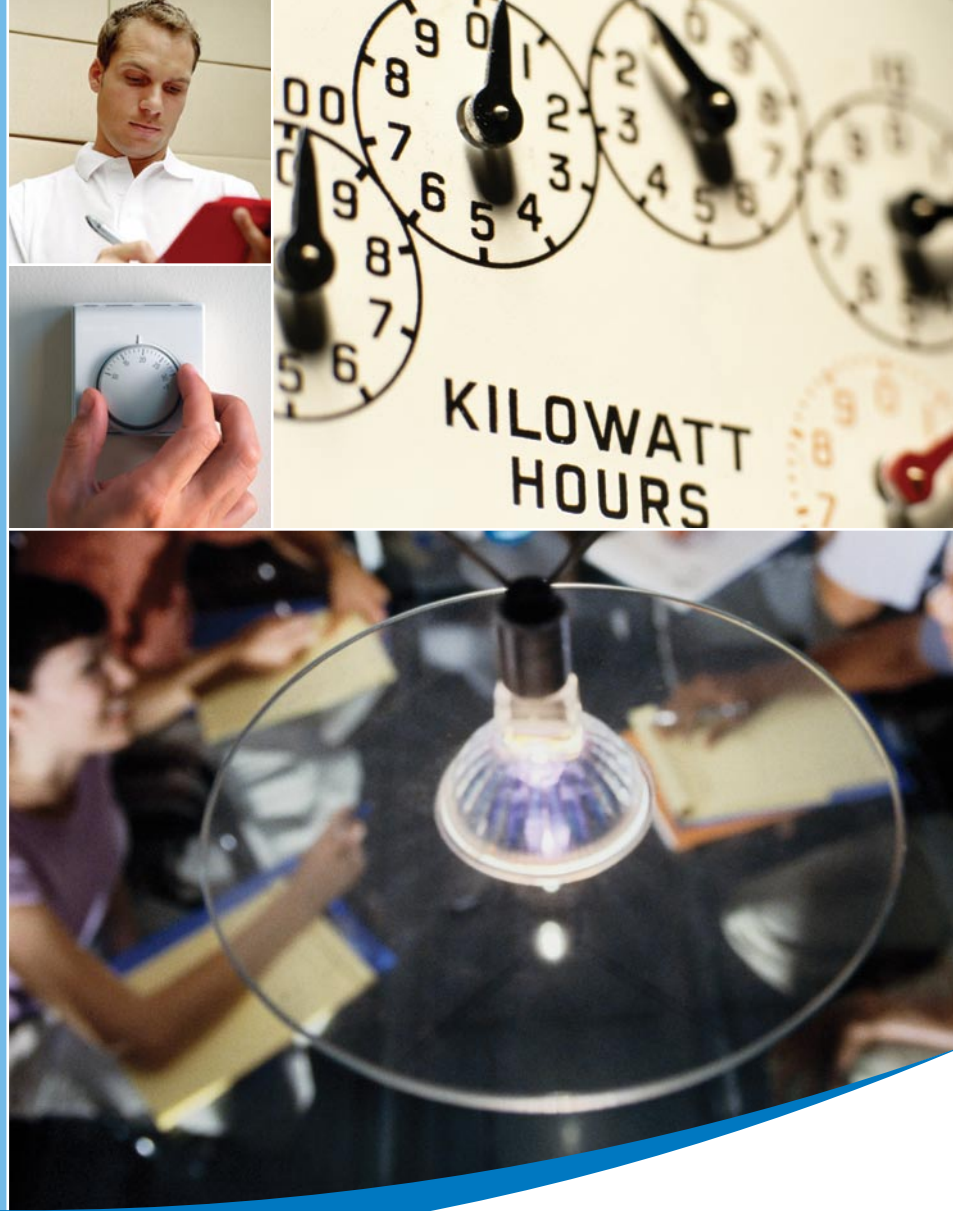


CTV023

Management Overview



Practical energy management


**CARBON
TRUST**

Making business sense
of climate change

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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 businesses and public sector organisations take action to reduce carbon emissions, and the simplest way to do this is to use energy more efficiently.

This management overview provides practical advice to businesses on how to identify energy waste and implement savings. This will ensure long-term benefits for people, the business and the environment.



Introduction

Although many organisations believe energy is a fixed overhead, it actually represents one of the best opportunities for saving money.

