide all-in energy efficiency solutions, working with businesses to provide a complete service from audits through to recommendations, installations and capital funding plans. This is the case of Energy Services Companies (ESCOs) and some energy providers, who can act as brokers between SMEs and funding suppliers.
- Energy Performance Contracts (EPCs) are partnerships between your business and an ESCo, allowing you to invest in energy saving

technologies with financial security. ESCo providers identify, design and implement appropriate energy efficiency measures, guaranteeing the level of energy savings, thus offering a secured financial saving over the period of the agreement.

If your business is based at home, the Green Deal Home Improvement Fund allows you to claim back money from the Government if you make energy-saving home improvements.

To find out more, go to <https://www.gov.uk/green-deal-energy-saving-measures/getmoney-back-from-the-green-deal-home-improvement-fund>

## I'm interested in getting a loan from a bank to fund an energy efficiency improvement. What information will they want to know?

The British Business Bank, set up by the Government, can provide you with advice that you may find useful in approaching your bank or other sources of finance.

To find out more, go to: [www.british-business-bank.co.uk/business-finance-options-smaller-businesses](http://www.british-business-bank.co.uk/business-finance-options-smaller-businesses)



## Where can I find out more about renewable energy technologies and the financial support available?

There are a number of different renewable energy technologies that can provide electricity and/or heating for your business. The Government operates two incentives, Feed-in-Tariffs (FiTs) and the Renewable Heat Incentive (RHI) – to encourage businesses to install certain technologies and receive an income from the electricity or heat they provide.

The FiTs scheme supports those who generate low-carbon electricity on a smallscale (5MW) or less in total installed capacity). Technologies eligible under the scheme include solar photovoltaic (PV), wind, hydro, micro combined heat and power (CHP) and anaerobic digestion (AD). Installations need to be registered and verified with either a licenced electricity supplier or Ofgem to be eligible. The electricity supplier then pays you a generation tariff for any electricity generated and, where applicable, an export tariff for any surplus electricity exported to the grid.

The RHI supports those who use renewable energy to heat their buildings. By joining the RHI scheme, your business will receive a quarterly tariff payment for every kWh of renewable heat it produces, for 20 years.

To find out more, go to:

- Renewable Heat Incentive: <https://www.gov.uk/non-domestic-renewable-heat-incentive>
- Feed-in-Tariff: <https://www.ofgem.gov.uk/environmental-programmes/feed-tariff-fit-scheme>

## What is the Green Deal?

The Green Deal is a Government initiative to help people improve the energy efficiency of their property. If your business is based at your home property, the Green Deal can provide finance for installing energy efficiency

measures – such as a new boiler, double glazed windows, and loft and cavity wall insulation – to reduce your energy expenditure. The finance cost for the measures are repaid through your energy bills. To find out more about the Green Deal or how to get a free assessment, go to: <https://www.gov.uk/green-deal-energy-saving-measures>

## What is ‘The Golden Rule’?

The Golden Rule for a Green Deal Finance Plan is that the estimated financial savings generated by a package of energy efficiency measures must be equal to or greater than the costs attached to the energy bill. This means that your bills should not be any higher than they were before the installation of selected energy efficiency measures.



# Glossary



# Glossary

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## A-Rated

Energy ratings from A+++ to G are based on EU standards and are used to rate energy efficiency and energy saving potential. 'A-Rated' indicates the highest performing appliance with the most energy saving potential.

## Air tool

Also called 'pneumatic' tools, air tools are powered by compressed air.

## Annual Energy Consumption

The amount of energy that your business uses over a 12 month period, usually displayed in kWh. Energy suppliers use these figures to estimate future use, and this may affect the type of tariff you are offered.

## Automatic Drain Valve

Removes condensate from low points in a compressed air system where automatic drainage is required.

## Automatic Isolation Valve

Adjusts the flow of air in a compressed air system, based on process conditions and application requirements.

## Automatic Meter Reading (AMR)

AMR is the term given to a system that provides automatic meter readings remotely. It uses telephone technology and has the ability to transfer data into a billing system.

## Calorific value

The amount of heat generated when a given mass of fuel is completely burned. You can calculate energy use in kWh by converting it from its calorific value.

## Carbon dioxide (CO<sub>2</sub>)

A gas produced by fossil-fuel combustion as well as other natural processes. It is a normal part of the Earth's atmosphere. CO<sub>2</sub> is considered a greenhouse gas because it traps heat

into the atmosphere and contributes around 60% of the potential global warming effect of man-made emissions.

