
Energy management

A comprehensive guide to controlling energy use



Preface

Reducing energy use makes perfect business sense; it saves money, enhances corporate reputation and helps everyone lead 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.

Contents

Introduction 04

What do we mean by energy management?
Why is good energy management important?
Standards and certification

Successful energy management 10

Energy management roadmap
Initial review
Senior management commitment
Energy policy
Energy strategy
 Action plan
 Organising energy management
 Regulatory compliance and incentives
 Investment
 Procurement
 Metering, monitoring and targeting
 Identifying opportunities
 Organisational culture
 Communications

Management review

Next steps 45

Related publications and tools
Abbreviations

Appendix A 48

The energy management matrix

Appendix B 49

Sample energy policy

Appendix C 50

Energy management roles and responsibilities

Introduction

Energy costs are often treated as a fixed overhead by organisations. But, by taking the right approach to energy management it is possible to make considerable savings.

Successful energy management must combine an effective strategy with the right practical interventions. Many organisations would like to save energy, but they need to make energy management an integral part of running the organisation to ensure success.

Purpose of this guide

This guide is intended to help all industrial, commercial and public sector organisations, better understand the concepts of energy management, and how they can benefit from implementing it effectively.

While the guide provides a high level of detail, it is applicable to organisations of all sizes. **You should tailor the approach to energy management according to the size and needs of your organisation.**

We suggest that you first read [An introduction to energy management \(CTV045\)](#) if you are new to the subject.

This introductory section sets out what we mean by energy management, why it is important, and puts it in the context of wider environmental management and formal standards.

The following sections set out the various elements of successful energy management. Different organisations will have different priorities. Smaller and less complex organisations can still achieve good energy management with a simplified approach.

Energy management is a continuous process that develops over time. You are unlikely to tackle everything at once, so it's vital to prioritise. Dealing with the fundamentals first will provide the foundations for longer-term success:

1. Understand your organisation's energy use, costs and legal obligations
2. Gain senior management support and allocation of resources
3. Develop an energy policy and initial strategy
4. Work to formalise energy management and integrate it throughout the organisation.

Important note

This guide refers to the energy used by fixed installations (buildings and machinery) and mobile machinery. This does not include road transport. Effective energy management can be applied to other forms of energy demand and to water use. Generic job titles and descriptions are used throughout, and these should be read in the context of your own organisation.

What do we mean by energy management?

Let's consider some definitions.

Energy efficiency

Energy efficiency aims to gain the maximum results or effects from each unit of energy used; it's about achieving the same outcomes through less energy.

Renewable energy

Renewable energy refers to energy that occurs naturally and repeatedly in the environment. This can be energy from waves, wind, the sun and geothermal heat from the ground. Renewable energy can also be produced from plant sources such as wood or crops grown specifically as a fuel. Renewable energy will not run out, unlike energy from fossil fuels.

Energy management

Energy management is the systematic use of management and technology to improve an organisation's energy performance.

It needs to be integrated, proactive, and incorporate energy procurement, energy efficiency and renewable energy to be fully effective.

Energy management is essential if you want to control costs, be fully compliant with legislation and enhance the organisation's reputation.

Energy Manager

The term Energy Manager is widely used and we use it here as shorthand for **the person responsible for implementing the organisation's energy programme or strategy**. In practice, most organisations do not have or need a full-time Energy Manager; there are many part-time Energy Managers.

Why is good energy management important?

Saving energy makes business sense.

A structured, co-ordinated and integrated approach to managing energy will maximise the benefits. Evidence shows that effective energy management works, and its techniques are easily available and applicable to all types of organisation.

Good energy management leads to cost-effective decision-making.

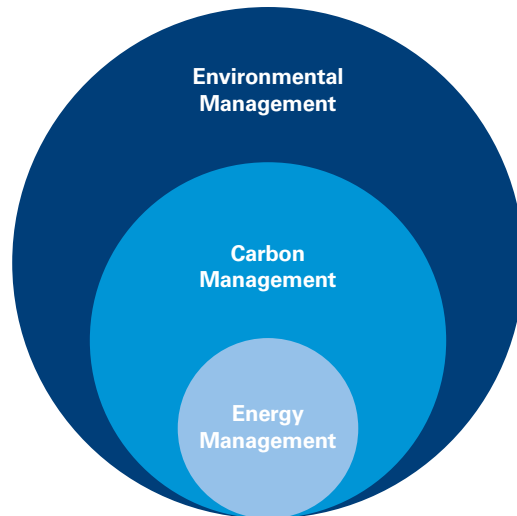
Carbon dioxide emissions from energy use will dominate total greenhouse gas emissions for most organisations, so energy management is a key component of wider carbon management. Similarly, carbon management is a key aspect of an organisation's overall environmental management (see Figure 1).

Cost reduction

The most compelling business reason for saving energy is reducing energy costs. Most organisations can save up to 20% on their fuel bills simply by better managing their energy use and investing in cost-effective measures. The Carbon Trust has seen good energy management result in savings of 5%-25%, with typical payback periods of two years or less, across a diverse range of companies. It is not unusual to save 5%-10% with just minimal capital expenditure.

Many energy saving technologies qualify for tax savings through the Enhanced Capital Allowances (ECA) scheme – further information can be found at <http://www.carbontrust.co.uk/eca>

Figure 1 Energy management in context



Recent Carbon Trust research has identified that the investments required to save 15% of energy bills have an average Internal Rate of Return (IRR) of 48%, well above the minimum requirement set by businesses, which averages 11.5%.

The portfolio of recommended energy efficiency investments that Carbon Trust has developed with its business clients has an average payback of less than three years. From the recent Carbon Trust survey of Chief Financial Officers (CFOs), we know that this satisfies the investment requirements of eight out of ten respondents.

Source: www.carbontrust.co.uk The business of energy efficiency (CTA001)

Compliance with legal requirements

The main regulatory schemes that aim to reduce carbon dioxide emissions from energy use require:

- accurate energy and emissions data with auditable evidence trails
- effective management systems for data handling and other required information
- demonstration of effective energy management (in some cases).

Sound energy management practice is entirely consistent with these requirements and will help ensure that an organisation complies with its legal obligations. Reducing carbon emissions through energy management will also help to mitigate the financial impact of schemes where carbon emissions allowances need to be purchased or specific targets need to be met.

Enhanced corporate image

Good energy management can bring other important benefits for the organisation and its employees, in addition to significant financial rewards:

- It can improve competitive advantage. Many consumers and investors will choose to support socially responsible businesses. Companies that demonstrate 'green' credentials or, have achieved recognised standards, are arguably in a stronger market position.
- Organisations can influence their supply chain; giving preference to suppliers that operate an environmental management system (EMS) or are working towards one can be attractive to customers and investors.
- An energy efficient organisation is a well-run organisation. Simple changes can improve working conditions for staff. For example, by making heating and lighting more effective and appropriate for the workspace or by releasing funds that could be invested to make their roles easier.

Certification, registration or accreditation?

Accreditation, certification and registration have different meanings, although the terms are sometimes used interchangeably. For energy management systems:

- Certification is said to occur when written verification of an organisation having reached a standard is issued — that is, a certificate is awarded.
- Registration refers to the recording of the certification by the relevant independent body.
- Accreditation is not the same as certification/registration. Some standards bodies use the term to refer to the process by which formal recognition is given to a specialised body, in order that they may carry out certification.

Source: Adapted from ISO, www.iso.org

Standard and certification

Energy Management Systems

In this guide, an Energy Management System (EnMS) refers to a documented procedural system, like the ISO 9001 Quality Management System, rather than a system of energy plant or equipment. An organisation can seek to have its EnMS certified to a recognised standard.

A number of organisations have used *ISO 14001 Environmental Management Systems* to provide energy management controls and procedures. Although ISO 14001 is a good starting point, *BS EN 16001:2009 Energy Management Systems* (which became available in 2009) provides specific focus on energy management. The standard specifies the requirements for an EnMS to enable your organisation to develop and implement a policy, identify significant areas of energy consumption and target energy reductions. BS EN 16001 provides a framework and enables a systematic approach for an organisation to continuously improve its energy efficiency and sustainable energy use.

The international standard *ISO 50001 Energy Management Systems* will be published in the latter part of 2011. Some organisations have already become certified to the draft standard, as part of its development. It is expected that ISO 50001 will effectively replace BS EN 16001.

Also of relevance to energy management is *ISO 14064-1:2006 Greenhouse Gases Part 1*, which provides a specification (at the organisation level) for quantification and reporting of greenhouse gas emissions and removals. It includes requirements for the design, development, management, reporting and verification of an organisation's greenhouse gases inventory.