To be successful, an energy management campaign must combine an effective strategy with the right practical measures. Any day-to-day interventions should form part of the overall strategy to have maximum impact.

This overview looks at some of the practical short and long-term measures that businesses can take to reduce the amount of energy they use, including a range of low and no-cost changes that can be made straightaway. It also gives advice on identifying opportunities for savings, building an action plan and effectively monitoring results.



Energy efficiency is vital to help combat climate change, which is fast becoming a major concern for the environment.

Who is this publication for?

This publication is aimed at organisations needing practical help in managing their energy. It outlines the steps needed to make businesses and public sector organisations more energy efficient.

A companion publication is available from the Carbon Trust: *Energy management strategy* (CTV022). This puts energy saving into a business context. It gives more information about how the actions in this overview will benefit the business as a whole, and will help to engage key stakeholders in the project.

Using these publications together will help companies to implement an effective energy management campaign that is clearly linked to their organisation's objectives.

Making the commitment

The key to successfully improving energy efficiency is to engage everyone within the organisation in the process. This must start at the top, with the key stakeholders, and continue through the whole organisation to the employees responsible for each task.

Unless everyone knows that they can make a difference, people will not contribute fully to the energy campaign.

Furthermore, companies will not see the potential return on any investment they make in energy saving technology, unless everyone is committed to reducing consumption.

Commitment is needed from senior managers, as improving energy efficiency will often require changes to current working practices and the overall culture of the business. Change will only be successful if it is driven from the top. Similarly, all employees will have to take responsibility for implementing day-to-day energy saving actions.

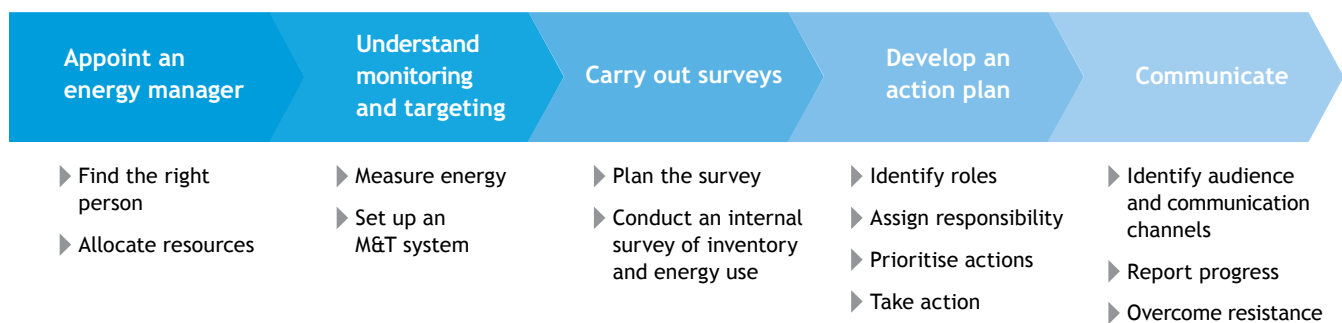
Once this commitment has been gained, and everyone understands the importance of energy management, it is time to look at the most effective way of achieving the savings.

Taking steps towards energy management

Figure 1 below shows the five steps that businesses can follow in order to successfully implement an energy management programme.

Refer to the Carbon Trust's *Energy management strategy* (CTV022) for information and advice on how to consider the overall picture of energy saving.

Figure 1 Five steps towards practical energy management



► Step 1: Appoint an energy manager

Appointing people to make sure that targets are met, timescales are being kept to and everyone is playing their part will give the campaign a good chance of success.

The energy team

An energy team is responsible for all aspects of energy within the organisation, including efficiency. Led by an energy manager, the team's role is wide – at the day-to-day level it involves checking meters and bills, while, in the broader sense, it's about understanding energy in the context of the organisation and reporting trends to senior management. Their other role is to communicate and reiterate the importance of the programme to employees.



The right person to lead an energy team

Tailor the role to fit the size and nature of the organisation, and the extent of the projects. Some organisations may already have a dedicated energy manager as a professional post. Others may have someone essentially fulfilling the role, but as part of their duties, such as a facilities manager.

Larger multi-site organisations, or those with very high energy use often benefit from making this a full-time role, or even employing more than one person to manage the programme. If this model is used, it is important that each person is given a specific area to look after, but that one person retains overall responsibility.

For smaller companies, this might be a part-time role, or 'energy champions' could be appointed, giving people responsibility for energy management in addition to their existing duties.

