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effective energy management guide

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“going low-carbon is the only option for
a profitable, future-proof business”

Environment Agency

published on www.oursouthwest.com

produced & developed by members of the philharding.net
network of leading independent management consultants

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If your business is wasting energy it is causing avoidable pollution, primarily through increased carbon emissions leading to climate change, whilst contributing to the problems associated with dwindling fossil fuel reserves.

But wasting energy also reduces your profitability. For every £1 saved on energy costs, most UK businesses would have to make £10 worth of sales to make the same £1 of profit. So, for example, wasting just £1,000 a year on energy due to poor energy management would require £10,000 worth of sales to make the equivalent £1,000 of profit.

The Government's support programmes on energy efficiency and carbon management have proved that most companies can reduce their energy costs by at least 10% through the implementation of simple housekeeping measures and by as much as 30% through the implementation of cost-effective measures.

Monitoring & Targeting (M&T) provides the means to identify where energy is used, where it is wasted and where to have the most effect in implementing energy savings measures. This guide includes a special quick start guide to energy M&T to help explain how this simple but effective management tool works.

By implementing the '**Low Carbon Hierarchy**' (see Annex 1) in all investment decisions, your organisation can make the most cost-effective progress towards a more sustainable future for its energy needs.

The 5 steps to effective energy management

Energy management is not a one-off exercise; to be effective it needs to be an ongoing process. This short guide provides a structured approach that businesses can adopt to manage their energy use effectively. The 5 steps to effective energy management are:

- 1. Commitment**
- 2. Understand**
- 3. Plan and Organise**
- 4. Act**
- 5. Control, Monitor & Review**

Step 1. Commitment

Make it your organisation's policy to use energy efficiently and to keep carbon dioxide emissions to a minimum wherever possible. A simple statement of policy objectives - perhaps as part of your environmental policy - will show senior management's commitment to energy efficiency and helping to reduce or negate the organisation's contribution to climate change. Once this has been decided, it is important that someone should be the 'energy champion' in your organisation. This person should have the support of top management and be given the necessary resources to be effective.

The energy champion should: act as the firm's eyes and ears for energy wastage; be responsible for reading the meters and checking the fuel bills; develop a weekly or monthly checklist of duties; and consider forming an Energy Action Team to report on progress and problems to stimulate further action.

Remember... the key factors for success in energy management, as in any other management discipline, are:

- **pressure for change** (senior management commitment is essential)
- **a clear shared vision** (you must take staff with you)
- **capacity for change** (provide the resources: time & finance)
- **action** (monitor performance & keep your communication channels open)

The 5 steps in this guide should help you achieve that success. For further guidance on changing the culture of your organisation, see the highly popular Managing Change Guide on the www.oursouthwest.com website.

"There are numerous examples in the South West where energy managers (or champions) in companies have made significant energy savings through changing staff attitudes and good housekeeping. Making a corporate commitment to energy efficiency led to 15% energy cost savings for a Gloucestershire based company."

It is essential to stay in touch with current and emerging energy efficiency techniques and technologies. Your energy champion (or manager) should refer to the national and local support highlighted within the BUSINESS section of www.oursouthwest.com.

Step 2. Understand (establish the facts)

The maxim *"You can't manage what you don't measure"* is especially true for energy management. Invoices alone will not provide sufficient information for you to take full control over your energy costs. You need to take your own meter readings at regular and frequent intervals. This will enable you to:

- identify exceptional consumption and attend to the causes quickly;
- check utility invoices and ensure that you pay only for the fuel actually used;
- compare current costs and performance with previous years;
- compare several sites, processes or buildings in the company with each other;
- compare your performance against typical standards for similar businesses; and
- assess the seasonal pattern of consumption.

Making these comparisons will help you set improvement targets and identify where the greatest scope for saving energy exists in your business.

The Carbon Trust has published a wide range of Energy Consumption Guides. These can be obtained from the Carbon Trust's website (www.carbontrust.co.uk) or by telephoning the Carbon Trust on 0800 085 2005.