Visit www.bsigroup.co.uk and www.iso.org

The Carbon Trust Standard

The Carbon Trust Standard sets performance criteria for the measurement, management and reduction of an organisation's carbon footprint. It gives a clear message that action is being taken to reduce carbon emissions year on year. This is a strong sign of ongoing commitment and a clear sustainability credential. Over 500 organisations have achieved the Carbon Trust Standard, with a total carbon footprint of nearly 42 million tonnes of carbon dioxide equivalent.

Organisations awarded the Carbon Trust Standard include household names such as first direct, Tesco and O2, and public sector organisations such as HM Treasury, London Fire Brigade and Manchester University.

To achieve certification against the Carbon Trust Standard, your organisation will need to:

- Measure its carbon footprint over two to three years.
- Demonstrate a reduction in carbon emissions.
- Provide evidence of good carbon management.

Applications are assessed by independent assessors, and certification must be renewed every two years. Visit the [Carbon Trust Standard](#) website.

Other standards

The Carbon Trust Standard is one of a number of schemes that are approved by the Environment Agency for the 'early action metric' under the CRC Energy Efficiency Scheme (CRC), formerly known as the Carbon Reduction Commitment. A full list of approved schemes is available from the [Environment Agency's](#) website. All such schemes are considered by the Environment Agency to be equivalent to the Carbon Trust Standard for CRC purposes.



Successful energy management

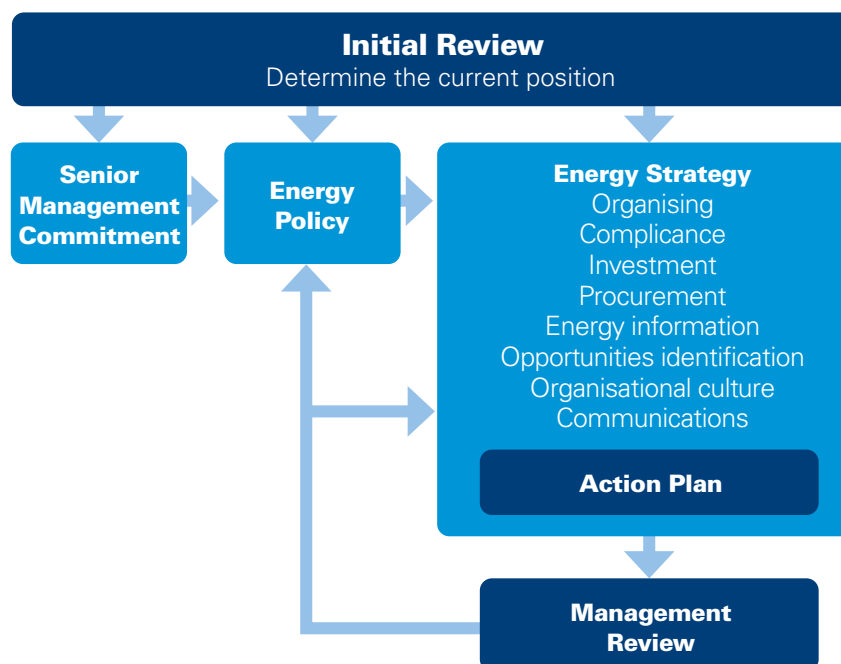
Successful energy management does not just happen – it needs commitment, planning, implementation and sustained effort.

Energy management roadmap

The key elements for delivering successful energy management are illustrated in the roadmap (Figure 2). Senior manager commitment is the foundation of good energy management, which is delivered through a formal energy policy and a supporting energy strategy with action plan. An initial review will be needed to get things going and it will take time to put all the elements in place. The roadmap elements as shown in Figure 2, are discussed in more detail on the following pages.

Clicking on the links in the roadmap will take you to the corresponding sections of this guide.

Figure 2 A roadmap of the different elements of energy management



Initial review

Before formally developing an energy management approach, you will need to gain an initial understanding of how energy is currently used and managed, and the main issues for your organisation, including the impact of:

- energy spend on your organisation's finances
- energy and climate change legislation and taxation on your organisation's finances and operation
- good energy management on your corporate reputation.

Key indicators of both poor and good practice are illustrated – which will give you a 'quick view' of your current position.

Poor practice

- There is no structured management approach to energy issues
- Energy costs are treated as an overhead
- There is no clear accountability or responsibility for energy management
- The only energy monitoring is simple financial control in the accounts department
- Energy is procured from the same supplier each year, without reviewing prices
- There is no planning to address issues such as the CRC Energy Efficiency Scheme (CRC) or Display Energy Certificates
- There is a general lack of awareness about energy issues at all levels of the organisation
- The workforce does not see energy as an issue for them
- The organisation is certified to ISO 14001 but energy has not been included as a significant aspect
- Energy management is not seen as an opportunity to improve performance and reduce operating costs

Good practice

- Energy is reviewed as a strategic issue and there is a mandate to manage energy that is endorsed and actively supported at the highest levels in the organisation
- Adequate resources (financial and human) are allocated to energy management
- There is a reliable and effective system for monitoring and reporting energy performance
- Energy procurement is an integrated, proactive process
- There is planning to meet upcoming regulation
- There is a maintained level of energy awareness throughout the organisation
- There is active engagement of the workforce around energy issues
- There is full integration of energy management with other management systems
- Energy management is seen as an opportunity

Energy Management Self-Assessment Tools

The Carbon Trust has two tools that organisations can use to self-assess their performance across the areas of energy management. They are both available as a single Excel file [Energy management self-assessment tool \(CTX614\)](#) from the Carbon Trust website.

- **The Energy Management Matrix** (Figure 3 on the next page) helps organisations assess their strengths and weaknesses across the following six areas of energy management:

- Policy
- Organising
- Training
- Performance measurement
- Communication
- Investment

Instructions for using the energy management matrix and a blank copy are provided at the end of this guide, Appendix A.

- **The Energy Management Assessment (EMA)** tool (see Figure 4 on page 14) provides more comprehensive self-assessment through the following criteria:

- Management commitment
 - Energy policy
 - Energy strategy
 - Organisational structure
- Regulatory compliance
- Procurement and investment
 - Procurement policy
 - Investment procedures
- Energy information systems and identifying opportunities
 - Monitoring and analysing energy use
 - Target setting
 - Opportunities identification
- Culture and communications
 - Staff engagement and training
 - Operational procedures
 - Communications

How does your organisation score?

Both tools can be used to identify areas for improvement and show how balanced your approach to energy management is. Revisiting the self-assessment periodically can help organisations measure their progress.

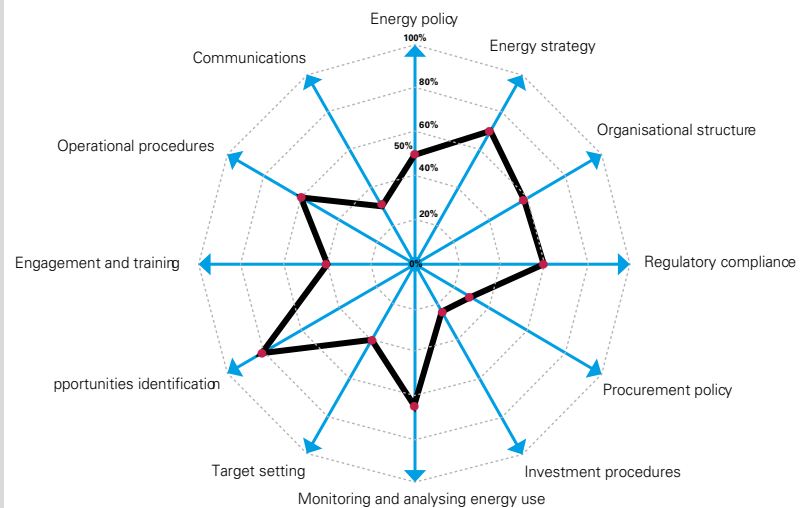
Not every company will need to aim for the upper levels in all areas, as this will not always be appropriate.