Typically, energy managers need experience and training. Professional qualifications from an accredited body are available, such as those from the Chartered Institute of Building Services Engineers (CIBSE).

Allocate resources

The accountable person/people must be given adequate time, budget and resource if they are to be able to complete projects and have impact. There should also be time for monitoring and reporting progress. Ensuring adequate resource is particularly important when the role is assigned to an employee as only part of their duties.

▶ Step 2: Understand energy monitoring and targeting

To manage energy effectively, understand how the organisation currently uses energy, and set clear targets for becoming more efficient.

Monitoring existing energy use can help to establish existing patterns, and identify where too much energy is being used. It will also help organisations compare their own energy usage with that of others.

Information will help highlight the best energy saving opportunities, which can then be used to set clear, measurable targets. In addition, and perhaps most importantly, it will show where a business is now, so any future changes can be measured.

Measure it to manage it

The consumption of each different energy type (for example, gas, electricity, oil, renewables) must be recorded, so the overall energy usage can be accurately measured and then managed.

In larger organisations, it may be worth breaking down the business into different areas to make energy monitoring more effective. If the organisation has a number of different buildings, or incorporates several processes, the energy used in each could be measured separately. Alternatively, in offices or service organisations with just one building, it may make sense to measure energy by different teams or floor areas.

After deciding how the organisation's energy consumption will be measured, the next step is to collect the data. This usually involves reading meters (and sub-meters). Delivery chits, for example, for oil, could be used to support usage information.

Meter reading can be straightforward. Smaller organisations may find that reading meters is enough. Larger organisations may need an automated system which gives more data. Either way it is important to collect enough information to show where energy savings can be made.

The next section covers the types of meter that might be considered if there is not enough information about current energy consumption.

Metering systems

Some meters will make monitoring energy usage easier and faster, producing data for analysis. These systems can help to quickly identify any unexpected or excessive energy use, and highlight opportunities to make cost savings.

Most of the solutions discussed here relate to electricity but meters for gas and other energy sources are available.

Half-hourly supplier meters

Sites with a peak electricity load above 100kW are equipped with 'half-hourly' primary meters. This means that total consumption is recorded every half hour and this information is automatically retrieved from the meter and passed to the energy supplier.

These meters provide a good source of information for energy management. If possible, access this data – it is typically available online – and use it to identify potential energy savings.

Smart meters

Smart meters can provide half-hourly consumption data. However, they are relatively new technology – ask your supplier about the services they provide.

Smart metering is suitable for smaller electricity sites which currently have non-half-hourly meters, and for gas sites with manually read meters.

Site sub-meters

Sub-metering systems measure energy consumption within particular areas of the site or by particular items of equipment. This technique allows much more specific identification of energy saving opportunities than is possible by using data from the primary utility meter. Sub-metering is appropriate for energy intensive organisations and those that are already familiar with basic energy management practices.

Before installing permanent sub-meters, it may make sense to try portable clip-on meters to see if they provide the information required.

For more information, see the technology overview on *Metering* (CTV027) from the Carbon Trust.

top tip:

Any work planned on meters must be done by an approved contractor.

Set up an energy monitoring system

The person responsible for managing energy will usually oversee the collection and analysis of energy data. The amount of time required for this will depend on the energy sources, the metering system being used and the size and nature of the business. In some cases, it may be worth considering outsourcing this role to a central energy monitoring company. See *Energy management strategy* (CTV022) for further information on this option.

Organisational targets

Set targets for energy reduction in areas of excessive consumption. Targets must be realistic and achievable, so take into account the varying needs of different parts of the organisation.

Although many businesses could achieve 10-20% savings on their energy bill, most organisations try for a 5% overall reduction in their first year.

CASE STUDY

What other businesses are doing

A chemical manufacturer achieved a 14% reduction in overall energy usage in the first year of its energy management campaign (2000-1). This reduced the company's typical £2.5 million annual energy bill by £350,000 and was achieved through the involvement and motivation of staff; the campaign had no money to spend on new plant or energy saving technology.