How often you take meter readings will be determined by how much energy is used. As a general rule of thumb, meters should be read monthly if invoicing is quarterly and be read weekly if invoicing is monthly. **IMPORTANT – readings should be made at the same time of day and day of the week, particularly if the reading is weekly.**

Meter readings can be recorded on worksheets or on a computer spreadsheet. In either case consumption can then be displayed graphically, which is useful for detecting trends and giving warning of exceptional consumption.

The relatively high cost of transport fuel means that if you have a transport fleet, a high proportion of your overall energy costs will be diesel or petrol. Each vehicle should have a record of activity and service log. This should record date, milometer reading, fuel purchased, cost, driver and service details. This data can be used to analyse vehicle performance and overall costs.

"A Swindon organisation looking at energy management for the first time was shown how to apply Monitoring & Targeting (M&T) techniques to its energy use at its headquarters building. The result was a 26% saving on energy costs – and this was without any capital investment."

One way to reduce energy costs is to buy your fuel at the lowest price. Shop around for the best deal. For electricity, there are several ways of paying less for each unit of electricity, for example:

- make maximum use of cheaper units, especially night-time units
- minimise use of peak rate winter units
- reduce peak demand where possible
- check the tariffs to ensure you are paying the minimum amount for availability and for your maximum demand against your agreed availability
- check with your supplier that your load has no unusual characteristics e.g. low power factor

If your maximum demand for electricity is greater than 100kW you should be able to negotiate a contract with a supplier. If it is less than 100kW you will probably be on a standard tariff but there is a wide range of tariff structures - discuss the options with your supplier.

Consider looking at fuels or energy sources that can reduce your liability to pay the Climate Change Levy - renewable energy sources and, where sufficient heat demand exists, Combined Heat and Power.

Note: You are advised to take professional advice to ensure your business would benefit from such changes.

Step 3. Plan and organise

The energy policy statement (step 1) can be used to raise staff awareness and demonstrate the commitment of senior management. In a small business this may be the proprietor. A simple policy statement should set out the main objectives, together with the performance targets that need to be met to fulfil the objectives.

Once objectives and targets have been agreed, action plans can be drawn up to drive the management plan forward and set down what needs to be done and when. Your action plan should:

- have management approval
- relate actions to particular objectives
- assign actions to individuals
- allocate resources (both time and money if needed) to each improvement

An important lesson to note from the many businesses that have successfully implemented effective energy management programmes is the issue of **making people accountable**. If different business units or teams of the organisation are required to regularly account to senior management for the energy usage (and thus carbon emissions) for their operations, they will have an incentive to practice good housekeeping, implement energy saving measures and to maintain efficient performance levels into the future.

No one wants to be asked to explain bad performance to senior management! It's so much better to be able to show that your team is delivering the energy efficiency levels and improvements that the organisation aspires to.

Use promotional material, internal newsletters and staff meetings to raise staff awareness. Although you may make one individual responsible for energy efficiency, the involvement and commitment of all staff is crucial to achieve success - and making people and the teams they work in accountable for the energy they use really helps here. All staff should be encouraged to participate. Incentive schemes (benefiting facilities for staff or perhaps a local charity chosen by staff themselves) can help ensure that actions are taken and that all staff contribute to energy efficiency measures. The Managing Change Guide (found on www.oursouthwest.com) can help you embed the policy at all levels in your organisation.

Step 4. Act

A good way of finding energy waste initially is to conduct an **energy walk-round**. Ask key members of staff to accompany you – both to identify problems and opportunities, and to ensure they feel part of the assessment process.

The pattern of energy use will vary throughout the day, so it is useful to vary the times that you carry out your walk-rounds, for example:

- when the cleaners are on duty
- at lunchtime
- at night or over weekends (if your meter readings indicate that there is unexpectedly high energy use during these periods)

Note where energy is being wasted because of lack of awareness, or procedures are being ignored, repair or maintenance work is needed to reduce energy costs, or there is a need for capital investment.

To help you with the walk-round you might like to use an example walk-round checklist which can be found at Annex 2.