Figure 3 Energy Management Matrix – example output

	Policy	Organising	Training	Performance measurement	Communicating	Investment
4	Energy policy action plan and regular review have active commitment of top management <input type="checkbox"/>	Fully integrated into management structure with clear accountability for energy consumption <input type="checkbox"/>	Appropriate and comprehensive staff training tailored to identified needs, with evaluation <input type="checkbox"/>	Comprehensive performance measurement against targets with effective management reporting <input type="checkbox"/>	Extensive communication of energy issues within and outside organisation <input type="checkbox"/>	Resources routinely committed to energy efficiency in support of business objectives <input type="checkbox"/>
3	Formal policy but not active commitment from top <input type="checkbox"/>	Clear line management accountability for consumption and responsibility for improvements <input type="checkbox"/>	Energy training targeted at major users following training needs analysis <input type="checkbox"/>	Weekly performance measurement for each process, unit or building <input type="checkbox"/>	Regular staff briefings, performance reporting and energy promotion <input type="checkbox"/>	Same appraisal criteria used as for other cost reduction projects <input type="checkbox"/>
3	Unadopted policy <input type="checkbox"/>	Some delegation of responsibility but line management and authority unclear <input type="checkbox"/>	Ad-hoc internal training for selected people as required <input type="checkbox"/>	Monthly monitoring by fuel type <input type="checkbox"/>	Some use of company communication mechanisms to promote energy efficiency <input type="checkbox"/>	Low or medium cost measures considered if short payback period <input type="checkbox"/>
1	Unwritten set of guidelines <input type="checkbox"/>	Informal mainly focused on energy supply <input type="checkbox"/>	Technical staff occasionally attend specialist courses <input type="checkbox"/>	Invoice checking only <input type="checkbox"/>	Ad-hoc informal contacts used to promote energy efficiency <input type="checkbox"/>	Only low or no-cost measures taken <input type="checkbox"/>
0	No explicit energy policy <input type="checkbox"/>	No delegation or responsibility for managing energy <input type="checkbox"/>	No energy related staff training provided <input type="checkbox"/>	No measurement of energy costs of consumption <input type="checkbox"/>	No communication or promotion of energy issues <input type="checkbox"/>	No investment in improving energy efficiency <input type="checkbox"/>

Figure 4 Energy Management Assessment – example output

Characteristic	Score		% score
	Actual	Max	
Management commitment	19	32	59%
Energy policy	5	10	50%
Energy strategy	7	10	70%
Organisational structure	7	12	58%
Regulatory compliance	6	10	60%
Regulatory compliance	6	10	60%
Procurement and investment	6	22	27%
Procurement policy	3	10	30%
Investment procedures	3	12	25%
Energy information systems & identifying opportunities	21	34	62%
Monitoring and analysing energy use	9	14	64%
Target setting	4	10	40%
Opportunities identification	8	10	80%
Culture & communications	13	30	43%
Staff engagement and training	4	10	40%
Operational procedures	6	10	60%
Communications	3	10	30%
Grand total	65	128	51%



Understanding energy usage

Ask these key questions to understand how and why energy is used in a broader context.

How does the core work of the business affect energy use?

Manufacturers, for example, need energy for their processes, so consumption will fluctuate depending on production levels. Offices and service businesses might not see such a direct correlation with activity levels, but energy is needed for heating, lighting and office equipment. Energy for heating and lighting might go up in winter, or office equipment might be used more if staff members are working late. Understanding this is crucial to finding ways to save.

How does legislation affect the organisation?

Understand what legislation is relevant to the organisation. This may well include legislation designed to encourage energy savings, but also legislation that tends to increase energy demand, through, for example, pollution control or safety-critical operations.

Visit: <http://www.carbontrust.co.uk/uklegislation>

Benchmark current performance

Understand current energy performance by collecting and analysing data. Assess which sets of data will be most useful, and how much is needed.

Trends and issues that need investigating often emerge quickly, simply by looking at year-on-year or month-by-month data. Link the data to appropriate drivers, such as turnover, tonnes of material processed and so on, as relevant to the site. For example, performance could be expressed in terms of energy used per m² of occupied office space or kilogrammes of carbon dioxide emissions per unit of output.

[\(See Monitoring and Targeting section\)](#)

This process will show an organisation how well it is performing compared with in the past, and help to identify areas where savings may be possible.

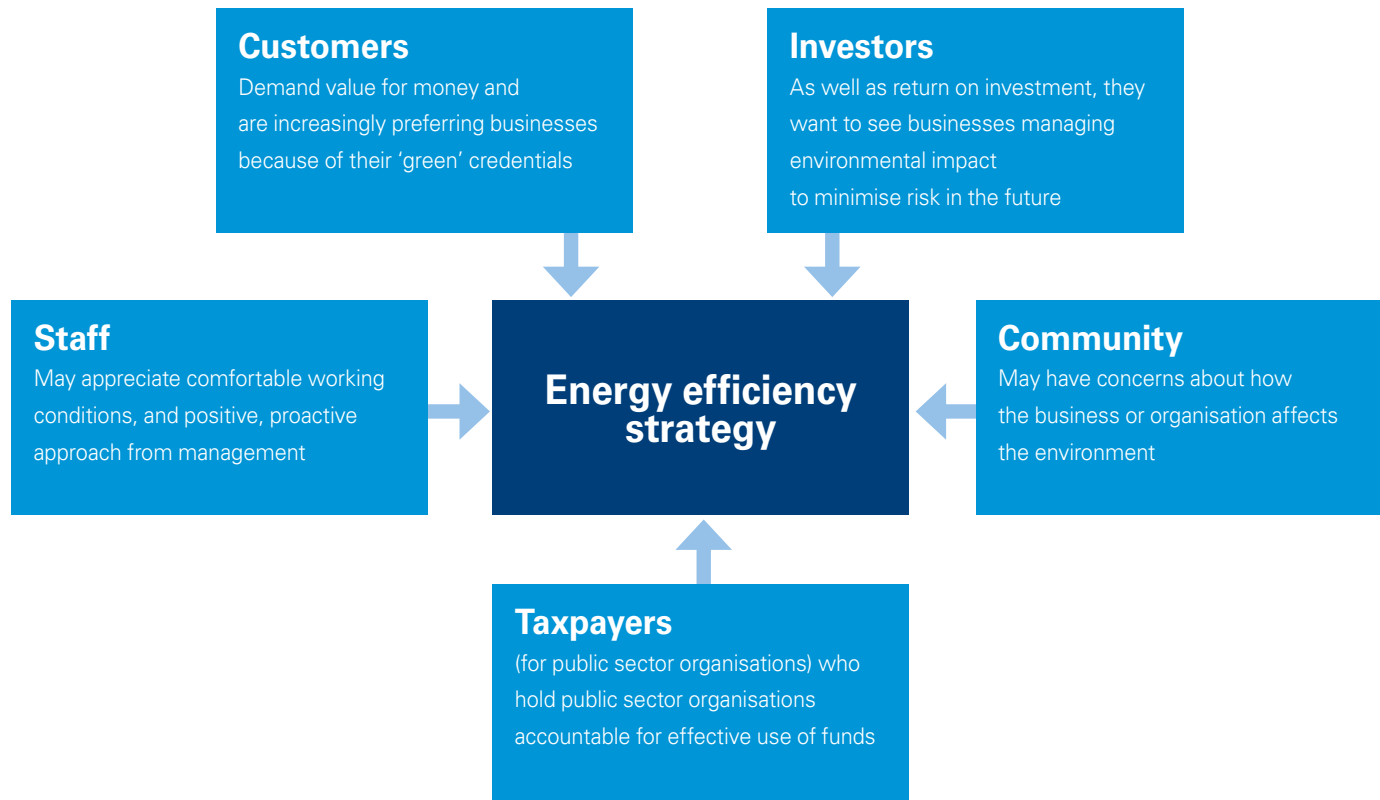
In some cases, reference to published consumption benchmarks for other similar organisations, buildings or processes may be useful to compare relative performance, but make sure that like-for-like indices are compared. Call the Carbon Trust on 0800 085 2005 for further information.

Analyse stakeholder needs

People will be interested in helping to shape a company's energy management strategy. The diagram on the next page (Figure 5) shows who may need to be considered.

This initial review should put you in a good position to gain senior management support and develop your energy policy and strategy.

Figure 5 Diagram showing potential stakeholder needs



Senior management commitment

Active management starts at the top of the organisation.

Any energy management initiative is likely to falter without the support of senior managers. But, to gain their commitment they will need to understand clearly:

- what it is
- why it is needed
- what the benefits are
- what it will cost.



The Carbon Trust Management Guide, [Making the business case for a carbon reduction project \(CTV039\)](#) provides valuable guidance on what senior decision-makers will be looking for.

High level commitment will provide:

- advocacy from senior managers
- visibility of the issues across your organisation
- impetus for the organisation to implement energy management
- resources, both human and financial.

It will also demonstrate that good energy management is part of your organisation's mission and as relevant as other management aspects.

It's worth finding out whether energy management has been previously undertaken to learn from any mistakes or to reinstate any good practice that has since lapsed.

For energy management to be successful and sustained, it must be seen as an important aspect of how the organisation operates and be supported at the highest level.

It is good practice for a board member or other senior manager to act as a sponsor for energy management within the senior management team (SMT). This Responsible Senior Manager will provide the link between the Energy Manager and the SMT and act as an advisor to the Energy Manager.

However energy management arrives on the corporate agenda, it is essential that it is seen as an improvement opportunity for the organisation.

It is important that senior managers have a broad understanding of energy issues, which may mean that they need to be formally briefed.

When making the case for energy management, you should always be able to:

- articulate what the costs and benefits will be
- explain how it can be implemented
- outline who should be involved
- propose a timeframe and milestones
- clearly state what the next actions should be.

Having secured high level commitment, the next stage is the development of the energy policy and working strategy.