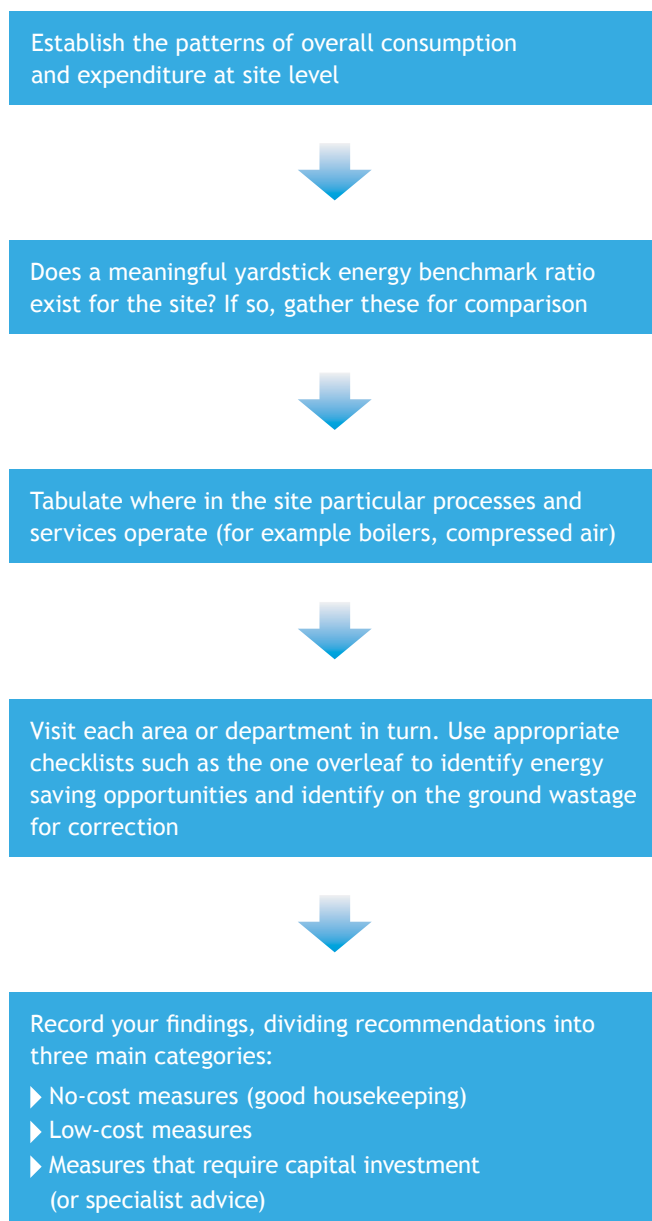
fact:

Actions taken as a result of good energy metering and monitoring can save 5-10% of a site's energy use.

▶ Step 3: Carry out an energy survey

As well as automated metering of energy use, carry out a physical site inspection to spot any obvious areas of waste. The inspection should cover the entire site and result in a list of opportunities that can then be developed into an effective action plan.

Figure 3 An outline structure for an initial energy survey



Plan the inspection

Energy surveys can be conducted on entire sites or individual areas of the business such as: single manufacturing units, utility systems (such as heating or compressed air), specific buildings, or particular items of equipment. If an overall picture is required, one option is to carry out an initial overall survey, and then focus on key target areas.

Another decision to make is whether to carry out the survey in-house, or bring in outside expertise.

Consultancy

A consultant is likely to have a fresh view of the organisation, coupled with considerable depth of technical expertise. To make the most out of a consultant's visit, prepare a briefing, including:

- ▶ Energy consumption data
- ▶ Known factors which affected consumption in the data period, for example, peaks in production or especially cold weather
- ▶ Production/output history and core business function
- ▶ What measures have been taken
- ▶ Known problems and any questions to ask.

When consultants carry out an initial energy survey, they will usually:

- ▶ Familiarise themselves with the site and the work done there and learn how energy is currently managed
- ▶ Request data on monthly energy consumption and expenditure over the past year
- ▶ Study the main services facilities (for example boilers, lighting, compressed air)
- ▶ Seek energy saving opportunities
- ▶ Estimate likely implementation costs, savings and paybacks, usually based on limited data
- ▶ Write a report for the business based on actions it can take.

Internal survey

The alternative is to carry out the survey internally, which has its own advantages. The person or people carrying out the survey will:

- ▶ Be familiar with the site and its activities
- ▶ Know who in the business holds any relevant information
- ▶ Have the option of delegating tasks to other staff members as appropriate
- ▶ Be able to improvise measurement techniques and vary processes to see how they affect results
- ▶ Be able to carry out multiple walk rounds at different times of day and at weekends to ascertain different levels of energy use. For example:
 - At a time when little or no energy is used, such as when everyone has gone home for the evening or at the weekend (after any cleaners have left)
 - When the clocks have changed – to make sure any equipment timers have also been changed
- ▶ Understand the culture of the organisation and have insight into how to make changes
- ▶ Be on-site to drive change and monitor how it is working.