## Carbon footprint

The impact human activities have on the environment. This is measured by the amount of greenhouse gases – usually in carbon dioxide equivalence (CO<sub>2</sub>e) – produced by a particular activity.

## CRC Energy Efficiency Scheme (CRC)

The CRC Energy Efficiency Scheme is a mandatory scheme aimed at improving energy efficiency and cutting emissions in large users of energy in the public and private sectors.

## Circulation pump

A device used to pump water to the central heating system.





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## Climate Change Levy (CCL)

A tax on the energy use of business customers, charged on the total kWhs used in the bill period. CCL is subject to certain exemptions and reductions for example for electricity from renewables, use of Combined Heat and Power (CHP), and for energy intensive sectors via Climate Change Agreements (CCAs) in exchange for meeting energy efficiency targets.

## Condensing boiler

Condensing boilers are much more efficient than non-condensing boilers. They use heat from exhaust gases that would normally be released into the atmosphere through the flue. The water vapour from the exhaust gas is turned into liquid condensate, returning heat to the system.

## Display Energy Certificate (DEC)

Shows the energy performance of a building based on actual energy consumption as recorded over the last

12 months within the validity period of the certificate. This rating is shown on a scale from A to G, where A is the lowest CO<sub>2</sub> emissions (best) and G is the highest CO<sub>2</sub> emissions (worst).

## Department of Energy and Climate Change (DECC)

The ministerial department working to ensure the UK has secure, clean, affordable energy supplies and promotes international action to mitigate climate change.

## Enhanced Capital Allowance (ECA)

The ECA Scheme for energy saving technologies allows businesses to benefit from tax breaks when investing in eligible energy-saving equipment.

## Energy Performance Certificate (EPC)

EPCs tell you how energy efficient a building is and give it a rating from A+ (very efficient) to G (very inefficient) and highlight cost-effective ways to achieve a better rating. EPCs for dwellings state

the energy costs and carbon dioxide emissions for the building and will state what the energy efficiency rating could be if improvements are made. EPCs for non-dwellings will state what the carbon dioxide emission rate of the buildings is. EPCs are valid for 10 years from when issued.

## Energy Performance Contract (EPC)

A contract between businesses under which energy efficiency measures are provided, verified, monitored and paid for by reference to an agreed level of energy efficiency improvement or other agreed criterion such as financial savings.

## Energy Service Company (ESCO)

Businesses providing energy solutions including designs and implementation of energy savings projects, energy conservation, energy infrastructure, outsourcing power generation and energy supply, and financing methods.



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## Estimated bill

A bill based on an estimated meter reading (as opposed to an actual reading). This bill will reflect your estimated energy consumption for a defined period.

## Feed-in Tariffs

The Feed-in Tariffs (FITs) scheme encourages the deployment of small-scale (less than 5MW) low carbon electricity generation. Those with a qualifying technology receive a guaranteed payment for the electricity they generate and use, as well as a guaranteed payment for unused surplus electricity they export back to the grid.

## Fossil Fuel Levy

In England and Wales, the Fossil Fuel Levy is set at 0.3%. This levy was introduced to cover the cost of decommissioning nuclear power plants. The Scottish equivalent is called the S.R.O. (Scottish Renewable Order) levy, which is set at 0.8%.

## Green Deal

A scheme by which energy-saving improvements can be made in a home or business without having to pay all the costs up front. Energy saving improvements include:

- insulation – e.g. loft or cavity wall
- heating
- draught-proofing
- double glazing
- renewable energy technologies – e.g. solar panels or wind turbines

For a full list of eligible measures see: [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/383541/GD\\_and\\_ECO\\_Measures\\_UpdateFINAL\\_2\\_.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/383541/GD_and_ECO_Measures_UpdateFINAL_2_.pdf)

Unlike a normal loan, under Green Deal Finance the cost sits with the building rather than the occupier/tenant.

## Half hourly meters

Since April 1998, half-hourly code five meters have been mandatory for all sites over 100 kilovolt amps (kva), and

voluntary for sites under 100 kva. This meter sends your consumption record by telephone or radio every half-hour to a central data bank. The supplier will then receive this information from the data collector and bill you accordingly.