Energy policy

Decide whether the energy policy should be a standalone document or part of an existing framework such as an environmental or carbon management policy.

Drafting your energy policy

A suitable energy policy provides the foundation for best practice in energy management. An effective policy needs to be directly relevant to the organisation and appropriate to its nature and size. It should provide a clear focus for the organisation's objectives and be the formal expression of the senior management's commitment to, and ownership of, the issues. It should provide workable principles to guide the organisation's energy strategy, and include the following elements:

- The context with respect to corporate vision and mission, plus other specific environmental policies.
- A clear expression of the organisation's energy/carbon vision and aspirations, with specific objectives, for example:
 - to go beyond basic legal requirements;

- quantitative targets or a commitment to develop and adopt such targets;
- the adoption of qualitative public commitments or external recognition/accreditation schemes such as the Carbon Trust Standard or BS EN 16001.

- A commitment to develop and maintain an up-to-date energy strategy ensuring the integration of energy management across all relevant decision-making.
- A commitment to ensure that sufficient resources are in place to meet the policy objectives.
- A commitment to meeting the training and development needs of energy management staff and raising the energy awareness of all staff.
- A commitment to regular and formal review. Good practice would be to review the policy annually, though this does not mean that it has to be redrafted each year.

An energy policy should be short and succinct (certainly no more than two pages), signed by the Chief Executive (or equivalent), and be a public document.

Policies often comprise two documents:

Part A: A high-level statement containing the guidelines and principles to which the organisation is committing. It should demonstrate explicit support from senior management and provide the framework for the delivery of energy savings.

Part B: A more detailed document setting out specific energy management objectives and targets along with the methodology for achieving these. It should provide clear information about who is responsible for the delivery of the policy, detail of actions, and a timeframe for review.

See [Appendix B](#), on page 49, for a sample energy policy which could be used as a starting point.

Case study

Guala Closures

During an energy survey, the Carbon Trust identified that energy management was relatively undeveloped at Guala Closures, which meant that the company had little understanding of how energy was used at the site, where wastage was occurring and how savings could be achieved.

The Carbon Trust helped the company put in place a comprehensive energy management system which now enables them to control and minimise energy use to achieve year-on-year cost and emission savings.

The system is driven by the company's energy policy which states its commitment to save energy, sets targets and goals for improvement and identifies the senior managers who have responsibility for achieving these results, with specific funding allocated to implement energy saving projects. The policy is made available to all employees together with updates on performance.

View the full Case Study: [Guala Closures \(CTS168\)](#)

Setting objectives and targets

When developing objectives and targets, there are a number of factors to take into account, both in terms of the size of the targets and how they are to be achieved. These include:

- assessing energy reduction targets to calculate the cost and potential return on investment
- building on management strengths and identifying any gaps in resources
- expressing objectives and targets in ways that provide incentives for people at all levels in the organisation.

Energy saving targets are often expressed in terms of a percentage reduction in energy consumption or CO₂ emissions. It is important to ensure that targets are realistic and reflect the organisation's potential.

Alternatively, reductions can be expressed in terms of improvement compared with benchmarks, either those taken internally or, if available, those published for comparable organisations. Energy use or CO₂ emissions are not the only ways to measure success. Other key performance indicators (KPIs) include:

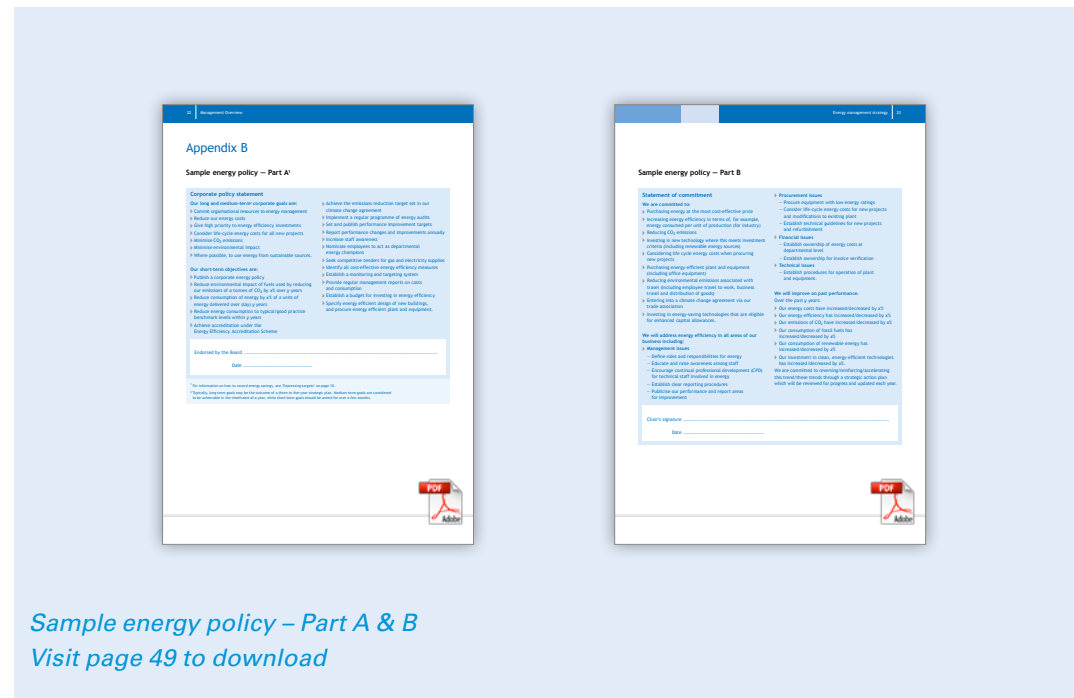
- increasing the percentage of annual energy expenditure invested in reducing consumption
- achieving greater return on investment in improving energy efficiency
- increasing the awareness of staff, measured by a staff questionnaire and the impacts of staff actions
- increasing the number of key personnel given energy training
- improving on the Energy Management Assessment tool or Energy Management Matrix.

Barriers to success

The following are common weaknesses in energy policies that lead to poor energy management:

- not actively supported by senior management
- not succinct
- lack of specific targets and commitments
- out of date – not a living document
- not supported by a strategy with the ability to deliver.

Use the template energy policy in [Appendix B](#) to make sure you don't miss any key points and ensure you have support from senior management from the outset. Keep your policy focused and current.



Energy strategy

A policy on its own will not deliver energy savings. What the policy does is provide the mandate and focus for the development of an effective energy management strategy.

Following approval of the policy, a working strategy needs to be developed. In some cases an organisation might need to develop a draft strategy to finalise and approve their policy. In this case, the instruction to draft the strategy is one form of commitment.

A strategy is essential if you are a large organisation. For smaller organisations, it may be enough to have a robust energy plan.

Strategies should not be developed by a single individual, or fully handed over to an external organisation, though it can be helpful to involve external facilitation if the cost can be justified.

A group of stakeholders should develop the strategy. This is important because:

- you need the input and 'buy-in' of the people that the strategy will affect and those who will be responsible for implementing the various elements.
- it spreads the resource requirement.



The strategy is, in effect, the 'corporate framework' that will enable energy management to develop and integrate with the other activities of the organisation.

Some key strategic issues to resolve are:

- will a formal management system be used – for example ISO 14001, BS EN 16001, or ISO 50001?
- what will be the responsibility or accountability structure for energy management?
- can it be delivered with existing staff?

The strategy should be an operational document that sets out how the organisation will ensure that the energy policy objectives are met.

The strategy should ensure that the necessary systems, processes and resources are in place.

It should be a formal written document adopted by the Senior Management Team (SMT), all of whom take responsibility for its successful implementation. Like the policy, it should be subject to a process of formal review and each edition of the strategy should provide a plan of action for a specified period, for example two years, with clear timescales for implementation and regular formal review.

The detail of the strategy will of course depend not only on the policy objectives, but also on the existing energy management position and nature of the organisation.

Whatever the organisation's starting position, the following aspects should be covered by the strategy:

- Assignment of energy roles and responsibilities across the organisation with sufficient resources allocated to ensure that these responsibilities can be properly delivered. This includes staff time, staff grades and budgets.
- Development and maintenance of organisational structures so they support energy management and related processes.
- Compliance with energy and carbon regulation.
- Development and maintenance of procedures for operational and capital financing of energy efficiency activities and projects, which are consistent with the policy aims.
- Development and maintenance of procedures for the procurement of energy consuming equipment, energy related services and energy itself.
- Energy information management including metering, monitoring, analysis and reporting of energy performance and related issues.
- Methods and processes for identifying energy reduction opportunities.
- Training and development of staff across the organisation, which supports the energy policy objectives.
- Communicating the energy policy, targets and particular initiatives both internally and externally where appropriate.

These topics are considered in more detail in the following pages of this guide.