Considering all the benefits, many organisations choose to employ an external contractor to conduct a survey but rely on in-house expertise to manage change.

Appendices A & B at the back of this overview have two checklists that could be handy for compiling this information:

- ▶ **Inventory** – to record information about equipment
- ▶ **Energy use assessment** – with questions to highlight poor habits and actions that need to be taken.

These checklists provide a structured framework necessary for ensuring that all areas are covered and potential energy-saving opportunities are identified.

Further usable checklists available from the Carbon Trust divided by industrial and non-industrial organisations are: *Assessing the energy use at your industrial site* (CTL002) and *Assessing the energy use in your building* (CTL003).

Organisations could use the information given in these publications to tailor a checklist specifically for their needs. See the example checklist given in Appendix A.

▶▶▶ Expert advice

Your company may qualify for a free energy efficiency survey from one of the Carbon Trust's expert consultants.

Subject to terms and conditions.

top tip:

If you are considering conducting a survey in-house, without a consultant's help, make sure that your organisation has the expertise to spot waste and the experience to design workable solutions.

► Step 4: Develop an action plan

Watch the hard work begin to show results.

Get started

To kick-start the strategy, consider:

- Holding a launch event
- Booking staff into training in efficiency
- Promoting the initial, quick-win actions to staff in an all-team meeting, as well as scheduling updates on progress.

Make sure that technical staff members have already received the necessary extra training, and that the plan is incorporated into existing systems as far as possible.

Thereafter, track progress on both short and long-term projects. Rewarding success will encourage people to engage with the strategy and be alert to any further potential savings.

Raise awareness

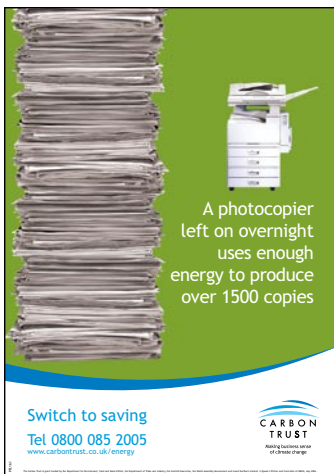
Motivating staff

All employees will have different attitudes to changes in energy policy and usage habits. Some may be keen, but others could be apathetic or even oppose the changes.

The management guide, *Creating an awareness campaign* (CTG001), is full of ideas on how to educate and enthuse staff and management about energy saving. It includes tips on communication and examples of materials which can be used. The Carbon Trust has also produced posters and stickers which can be part of an awareness campaign.

Your marketing department could come up with an internal campaign for all your achievements.

Examples of free posters and stickers available from the Carbon Trust



PFL160



PFL164



PFL167



PFL170



PFL170



PFL170

Publicise performance

Spreading good news is important because it encourages people who have contributed towards the success and lets stakeholders know their interests are being met. Highlighting poor performance can help encourage improvement, if treated sensitively. Remember, few plans will be perfect from the outset and will need refinement year on year.

Make publicity relevant to the target audience. For example, senior management will want to see how much money has been saved. Staff may like to be reminded how their working conditions have improved or how to make savings at home. Maximise the impact of reports by making them concise and accessible. This is discussed further in the next section.

top tip:

What if we fail?

Energy management is a highly specialised skill, which may not be natural for all staff. Rather than blame people for not achieving the desired result, constructively analyse the reasons that the programme did not work, and allocate resource and support to overcome them.

▶▶▶ Energy-Efficiency Loans

Small or medium-sized enterprises (SMEs) in England or Scotland and all businesses in Wales that have been trading for at least 12 months could borrow* from £5,000 to £100,000. Loans are unsecured, interest-free and repayable over a period of up to four years. There are no arrangement fees and applying is straightforward.

All businesses in Northern Ireland* that have been trading for at least 12 months may be eligible for an unsecured interest-free loan of up to £200,000.

*Subject to eligibility. Regional variations apply.