## Heat pumps

Heat pumps use a heat exchanger (much like those installed in fridges and freezers – although running in reverse) to take heat from the ground, air or water and convert it into heating. Ground source heat pumps use pipes which are buried in the ground to extract heat. Air source heat pumps absorb heat from the outside air. Water source heat pumps extract heat from water, like a river or lake. Heat pumps need electricity to run, but the heat they extract from the ground, air or water is constantly being renewed naturally.



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## Kilowatt (kW)

A unit of measurement for power. A kilowatt equals one thousand watts.

## Kilowatt hour (kWh)

A unit of measurement for electrical energy, equivalent to the power of one kilowatt operating for one hour. A bill from your current supplier will show your usage in kWh.

## Light emitting diode (LED)

A highly-efficient semiconductor diode that emits light when conducting current.

## Micro generation

Small-scale production of energy via mini-wind turbines, solar panels or other mini generators.

## Meter Point Administration Number (MPAN) (electricity only)

Also known as a 'supplier number' or an 'S number', this is a unique 13-digit number relating to the electricity meter at your property. The first two digits give

your meter profile class (03 or 04 for small businesses, 05 to 08 for maximum demand meters and 00 for half-hourly). It is useful to know this when planning to switch your electricity supplier.

## Meter Point Reference Number (MPRN) (gas only)

This is a unique 10-digit reference number for the gas meter at your property. You should find it on your gas bill. You may need this if you are planning to switch your gas supplier.

## Nitrogen oxides (NO<sub>x</sub>)

A number of nitrogen compounds including nitrogen dioxide are formed in combustion processes when nitrogen in the air or fuel combines with oxygen. These compounds are considered greenhouse gases and can add to the natural acidity of rainfall.

## Refrigeration condensers and evaporators

Two of the main components that make up the cooling system on a refrigerator.

The evaporator is internal and transfers heat from the air of the refrigerated space to the refrigerant, which passes through the external condenser where the heat is then transferred outside of the unit.

## Renewable Heat Incentive (RHI)

The Renewable Heat Incentive (RHI) is the world's first long-term financial support programme for renewable heat. The RHI scheme provides payment to those who generate and use renewable energy to heat their buildings, such as heat from biomass boilers, heat pumps and solar thermal panels.

## Smart meter

A meter which sends readings to your energy supplier automatically at regular intervals, resulting in more accurate billing and fewer required manual meter readings.

## Sulphur dioxide (SO<sub>2</sub>)

A greenhouse gas produced by the combustion of sulphur-containing fuels such as coal and oil.



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## Standing charge

A fixed cost paid in addition to usage charges for gas and electricity. Standing charges cover costs like meter reading, maintenance, connection to the energy grid and, in the case of gas, emergency services.

## Sub-metering

A term often used when a property owner installs a separate meter to monitor the consumption of a utility such as water, gas or electricity. Sub-metering allows a more detailed understanding of when and where energy is being used.

## Supply address

The address where energy is supplied to and used. This can be different to the billing address, where bills and invoices are sent.

## Switching

The process of switching from one energy supplier to another.

## T5 lights

Slimmer and more efficient than the wider T8 and T12 lamps. The T indicates that the shape of the bulb is tubular and the number is the diameter in eighths of an inch.

## Thermostat

Measures the air temperature of a space and adjusts to the temperature it is set to. When the temperature falls below the setting, the thermostat switches on the central heating; once the room reaches the set temperature, the thermostat switches the heating off.

## Therms

A unit of energy measurement. To calculate the equivalent value in kWh, multiply by 29.3.

## U Value

A measure of heat loss. It is expressed in  $W/m^2K$ , showing the amount of heat lost in watts (W) over a square metre of material (for example a wall, roof, window, etc.) or each degree (K) difference between the inside and outside temperature. The lower the U value, the better the insulation provided by the material and the less heat transferred.

## Unit Price Rate

The amount charged for each unit of electricity or gas that you have used during the bill period. This is always expressed as pence per kilowatt-hour (p/kWh).

## Variable Speed Drive (VSD)

A piece of equipment that regulates the speed and rotational force, or torque output, of an electric motor.