Action plan

Developing the strategy will identify which initial actions are needed to put good energy management into effect. The following sections describe the vital elements that need to be established, if not already in place. These actions should form a live energy plan that is regularly updated to show progress and development.

The action plan will expand to include specific actions to identify opportunities and implement energy reduction projects.

The format of the action plan will depend on what works for you, rather than reflecting a standard approach. Many larger organisations may have planning or project management processes already in place that can be used for energy management. It is far better to do this than to invent new processes.

To be effective, the action plan should:

- be agreed and approved by the appropriate level of management
- involve the senior manager who is ultimately accountable for energy management performance
- prioritise actions

- relate actions to individual objectives and targets, which should come, in turn, from specific policy commitments and strategy development
- assign actions to individuals with clear deadlines for reporting progress and completing the task
- state a realistic time and budget allocated to individuals to complete each action
- clearly indicate who has authority for approval and signing off each action when it has been completed.

Barriers to success

An effective energy strategy will be a fairly complex document, involving input from a range of people and departments. A common issue for the lead author is gaining this input and ensuring that there is shared ownership of the strategy from all those whom it affects. Senior management support, including the assignment of responsibilities to a range of staff (see next section) is important in addressing this.

Organising energy management

Energy Manager and Energy Management Team

There is no single ideal model for the Energy Management Team; how it works will depend upon the characteristics of the particular organisation.

Staff on the team may also have other functions and duties. It's important that they have sufficient time, expertise and resource to perform their energy management responsibilities effectively.

The team, led by the Energy Manager, is the core group with responsibility for delivering the energy policy's objectives through developing and implementing the energy strategy across the organisation. In practice, the designations of Energy Manager and Energy Management Team might not be used, but the functions are still needed for effective energy management.

The Energy Management Team, as a whole, should encompass the following functions:

- Ongoing monitoring and reporting on energy use, energy cost and related carbon emissions through the use of appropriate energy metering, monitoring and analysis tools and systems. Benchmarking performance, identifying exceptions and instigating corrective actions.
- Communicating with staff to encourage all employees to be energy aware and play their part. Providing support and advice to staff.
- Identifying and implementing opportunities for reducing energy consumption and for using alternative lower carbon sources of energy.
- Keeping abreast of and managing relevant regulatory requirements, new technical developments and identifying sources of external funding for energy efficiency investment and support.
- Specifying energy efficient features in maintenance operations, plant replacements, building refurbishments and in new builds. Approval of equipment purchases from an energy efficiency perspective.

The scale of activity should of course be appropriate to the size and nature of your organisation.

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 having an Energy Manager in 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. 'Energy champions' could be appointed, giving people responsibility for energy management in addition to their existing duties.

Responsibilities for energy management should not reside exclusively with the Energy Management Team

Energy management is only one small element of any organisation and there are many influences determining how an organisation is structured. It is not possible or indeed appropriate to prescribe a particular solution; only the organisation's senior management can decide what is best for their specific circumstances.

There are a number of characteristics that should be put in place to facilitate effective energy management and ensure that key decision-making considers the consequences for energy:

- There should be a clear reporting structure from the Energy Manager and team through to the Senior Management Team via the Responsible Senior Manager.
- Particularly strong relationships are necessary between the energy management function and those responsible for operation of buildings (e.g. facilities manager) or process

plant (e.g. production manager). For new or refurbished buildings or plant, Energy Managers need to liaise closely with the specifiers/designers.

- Communications need to be underpinned through specified processes and not be dependent on ad-hoc relationships between departments or individuals.

Organisational issues and energy management roles and responsibilities are all inter-related. The overarching good practice principle is that energy management is everyone's responsibility, has a wide remit across departments and consequently needs to be fully integrated within the organisation to be fully effective.

Case study: confectionary company

Working with the Carbon Trust this company took a structured approach to energy management. Within two weeks of developing an energy plan, they had taken action to reduce consumption and seen noticeable improvements. This company's approach centred around an energy team that met on a monthly basis. The result was a reduction in the utility bill of £22,000 with a 22% improvement in production output. The total cost of the projects implemented was £58,790 giving a simple payback of 2.8 years. Additionally it allowed the company to easily achieve its targets in its Climate Change Agreement.

Allocation of resources

People with energy management responsibilities must be given adequate time, budget and resource to fulfil their responsibilities effectively. There should also be time to monitor and report progress. This is particularly important when the role is assigned to an employee as only part of their duties.

Formal responsibilities for energy management should not reside exclusively with the Energy Management Team. There are also specific responsibilities that should be formally assigned to individuals whose support and engagement is necessary for delivering effective energy management. In particular, best practice will include clearly specified energy related responsibilities for:

- the Chief Executive
- the Responsible Senior Manager and the Senior Management Team (SMT) as a whole
- the Energy Manager (or person who has that role) and Energy Management Team

- Other key managers and their departments (depending on the organisational structure):
 - Production or Service Delivery
 - Asset Management/Property
 - Facilities
 - Estates
 - Maintenance
 - Capital projects
 - Finance
 - Procurement
 - IT
 - Human Resources
 - Security, cleaners, and caretakers

It is a common mistake for organisations to expect that informal and ad-hoc arrangements between particular individuals will be sufficient to make energy management effective.

[Appendix C](#) at the end of this guide provides further details on the specific responsibilities that should be assigned to the individuals above. It is unlikely that the desired outcomes will be achieved without formalising responsibilities.

Responsibilities must be matched with resource otherwise they will not be adequately realised. A minimum guideline is that for every £2 million spent annually on energy, an organisation should have one or more full-time equivalent (FTE) people assigned to energy management activities, excluding activities related to energy procurement. An organisation, for example, with a £4 million annual energy bill really requires two FTE in total allocated to energy management.

Barriers to success

A lack of understanding and appreciation, or a lack of appropriate training can lead to unsatisfactory staff engagement outside of the core Energy Management Team. This can be overcome by ensuring formal responsibilities are assigned as above and through wider staff awareness programmes (see [Organisational Culture](#))

Without proper integration and strong communications across the organisation, energy management becomes easily marginalised and undermined.



Regulatory compliance and incentives

Both the UK government and the EU have, over recent years, introduced various energy and carbon related regulatory schemes in response to the challenges of man-made climate change, and to ensure secure and affordable energy supplies. These aim to drive greater energy efficiency, reduce greenhouse gas emissions, and encourage diversification of energy supply, particularly towards alternative and renewable sources.

Such regulatory schemes can be divided into two broad groups:

- Those that place mandatory requirements on organisations, including:
 - CRC Energy Efficiency Scheme (CRC)
 - Building Regulations and Energy Certificates (EPCs and DEC)s
 - Climate Change Levy (CCL) and Climate Change Agreements (CCAs)*
 - EU Emissions Trading System (EU-ETS)
 - Fluorinated Gas (F-gas) Regulations
- Those that provide direct financial incentives for implementing certain technologies and alternative energy sources, including:
 - Enhanced Capital Allowances (ECAs)
 - Feed-in Tariffs for renewable technologies (FITs)
 - Renewable Heat Incentive (RHI)

It is important that all organisations are fully aware of the compliance framework that affects them, and of the opportunities there may be

from incentive schemes. This is a constantly developing area and it is vital that organisations ensure they keep up-to-date, particularly with their legal obligations.

Good energy management practice also provides the basis for efficient regulatory compliance and taking advantage of incentives where cost-effective.

The Carbon Trust's website provides up-to-date details of relevant legislation and links to relevant government web pages.

Visit: <http://www.carbontrust.co.uk/uklegislation>

Investment

Energy efficiency investments often have to compete directly against other demands for capital budgets.

It is likely that capital budgets will need to be specifically allocated to energy efficiency for the organisation to meet its energy policy objectives.

* Entering into a CCA is voluntary

Good investment practice can be characterised by all or some of the following:

- A ring-fenced investment budget for energy efficiency/sustainable energy that is under the management control of the Energy Manager. This avoids the danger of funds that may nominally be allocated to energy efficiency within a specific capital project, being diverted for other purposes within the project.
- Retention of at least a proportion of energy savings by the function to which they relate. This provides an incentive and reward for pursuing energy efficiency.
- Retention of at least a proportion of energy savings for investment in further sustainable energy measures.
- Appraisal on a whole life cycle basis (see below) when comparing energy efficiency investments with competing demands on capital funding.
- Maximising the use of support from organisations such as the Carbon Trust to complement and strengthen in-house endeavours.
- Presenting clear and thorough business cases for investment appraisal.

Case study

Championing Energy Management

A Carbon Trust review highlighted that Sainsbury's could save up to 5% on energy consumption, simply by giving one staff member in each store responsibility for driving energy efficiency measures for that store. Sainsbury's appointed these 'energy champions' in a number of stores, with a brief to understand how their store uses energy, and identify where it could use less. They were also tasked with reporting progress back to their colleagues at each store, to raise awareness of what individuals could do to be more energy efficient. This helped to create a feeling of ownership at store level – ensuring that the good housekeeping measures were not only implemented but also maintained.