This checklist has been taken from the "Better Business Guide to Energy Saving" publication (reference GPG 367) from The Carbon Trust. It is highly recommended that you obtain a copy of this useful guide that also includes practical advice on heating, lighting, office equipment, electrical equipment, refrigeration, compressed air etc. You can download the guide from The Carbon Trust's website (www.carbontrust.co.uk) or by telephoning the Carbon Trust on 0800 085 2005.

There are also many useful case studies and good practice guides available from this programme that can give specific technical or management advice to help you.

If your site's energy bill is substantial and you need advice on a particular aspect of your energy use, **free expert help** is available via the telephone or, where appropriate, **site specific advice** can be provided at your site from The Carbon Trust or other providers.

Step 5. Control, monitor & review

Energy management should be a process of continuous control and improvement, not a one-off effort. You must therefore set up recording and monitoring systems to both check that targets are being met and to identify further cost reduction opportunities offering attractive returns on investment.

Use meter readings (Step 2) to monitor progress and compare results with your own targets and performance indicators.

In the UK, the process of continuous recording and monitoring of energy use against consumption targets is known as **Monitoring and Targeting (M&T)** and has been shown to be an effective management tool in numerous companies and organisations BUT it should be kept up.

Experience has shown that once companies stop monitoring their energy use on a regular basis, waste starts to occur – often at least 10% in a relatively short time. This is because problems arise (for example failed or wrongly set controls) and procedures change and the effect on energy consumption goes unnoticed or unexplained. For more details including information on how to use **CUSUM** (**CU**mulative **SUM** of variances) as a powerful technique for energy management, see the "Quick Start Guide to Energy M&T" which can be found at: www.oursouthwest.com/SusBus/susbus9/eemguide.htm

Do use the data you are collecting!

"One Swindon organisation was already recording energy data but was not analysing the data produced. 16% energy wastage had already occurred over 7 months. Once shown how to analyse the data, potential wastage of 28% per annum was avoided! The cause of this waste was a maintenance contractor that had changed the control settings to the building's heating system during a routine visit but had not reset the settings. Simply looking at the monitoring data and comparing with previous months' data identified the problem."

Degree-day figures quantify how cold (or hot) the weather has been in a given region, expressing the result as a single index number for each month or week. This allows you to "weather correct" your heating or cooling energy consumption data so that you will know whether your heating/cooling system and its control system is operating correctly and efficiently. Further information and degree day data can be found from the Carbon Trust and also:

Degree Days Direct (www.vesma.com/ddd) - service provided by vesma.com

Degree Days.net (www.degreedays.net) - custom degree day data

The Environmental Change Institute (ECI) (www.eci.ox.ac.uk/research/energy/degreedays.php) - based at the University of Oxford

Monitoring and Targeting is not a substitute for the energy management steps 1 - 4. In fact, it can often provide useful information when implementing these steps and their associated energy saving measures or the effect of other activities. It can show the deviation from expected patterns of energy use (e.g. when controls are installed or re-set or production levels change). In businesses where there is an information-based programme of quality improvement already operating, energy M&T will almost certainly share some information, for example from the management information systems.

The Carbon Trust provides useful good practice guides on energy M&T. These can be obtained from the Carbon Trust's website (www.carbontrust.co.uk) or by telephoning the Carbon Trust on 0800 085 2005.

aM&T

aM&T is a management system that automatically collects energy consumption data and analyses this data to ensure energy use is in line with targets set by the user. **aM&T** includes the meters, automatic data collection, database collation, analysis and presentation. **aM&T** automatically delivers useable energy management information to the person(s) who can make changes.

Most **aM&T** systems allow the user to set targets for energy use and review current performance against these targets. Many systems automatically produce variation reports and notify users of potential problems by e-mail or text message.

Today many systems are web based and can be extended to cover consumption of other utilities in addition to the traditional electricity and gas use e.g. water, fuel oil, steam etc. Typically the application of **aM&T** can lead to savings of c.5% although often even greater savings can be enjoyed on individual sites. Many users are instantly surprised at the level of avoidable energy waste that they identify.