▶▶▶ Tax incentives

Enhanced Capital Allowances (ECAs) enable businesses to buy energy efficient equipment using a 100% rate of tax allowance in the year of purchase. Businesses can claim this allowance on the investment value of energy efficient equipment, if it is on the Energy Technology List. The procedure for claiming an ECA is the same as for any other capital allowance. For further information please visit www.eca.gov.uk/energy or call the Carbon Trust on 0800 085 2005.

► Step 5: Communicate

It is vital to communicate the energy management plan to employees at every stage, as effective energy management relies on everyone being involved and playing their part.

To achieve full participation, everyone in the organisation must understand:

- Why action is being taken
- What is being done, for example, the aims and targets set
- When the action will be, for example, campaign launches and milestones
- How they can be involved.

Consider the audience

When launching energy saving initiatives, identify the target audience and strike a balance between giving enough detail so they are informed and motivated, but not too much, or they will be swamped and lose interest.

The best method used will depend on the nature of the company. For smaller companies a simple briefing may work best, while larger organisations might choose emailing a newsletter to ensure they reach all staff.

Whatever elements it is made up of, publicising the action that has been taken should:

- Build greater understanding of the importance of energy efficiency – both for the business and the environment as a whole
- Create a sense of ownership of the problem and the solution
- Share relevant technical information with stakeholders
- Focus attention on key issues
- Demonstrate how individuals can help
- Dispel myths.

Report progress

Maintaining interest in, and commitment to the campaign in the long term is just as important as launching it effectively. It is important to keep employees updated on progress and feed back the cost savings and environmental impact of the campaign. Unless this is actively managed, the impetus behind energy saving activities can evaporate.



Some organisations may wish to report to external stakeholders, such as shareholders, customers or local residents. This will involve an external communications campaign running alongside the campaign for employees.

Overcoming resistance

When changing energy management practice, people inevitably have to alter their own habits and ways of working. The person in charge of the programme should be prepared for some resistance and reluctance to adapt.

It is important, however, to get these people on board, as real, lasting energy savings rely on everyone adopting efficient practices. Trying to force people to change their habits rarely works, and will usually cause greater opposition. Instead, work out what is the problem and make a point of demonstrating the benefits of change.

Offering training in simple energy management, including practical habits that individuals can adopt could be a solution. To get staff involvement this could be rolled out as an inter-departmental competition with prizes for the winning team.

Creating an awareness campaign (CTG001) is full of ideas on how to get buy-in from staff, and promote the energy campaign. Further advice on troubleshooting is given in *Energy management strategy* (CTV022).

Appendix A

Inventory

Date of survey Time Undertaken by

Heating	Approx no. per site	Optional comments/more detail
Air conditioning		
Boilers – hot water		
Boilers – steam		
Heaters (fixed)		
Heaters (portable)		

Lighting	Approx no. per site	Optional comments/more detail
Energy saving lights		
Standard tungsten bulbs		
Sodium lighting		
Strip fluorescent lights		

In the office	Approx no. per site	Optional comments/more detail
Computer workstations		
Laptops		
Photocopiers		
Fax machines		
Vending machines		
Watercoolers		

In the factory	Approx no. per site	Optional comments/more detail
Compressed air units		
Fans		
Pumps		
Refrigeration units		
Other plant		

Appendix B

Energy use assessment

Weather: Dry/Wet Cold/Mild/Warm Windy/Still Sunny/Overcast

Date of survey Time Undertaken by

Heating		Comments
Are staff happy with the temperature?	Y/N	
Have heaters/boilers been serviced in the last 12 months?	Y/N	
Are heaters and air conditioning units operating separately and not at odds with each other?	Y/N	
Are thermostats working and set to the correct temperature?	Y/N	
Are the timers working and on the correct settings?	Y/N	
Are other heating controls working and on the correct settings?	Y/N	
Are radiators and heaters clear of obstructions?	Y/N	
Are windows closed when heating or air conditioning is on?	Y/N	
Are windows and doors draught-free?	Y/N	
How is hot water provided?	Y/N	
How are extractor fans controlled (eg in toilets)?	Y/N	

Lighting		Comments
Are lights switched off if daylight is sufficient/the room is not in use?	Y/N	
Are halogen lights used?	Y/N	
Have old, large diameter fluorescent tube lights been replaced?	Y/N	
Are lamps, fittings and roof lights clean?	Y/N	
Have traditional tungsten bulbs been replaced?	Y/N	
Are light switches arranged conveniently and labelled?	Y/N	
Is exterior lighting switched off when not needed?	Y/N	