Among other successes, these champions helped identify an easier way for colleagues to control back-of-store lighting, and developed a process for giving staff daily updates on energy usage. Energy management has now been built into the job spec for the commercial managers at Sainsbury's stores – accompanied by the introduction of additional training and communication introduced to support staff in this role.

[Sainsburys case study \(CTS083\)](#)



Barriers to success

- Increasing energy costs can reduce the availability of funds to invest in energy efficiency. Keep senior management aware of the risk of increasing energy costs and how energy management can mitigate this.
- If energy end users receive no financial benefit from reducing consumption there may be little incentive to invest time and resources in energy efficiency actions. Consider ways of incentivising different departments, perhaps by devolving energy budgets or the sharing of savings.
- Not ring-fencing funds makes energy efficiency vulnerable to the perceived priorities of other demands on capital. Gain senior management support for ring-fencing of funds and ensure business cases for energy projects are sound.
- Poor presentation of business cases to senior management for energy efficiency investment. Make sure you are prepared – follow the advice in [Making the business case for a carbon reduction project \(CTV039\)](#)

Life Cycle Costing

Life Cycle Costing is about getting the full picture of how much equipment will cost, over its whole life.

The energy cost of running most equipment is many times higher than the original purchase price. This can justify a higher purchase cost for more efficient equipment. For example, the capital cost of an electric motor may be as little as 1% of its lifetime cost.

To calculate a life cycle cost, determine the following:

- The total power demand of the equipment (in kilowatts). The supplier should be able to provide this information.
- The number of hours the equipment will operate each year.
- The unit price of energy (£ per kilowatt-hour). Check energy prices and the current tariff, usually on the energy bill. Consider if future price changes are likely.
- The annual maintenance cost of the equipment (£).
- The number of years for which the equipment will be used.

F. The equipment capital cost (£).

The annual running cost of the equipment is then $(A \times B \times C) + D$.

Multiply this by the number of years the equipment will be used (E) to provide the total lifetime running cost. Add this to the capital cost (F) to get the total life cycle cost of the equipment.

The life cycle costs of different options can be compared to determine the most attractive solution – see the worked example in the box below.

Most accountants would use a method based on discounted cash flow (DCF) to also take account of the value of money over time.

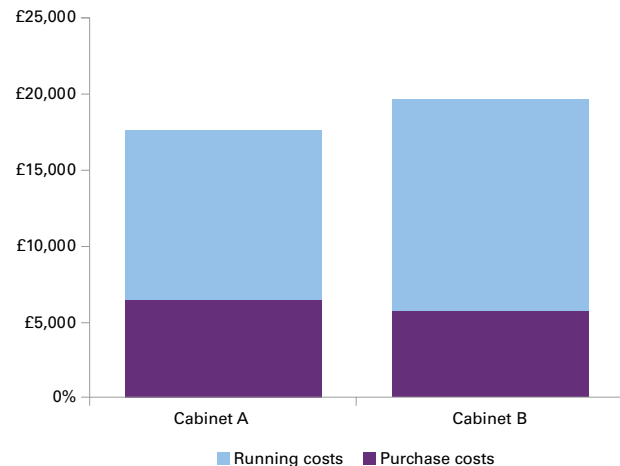
Figure 6 Purchase and lifetime energy costs for two similar refrigerated display cabinets

Example

Refrigerated display cabinet A has a purchase cost of £6,800, which is £1,100 more than the cost of a similar cabinet B at £5,700.

Cabinet A consumes 44kWh per day, whereas cabinet B consumes 55kWh. During its 10-year life, cabinet B has energy costs over £3,500*in excess of those for cabinet A.

The lifetime energy savings achieved by choosing the more efficient option will repay the premium in purchase cost for cabinet A more than three times over.



The Carbon Trust Management Guide [Making the business case for a carbon reduction project \(CTV039\)](#) provides valuable guidance to help ensure that projects for cutting energy costs and reducing carbon emissions get a fair hearing and the best possible chance of implementation. This includes more detailed guidance on financial appraisal methods such as DCF.

Procurement

There are two areas of procurement that are critical to an effective energy management strategy. One is the procurement of energy itself, the other the procurement of energy using equipment and services.

Energy procurement

It is important to recognise that, while necessary, activities related to energy procurement should represent only a small part of energy management. The energy management function should focus overwhelmingly on the reduction of energy demand rather than on the procurement and administration of energy supplies.

Energy procurement is really about getting the best price for the supply of energy. With

electricity and natural gas the 'quality' of the supply is not really an issue, although additional customer services may differ between suppliers.

Energy procurement is not part of energy efficiency, but it is part of energy management. Effective procurement of energy may not save energy or carbon but it can reduce energy bills. Without knowledge of how and when your organisation uses energy, you can be approaching the market at a disadvantage.

The Office of Government Commerce (OGC) has produced guidance on energy procurement for the public sector (**Energy Buying: The effective way to manage risk**) – this information may also be of interest to those outside the public sector.

Visit www.ogc.gov.uk

The finance department is often responsible for buying energy, but not for managing it – so it's important to ensure that the split of roles is clear. You can only make smart decisions about energy procurement if:

- you understand the markets
- you know how your organisation uses and will use energy.

Don't leave energy procurement up to someone with no knowledge of your organisation's energy use!

Procurement of equipment and services

Procurement is a part of everyday business. Good managers expect to replace equipment when it is old or fails, and as a matter of course in regularly upgrading the premises. An energy action plan may have identified certain inefficiencies that could be rectified in the longer term with capital investment in new plant or equipment.

The energy performance of the organisation is influenced by the choices made regarding the procurement of both equipment and services that consume energy.

It is best practice in energy management to have procedures in place that ensure that the energy performance of such items is taken duly into account when procurement decisions are being made.

The following represent best practice:

- An energy efficiency/low carbon procurement policy is in place, possibly as an element of a wider sustainable procurement policy. The principal responsibility for developing and implementing this policy should be with the procurement department, with strong involvement from the Energy Management Team.
- The procurement policy and its related procedures should ensure that service provision agreements incorporate terms and conditions that ensure energy efficiency is taken fully into account in line with the objectives of the organisation's energy policy.
- The procurement policy and procedures should include reference to particular standards, such as Energy Star for IT equipment, or guidance provided by the Energy Management Team.
- Under the policy and its related procedures, the Energy Manager has a formal role in the procurement decision-making process for strategic items or service contracts, with a sign-off requirement that the procurement is consistent with the objectives of the organisation's energy policy.

Procurement of buildings

The procurement of buildings, whether through a lease or actual purchase, can be a key factor to the long-term energy performance of the organisation. It would be entirely appropriate, as a matter of policy, to only lease, purchase or commission buildings that meet the highest of energy efficiency standards. Visit the Carbon Trust website Buildings pages for further information: www.carbontrust.co.uk/buildings

Barriers to success

- Energy Managers are frequently distracted from the objective of managing energy consumption by the administrative demands of energy procurement and supply. It is important that sufficient resource is provided to avoid this situation.
- In some organisations, the people purchasing the energy and equipment have little or no contact with staff implementing the energy policy. This can be a strategic issue which needs to be tackled. Although supply contracts might need to be negotiated by a specific department, purchasing for efficiency should be an integral part of the organisation's energy strategy.

- There are many instances in the procurement of buildings, services and equipment where opportunities for energy efficiency and reduction in life cycle costs have been overlooked due to the decision-makers' lack of awareness and inadequate procedures that do not involve the Energy Management Team.
- Procurement staff will frequently consider just initial purchase cost, rather than the cost of ownership over the entire life of the item to be procured.



Metering, monitoring and targeting

“To measure is to know”

“If you cannot measure it,
you cannot improve it”

Lord Kelvin (William Thomson), Physicist and Engineer
1824-1907

You can't manage what you don't measure.
It is equally true to say that what is not
measured is not managed.

Effective energy management requires formal systems to be in place for data collection and analysis, and the reporting of progress and performance to a number of internal and external stakeholders:

- The Senior Management Team should receive regular reports on progress in implementing the energy strategy and meeting policy objectives.
- Department heads should receive reports on the energy performance of their departments and progress on specific initiatives.

- All staff should be informed about the organisation's progress and performance.
- Reports should be produced for inclusion in external communications such as the organisation's CSR report.

These reports will largely be produced by the Energy Management Team. As well as providing the mechanism for the ongoing review of progress against the strategy and policy objectives, they also help to maintain ownership of, and engagement with, the rest of the organisation.