# References



# References

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<sup>1</sup>[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/392908/Barriers\\_to\\_Energy\\_Efficiency\\_FINAL\\_2014-12-10.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/392908/Barriers_to_Energy_Efficiency_FINAL_2014-12-10.pdf)

<sup>2</sup> $£30,000 \times 5\% = £1,500$  over 3 years = £500 a year

<sup>3</sup>IEA – Capturing the Multiple Benefits of Energy Efficiency, 2014

<sup>4</sup>CTG065 – Heating control Technology guide/Carbon Trust/October 2011

<sup>5</sup>CTG065 – Heating control Technology guide/Carbon Trust/October 2011

<sup>6</sup><http://www.carbontrust.com/resources/guides/energy-efficiency/heating-ventilation-and-air-conditioning-hvac>

<sup>7</sup><http://www.carbontrust.com/resources/guides/energy-efficiency/heating-ventilation-and-air-conditioning-hvac>

<sup>8</sup><http://www.carbontrust.com/resources/guides/energy-efficiency/heating-ventilation-and-air-conditioning-hvac>

<sup>9</sup>May 2011

<sup>10</sup>PVC strip curtains will significantly reduce the volume of cold air entering the building, reducing the need for heating and creating a more comfortable working environment

<sup>11</sup>ECA765 – Pipework insulation equipment. A guide to equipment eligible for Enhanced Capital Allowances/Carbon Trust/October 2012

<sup>12</sup>Carbon Trust – <http://www.carbontrust.com/resources/guides/energy-efficiency/lighting>

<sup>13</sup>Carbon Trust – <http://www.carbontrust.com/resources/guides/energy-efficiency/lighting>

<sup>14</sup> $0.5\text{kW} \times 12 \text{ hours} \times 7 \text{ days} \times 52 \text{ weeks} \times 11.4\text{p/kwh} = £250$ , 11.4p is based on ENWORKS experience of the amount paid for electricity by companies this guide is aimed at.



# References

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<sup>15</sup>December 2012

<sup>16</sup>In many companies the first person arrives in the morning 14 hours after the last person left, so anything left switch on at night, uses 14hrs of energy. So every kW of lighting left costs £48 a month ( $1 \times 14\text{hrs} \times 30 \text{ days} \times \text{£}0.114 \text{ p kWh} = \text{£}48$ ); similarly with security lighting while in December you might need it on for 14 hrs, whereas in July, 5hrs would be enough saving you £17 in that month alone ( $1 \times 5 \times 30 \times 0.114 = \text{£}17$ )  
<sup>16</sup> British Gas - <http://www.britishgas.co.uk/blog/articles/businesses-in-the-dark-on-electricity-usage-up-to-1-in-every-2-spent-on-electricity-could-be-wasted>  
<sup>16</sup>  $1\text{watt} = 0.001\text{kW} \times 24\text{hr} \times 365 \times \text{£}0.114 = \text{£}1$

<sup>17</sup>British Gas - <http://www.britishgas.co.uk/blog/articles/businesses-in-the-dark-on-electricity-usage-up-to-1-in-every-2-spent-on-electricity-could-be-wasted>

<sup>18</sup> $1\text{watt} = 0.001\text{kW} \times 24\text{hr} \times 365 \times \text{£}0.114 = \text{£}0.97$

<sup>19</sup>November 2011

<sup>20</sup>May 2014

<sup>21</sup>Energy Policy for Manufacturers: an Agenda for Government/EEF/October 2014

<sup>22</sup>CTV048 – Motors and drives technology overview/Carbon Trust/November 2011

<sup>23</sup> $4\text{kW} \times 1\text{hr} \times 5 \text{ days a week} \times 50 \text{ weeks} \times \text{£}0.114 \text{ kW/h} = \text{£}114 \text{ a year}$   
 $50\text{kW} \times 1\text{day} \times 5\text{days a week} \times 50\text{weeks a} \times \text{£}0.114 \text{ kW/h} = \text{£}1,425$

<sup>24</sup>CTV050 Compressed air – opportunities for business/Carbon Trust/2012

<sup>25</sup>CTV050 Compressed air – opportunities for business/Carbon Trust/2012

<sup>26</sup>August 2012

<sup>27</sup>CTV050 Compressed air – opportunities for business/Carbon Trust/2012



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<sup>28</sup>CTV050 Compressed air - opportunities for business/Carbon Trust/2012 Draft of Guide 64

<sup>29</sup>CTL135 [http://www.carbontrust.com/media/147193/j7979\\_ctl135\\_refrigeration\\_aw.pdf](http://www.carbontrust.com/media/147193/j7979_ctl135_refrigeration_aw.pdf)

<sup>30</sup>CTG046 Refrigeration Systems – Guide to key energy saving opportunities/Carbon Trust/2011