Appendix B CONTINUED

Energy use assessment

Weather Dry/Wet Cold/Mild/Warm Windy/Still Sunny/Overcast

Date of survey Time Undertaken by

In the office		Comments
Do computers have built-in energy saving features – and are they activated?	Y/N	
Are computers turned off overnight, rather than left on standby?	Y/N	
Are monitors switched off, rather than left on standby, when not in use?	Y/N	
Are photocopiers located away from air conditioned areas?	Y/N	
Are printers and photocopiers turned off overnight/at weekends?	Y/N	
Are vending machines/water coolers turned off when not in use?	Y/N	

In the factory		Comments
Are pumps/fans/compressed air switched off when the equipment they serve is not in use?	Y/N	
Are areas free from abnormal sounds such as hissing?	Y/N	
Are refrigeration units being run efficiently?	Y/N	

Energy management abbreviations

BS	British Standards. BS 8555 is otherwise known as <i>Guide to the phased implementation of an environmental management system including the use of environmental performance evaluation</i> .
CCAs	Climate Change Agreements – agreements between government and trade bodies enabling eligible businesses to receive an 80% discount on the CCL (see below) if they agree to targets for improving their energy efficiency or reducing carbon emissions.
CCL	Climate Change Levy – a levy on energy use introduced in April 2001 affecting UK industry, commerce, agriculture and the public sector.
CSR	Corporate social responsibility – how organisations take account of their economic, social and environmental impacts in the way they operate with the aim of achieving sustainable development goals.
EEAS	Energy Efficiency Accreditation Scheme.
EMAS	Eco-Management and Audit Scheme.
EMS	Environmental management system – a quality management process for managing and reducing an organisation’s environmental impact.
ETS	Emissions Trading Scheme – a market process by which organisations that reduce their carbon emissions below an agreed target can sell the surplus allowances to organisations who have exceeded their allowance or need increased energy to expand.
ISO	The International Standards Organisation. ISO 14001 is the environmental management accreditation system.
M&T	Monitoring and targeting, the process by which energy data are collected, analysed and used to inform consumption management strategy.

Summary

There are five steps to be taken when implementing energy management at a practical level. Considerable savings can be made by taking action in-house; however, some will need specialist support from a consultant.

► Step 1. Appoint an energy manager

Appoint someone to the role of putting energy on the map in your organisation.

► Step 2. Understand energy monitoring and targeting

Look at your site and identify whether the current metering gives you enough information. Add any sub-meters you need and consider sophisticated methods of data collection.

Regularly monitor energy consumption and develop a picture of energy use.

► Step 3. Carry out energy surveys

Conduct site surveys to identify energy saving opportunities at your site and things which need fixing.

► Step 4. Implement

- Hold a launch event to generate awareness and motivation
- Provide training for all staff, particularly those involved in technical aspects of energy management
- Implement the individual action plans
- Publicise successes to stakeholders.

► Step 5. Communicate

Keep both management and staff informed – celebrating wins and keeping up the momentum.

Put in place policies, systems and procedures to ensure that your system operates efficiently and that savings are maintained in the future.

Related publications

The following publications are available from the Carbon Trust:

Fact sheets

Climate Change Levy (CTL005)

Energy and carbon conversions (CTL004)

Energy management (GIL136)

How to monitor your energy use (GIL157)

Understanding your energy consumption (CTL001)

Management and technology overviews

Energy management strategy (CTV022)

Metering (CTV027)

Guides

Creating an awareness campaign (CTG001)

Degree days – a practical introduction (CTG004)

Useful websites

CIBSE

The Chartered Institution of Building Services Engineers (CIBSE). An international membership body which represents and provides services to the building services profession. CIBSE offers its members skill development seminars, technical manuals and meetings to ensure they receive the support and knowledge they need. Visit www.cibse.org

Salix

Salix works with the public sector to reduce carbon emissions. Visit www.salixfinance.co.uk

For further information...

▶▶▶ call the Carbon Trust on 0800 085 2005

You'll find free advice on what your organisation can do to save energy and save money. Our team handles questions ranging from straightforward requests for information to in-depth technical queries about particular technologies and deals with all kinds of energy saving topics for people at all levels of experience.



▶▶▶ www.carbontrust.co.uk/energy

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



▶▶▶ receive free publications

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



www.carbontrust.co.uk
0800 085 2005

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

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

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

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of climate change

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