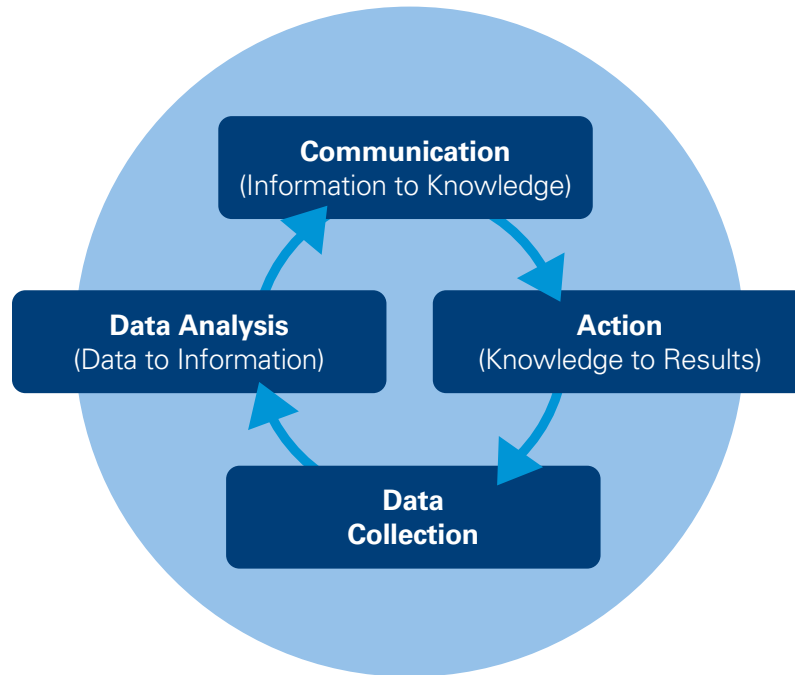
Understanding energy performance and its effective reporting relies on the availability of good data and sound analysis. This requires an effective energy metering, monitoring and targeting (MM&T) system that enables the easy production of suitable reports based on reliable information.

MM&T should be an integral part of your energy strategy. It should be developed to meet your organisation's strategic requirements and, in turn, the information it provides will support the delivery of that strategy. Studies by the Carbon Trust and others show MM&T can typically deliver energy use savings of between 5% and

15%. The actual figure will depend on the type of site, the 'maturity' of energy management and the controllable processes.

MM&T may have some impact in isolation but it is unlikely to deliver maximum or sustained benefits on its own.

Figure 7 *The MM&T process model*

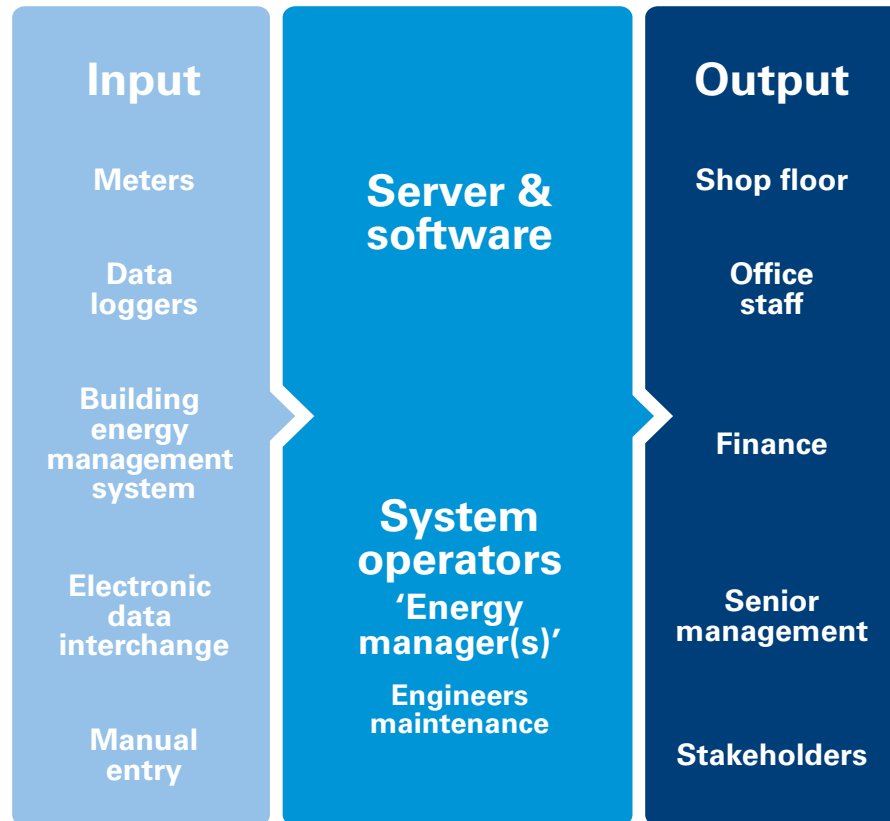


Metering, monitoring and targeting, or monitoring and targeting (M&T), is the management information system that supports energy management. Figure 7, to the left, illustrates the ongoing cyclical process of MM&T from data collection to taking action, via data analysis and communicating the resulting insights.

MM&T will give an Energy Manager:

- timely, relevant information on energy use
- the ability to investigate the energy performance of buildings and processes
- the ability to take action to rectify exceptions in performance and to improve energy performance over time
- energy reports to support accountability for energy use
- the ability to verify savings made following project implementation.

Figure 8 MM&T technology model



As illustrated in the generic technology model to the left (Figure 8), the core of an MM&T system will comprise some form of software package, which will often be a proprietary system, but in simpler circumstances could be a spreadsheet developed in-house.

Data input can originate from a variety of sources, but fixed meters will normally be the most common. Automatic metering (AMR) systems (i.e. meters that do not have to be read manually) have developed significantly in recent years and are becoming more and more cost-effective. Effective MM&T balances the practicality and cost of metering with the control and/or savings it may help deliver.

MM&T is NOT about extensive metering of every possible point.

Case study

Manufacturing company

Working with the Carbon Trust this company embarked on a structured approach to energy management based around MM&T. A phased approach was decided on and as gas represented 90% of site consumption gas submetering was introduced and a weekly spreadsheet based M&T system used. The result has been a 29% decrease in specific energy consumption, and an actual saving of 12,750,000kWh/year against year 2000 baseline, with increased production.

Barriers to success

- Energy data from suppliers is frequently inadequate for energy management purposes, due to estimated readings, errors and the time lag in availability.
- Data handling can be a very time-consuming process without the right MM&T system.

The Carbon Trust has more detailed guidance on metering and MM&T. Visit www.carbontrust.co.uk/mmandt

Use the following indicators to give you a quick view of the quality of your organisation's current MM&T.

Poor practice

- There is difficulty in obtaining basic invoice information
- Accounting for energy by spend only
- Relying on energy invoices for energy information
- Not checking utility invoices for accuracy
- Accepting estimated readings
- Not using data services provided by the energy supplier – for example, online analysis of half-hourly data
- Accounting for energy use by kilowatt hours (kWh) but not relating it to activity, production or weather
- Not analysing energy use and cost on an annual basis
- Systems and procedures do not support compliance required by regulation

Good practice

- All utility invoices are checked for accuracy, site, tariff, readings (consumption), Climate Change Levy and arithmetic
- Estimated readings are not accepted; actual meter readings are provided to the supplier where this is an issue
- Full use is made of data held by supplier. This is also downloaded and archived at regular intervals
- Taking up opportunities for automatic reading where available
- All utility meters are of a current standard. For electricity, this means that they are half-hourly meters and old meters have been 'swapped out'
- Where onsite generation is used, the energy produced is metered
- A sub-metering strategy/plan is in place and meters equal to or better than the Enhanced Capital Allowances (ECA) criteria are used
- Energy cost accountability has been defined and implemented. Regular reports are produced to inform and motivate the energy user
- Energy use is related to the factors that drive it, such as weather, production and activity
- An annual energy statement or balance is prepared
- Energy savings are tracked after each project has been implemented
- There is a sound audit trail for energy data and information
- Stakeholders have been involved in the development of the system

Identifying opportunities

Opportunities for improving energy efficiency can be identified through the following:

- analysis of energy data through MM&T, including comparisons with benchmarks
- energy surveys.

There may well also be useful information available from any existing building and equipment condition surveys, asset registers, and building energy certificates.

MM&T

MM&T can be used to identify opportunities for energy saving through a number of techniques, including:

- examining energy demand during out-of-hours periods (e.g. overnight and weekends)
- statistical analysis of data to understand the relationships between energy demand and drivers, such as external temperature (degree days) or production volumes
- implementing automatic exception reporting to flag when energy use falls outside expected norms.

Further information can be found in the separate Carbon Trust guidance at www.carbontrust.co.uk/mmandt

Energy surveys

This section provides an introduction to energy surveys, with more detailed guidance available in the Carbon Trust guide [Energy Surveys \(CTG055\)](#).