<sup>31</sup>CTG046 Refrigeration Systems – Guide to key energy saving opportunities/Carbon Trust/2011

<sup>32</sup>CTV048 – Motors and drives technology overview/Carbon Trust/November 2011

<sup>33</sup>Motors are sold based on the electricity they use, the amount of power that actually produce though is determined by their efficiency e.g. a 11kw motor which is 70% efficient produce  $11 \times 70\% = 7.7\text{kW}$  of power, which could be produced by 9kW motor with 85% efficiency ( $9 \times 85\% = 7.7\text{kW}$ ); assuming the motor lasts 4 years over an 8hr day, 5 days a week, 50 weeks a year, and £0.114 pKWh would save £912, if you work 2 shifts this is £1,824. This example is correct assuming that these types of motors are available on the market and that such a disparity exists in efficiencies.

<sup>34</sup>CTV050 Compressed air – opportunities for business/Carbon Trust/2012

<sup>35</sup>CTV050 Compressed air – opportunities for business/Carbon Trust/2012

<sup>36</sup>CTV050 Compressed air – opportunities for business/Carbon Trust/2012

<sup>37</sup>CTG046 Refrigeration Systems – Guide to key energy saving opportunities/Carbon Trust/2011

<sup>38</sup>CTG046 Refrigeration Systems – Guide to key energy saving opportunities/Carbon Trust/2011

<sup>39</sup>CTG046 Refrigeration Systems – Guide to key energy saving opportunities/Carbon Trust/2011

<sup>40</sup>Since 2012 The Co-operative stores have been rolling out a programme to put doors in its fridge's, they estimate this will have saved them £50m in energy bills <http://www.greenwisebusiness.co.uk/news/coop-saves-50m-in-energy-by-closing-fridge-doors-3713.aspx>





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<sup>41</sup>April 2010

<sup>42</sup>CTG065 – Heating control technology guide/Carbon Trust/October 2011

<sup>43</sup>CTL178 – How to implement roof insulation/Carbon Trust/no date

<sup>44</sup>Focus on Energy: A practical introduction to reducing energy bills/Carbon Trust/Second Edition

<sup>45</sup>Focus on Energy: A practical introduction to reducing energy bills/Carbon Trust/Second Edition

<sup>46</sup>Energy Saving Trust – <http://www.energysavingtrust.org.uk/domestic/content/replacing-my-boiler>. Also ref in Focus on Energy: A practical introduction to reducing energy bills/Carbon Trust/Second Edition

<sup>47</sup>CTV 049 – Lighting Overview Guide/Carbon Trust/December 2011

<sup>48</sup>Senate Electrical – <http://www.wfsenate.co.uk/media/uploads/bee51f8f5f304a577cde70e1e37e21db2bf7b60c.pdf>

<sup>49</sup>Which? – <http://www.which.co.uk/energy/energy-saving-products/guides/led-lights/led-lights-explained/>

<sup>50</sup>U.S. Department of Energy - <http://energy.gov/energysaver/articles/lighting-choices-save-you-money>

<sup>51</sup>December 2011

<sup>52</sup>Heatkeeper – <http://www.heatkeeper.co.uk/independent-reports.html>

<sup>53</sup>Charles Stuart University – <http://www.csu.edu.au/division/dit/environ-sustainability/>

<sup>54</sup> $0.01\text{kW} \times 24\text{hr} \times 7\text{days} \times 52\text{weeks} \times \text{£}0.114/\text{kWh} = \text{£}10$

<sup>55</sup>A Variable Speed Drive is a controller that varied the frequency and voltage supplied to an electrical motor, put simply it enables you to turn the motor speed up and down to the level you need, the slower you run the motor the less energy it uses



# References

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<sup>56</sup>January 2015

<sup>57</sup>CTV050 Compressed air – opportunities for business/Carbon Trust/2012

<sup>58</sup>CTG046 Refrigeration Systems – Guide to key energy saving opportunities/Carbon Trust/2011

<sup>59</sup> $1\text{kW} \times 24\text{hr} \times 7\text{days} \times 52\text{weeks} \times \text{£}0.114/\text{kWh} = \text{£}996$

<sup>60</sup>CT guidance on EHC from ECA272 v5 2012

<sup>61</sup><https://www.gov.uk/government/news/switch-to-save-27-billion-up-for-grabs-by-switching-energy-supplier>