Note: **aM&T** information source: Energy Services and Technology Association (www.esta.org.uk).

Next steps...

If you have successfully completed all 5 steps (but don't forget the **Quick Start Guide to Energy Monitoring & Targeting** at www.oursouthwest.com/SusBus/susbus9/m&tguide.pdf) you should now be making significant energy savings - and also helping to protect the environment!

To maintain these savings on a continuous basis go back to Step 2 and review each step.

Need expert help with energy management in your organisation?

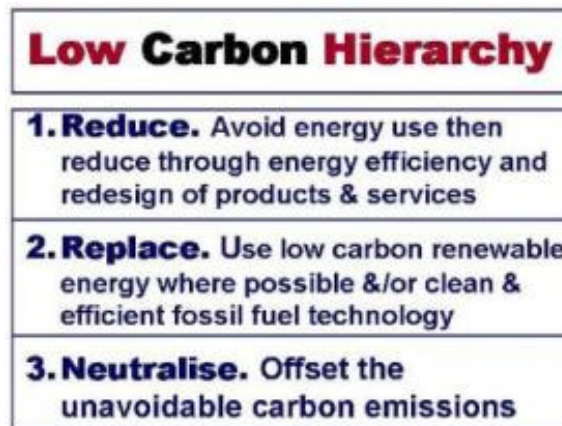
Organisations and networks such as the Energy Institute (www.energyinst.org), ESTA (www.esta.org.uk) and www.philharding.net can provide access to independent experts in this field.

This guide was originally produced and developed by members of the philharding.net network of leading independent management consultants

philharding.net
access to specialist expertise

The Low Carbon Hierarchy

“the route to a low carbon, climate friendly economy”



The most cost-effective solution for reducing your carbon footprint is to:

1. REDUCE energy use by avoiding unnecessary use and implementing energy efficiency measures. You should include the design of your goods and services and also look up and down your supply chain.

Once you have increased your efficiency you should then look to

2. REPLACE fossil fuels with renewable energy sources and/or use cleaner fossil fuel technology such as Combined Heat and Power (CHP) where it is feasible to do so.

Finally, having reduced your carbon emissions through avoiding waste, energy efficiency and use of renewable cleaner sources, you can

3. NEUTRALISE the remaining unavoidable emissions through carbon offsetting schemes.

Annex 2

Example of energy walk-round checklist

Date of energy walk-round	
Heating	
Are there staff complaints about the temperature?	
Have heaters/boilers been serviced in the last 12 months?	
Are portable heaters being used?	
Are heaters and air conditioning units operating in the same space?	
How is hot water provided?	
Do all areas have the same heating requirements?	
Is the room thermostat working and set to the correct temperature?	
Are the timers working and on the correct settings?	
Are other heating controls working and on the correct settings?	
Are there obstructions in front of the radiators or heaters?	
How are extractor fans controlled (eg in toilets)?	
Are windows and doors open when heating or air conditioning is on?	
Are there any cold draughts coming from windows or doors?	
Lighting	
Are lights switched off (if daylight sufficient/room not in use)?	
Are any old large diameter fluorescent tube lights still in use?	
Are lamps, fittings and rooflights clean?	
Are traditional tungsten light bulbs still in use?	
Are light switches arranged conveniently and labelled?	
Is exterior lighting switched off when not needed?	
In the office	
Have computers got built-in energy saving features – and are they activated?	
Are computers left on overnight?	
Are monitors switched off when not in use?	
Are photocopiers located in air conditioned areas?	
Are printers and photocopiers left on overnight/at weekends?	
Are vending machines/water coolers left on all the time?	
In the factory/warehouse	
Are pumps/fans/compressed air switched off when the equipment they serve is not in use?	
Do you hear compressed air leaks?	
Are refrigeration units being run efficiently?	

Source: Good Practice Guide GPG 367 'Better Business Guide to Energy Saving' from The Carbon Trust (2003)

Version 2010 based on the original version produced in 2000 by Phil Harding at the Government Office for the South West in partnership with the Carbon Trust and endorsed by CIMA, the Energy Institute and ESTA