Energy management is not an office-bound activity and 'walking the floor' is a great way of gaining a better understanding of how your organisation uses energy and how it could use less. Arguably, the only way to be really sure of what opportunities exist to save energy is by looking at the buildings, plant and equipment and identifying energy wastage and inefficiencies. It does not always require an energy efficiency professional to find savings. Many opportunities can be found by applying common sense.

A good starting point is to carry out a physical site inspection, or survey, to spot any obvious areas of waste. The inspection should normally cover the entire site and result in a list of opportunities that can then be developed into an effective action plan.

Record your findings, dividing recommendations into three main categories:

- no-cost measures (good housekeeping)
- low-cost measures
- measures that require capital investment (or specialist advice).

Energy surveys can be conducted on entire sites or individual areas of a 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.

A survey is a key element in any energy management programme. Ideally your first survey should take place as part of the development of your energy strategy. Objectives can then be set based on knowledge rather than instinct. Practices and technology change, so you should consider running a full energy survey around every five years – more frequently if circumstances dictate (for example, if there are significant changes in operations or plant configuration).

An alternative approach is to have a rolling programme that looks at different parts of the organisation in stages. An effective energy survey will establish which areas will need regular attention and review through good on-going energy management. The timing of energy surveys should also take account of any planned asset condition surveys, as the two can support each other.

If you have a small energy bill, you may not be able to justify the expense of a commercial energy survey. In this case, a good option is to undertake your own survey and then look to equipment suppliers to assist you in areas where you think that investment is required.

For those with a larger energy spend, there is still a case for conducting your own survey. It is a really good way of understanding how your organisation uses energy, and will leave you better placed should you wish to commission a commercial survey.

Sector specific checklists are available from the Carbon Trust. Simply visit www.carbontrust.co.uk/sector, select your relevant sector from the list, scroll down to the 'next steps' section, and download your checklist. You can use the information given in these publications to tailor a checklist specifically for your own needs.

Organisational culture

Like health and safety, everyone in the organisation should be responsible for their own actions with respect to energy efficiency. While health and safety regulations impose legal obligations on all employees, energy efficient behaviour is more appropriately driven by developing an energy efficient culture.

A common issue is that the Energy Management Team may just expect a culture of energy efficiency to develop because they have written a newsletter and put up some posters. While both of these actions can be of value, there needs to be an understanding about what makes the organisation tick and what will drive people to do what you want.

In addition to top-level commitment, the strategy must include engagement with staff at all levels. Any effort to engage the workforce must include everyone from the Chief Executive to the part-time worker.

This means making employees aware of the importance of saving energy, both for the organisation and for their own working conditions. People are more likely to change their own habits if they understand how their actions affect consumption. Staff should feel confident about making suggestions and be informed enough to take action.

Workforce engagement brings energy savings in two ways: when people change their day-to-day behaviour and by the ideas that staff generate.

Workforce engagement can be a low-cost activity, but it still needs to be carefully managed. Time and care spent in planning an awareness campaign will be rewarded.

Operational procedures

Considering energy efficiency in formal operating procedures is another way to encourage behavioural change. In this way, energy efficient actions become an integral part of standard tasks. For example:

- maintenance schedules include specific actions for reducing energy wastage (e.g. changing/cleaning air filters at the correct intervals)
- job/priority sheets include actions for reducing energy waste (e.g. repair of compressed air leaks)
- operating instructions include energy use issues (e.g. shut down procedures).

It is also worth introducing active reporting systems for energy waste (lights on, doors open, steam leaks etc.) and for staff members to make suggestions.

Case study: Packaging company

This company embarked on an energy management campaign that included MM&T, training and start-up and shut down procedures. The introduction of MM&T cost £10,000 and saved almost £30,000 in the first year. Development of machine start-up and shut down procedures cost £3,500 and delivered savings of almost £25,000 in the first year. These two measures alone saved £55,000 per year for an initial cost of £13,500 – a payback of around three months.

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.

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.

One solution is to offer training in simple energy management, including practical habits that people can adopt.

The success of any workforce engagement can be measured through hard energy data, but it may be difficult in the early stages to clearly see the impact. Lights and computers that are switched off over the lunch break may be a simple sign of behaviour changing.

You'll need to have a thorough understanding of the company's culture and any existing engagement activities to develop a successful programme of workforce engagement. The Carbon Trust guide [Creating an awareness campaign \(CTG056\)](#) provides a useful and effective framework for developing and implementing an energy awareness programme. See Figure 9 on the next page for examples of poster and stickers available from the Carbon Trust.

Figure 9 Examples of stickers and posters available from the Carbon Trust



PFL308



PFL310



PFL307



PFL313



PFL313



PFL338



PFL338

Training

Energy management requires knowledge and skill.

For a professional Energy Manager these are core competences, but for the part-time Energy Manager there may be a skills gap. Training is

available through a number of channels including the Carbon Trust's website. Make sure that you also have enough people trained to operate the MM&T system or the Building Management System.

Every organisation should conduct an energy training needs analysis.

Communications

Good communication throughout the management structure is essential for ensuring that the whole organisation works together to implement an energy management strategy.

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.

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. Few plans will be perfect from the outset and will need to be refined over time.

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.

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 occur, 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 to use will depend on the nature of the organisation. A simple briefing may work best for smaller companies, while larger organisations might choose to email a newsletter to ensure they reach all staff.

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 people 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. The impetus behind energy saving activities can evaporate, unless this is actively managed.

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.

It is clear that where best practice takes place there is positive communication both internally and externally. Good communication is essential for both the deployment and sustainability of best practice.

The 'public relations' aspect of energy management is important for the organisation for the following reasons:

- promoting results and initiatives can be rewarding and motivational to those directly and indirectly involved with them
- publicising energy achievements can enhance the reputation of the organisation.

There are a number of channels that an organisation can use to publicise its activity and results.

Internally controlled channels include:

- the organisation's intranet
- email
- strategy documents
- information publications and guides.

Value can be added to internally generated statements if they can be shown to be verified or independently assessed.

External channels include:

- the organisation's web site
- annual reports – CSR, accountability, best value
- magazine, newspaper, journal articles
- certification to a standard
- external awards.

Barriers to success

- Poor data availability inhibits the ability to communicate performance and cost information. This should be addressed by developing an effective MM&T system. The data you have from bills and best estimates

can be used, though estimates should be presented as such.

- Fear of failure and bad results being publicised. If results are disappointing don't be afraid to say so, but understand the reasons why. Use these as a spur to greater action or to revise the strategy. Don't be afraid to address problems directly.
- Energy Managers and others are sometimes reluctant to 'blow their own trumpet'. Seek support from your senior managers, which might include providing communications and presentation training. Fairly sharing out the praise to everyone who has helped can make you feel more comfortable with publicising your efforts and results.

See also the Carbon Trust Guide [Creating an awareness campaign \(CTG056\)](#), which provides additional ideas and suggestions on communications.

Management review

Regular assessment will verify that systems and processes are being followed, and will identify any areas for improvement.

In practice, if you have your energy management system certified to BS EN 16001 or ISO 50001 you are required to run a regular management review. This is simply good practice.

The action plan will help to keep the energy management strategy on track, but there will come a point when a more detailed assessment is needed. This might include measuring performance against the original plan, or against changing organisational policy. The key components of management review are listed below:

Assess the programme

Some organisations include management assessments as part of their overall energy policy, ensuring that progress is regularly measured and results reported to senior management. This provides the opportunity to promote the savings taking place – but also to manage unexpected performance straight away, before it starts to have a negative impact.

Assessments will also generate valuable feedback that can be used to:

- reaffirm top-level commitment
- review and amend policies and objectives

- revise action plans
- redefine roles and responsibilities
- amend reporting arrangements.

Consistent and fit for purpose

Many organisations will already be familiar with this type of assessment from other areas of their business, such as health and safety or quality management.

For organisations that don't have formal procedures in place, the energy assessment doesn't have to be a long, complicated process. Rather, it should reflect the size and culture of the organisation. For some, it will be as simple as an assessor talking to people to check actions have been taken, and discussing alternative measures that could be introduced.

Some multi-site organisations use software to generate and compare scores for each site's performance. Assessors may be required to interview personnel, review documents and make observations, so ensure they have appropriate technical and professional skills.

Whatever format the assessment takes, it must be consistent. Agree guidelines for when and how to conduct assessments, and what feedback to gather.

Develop review questionnaires relevant to your organisation. Assessors can use such questionnaires and checklists to confirm:

- whether energy use is in line with the aims of the policy statement
- if regulations and legal requirements are being met
- that agreed procedures are being followed.

Finally, report the findings. In the report, highlight areas that need improvement and recommend actions.

Once this process is in place, it should become an ongoing and fundamental part of the energy management programme.

Revisiting the self-assessment

The review is also an appropriate point at which to revisit the energy management matrix or assessment tool to assess the organisation's progress and what else it could achieve.

Plotting the organisation on the matrix can be an excellent visual introduction to a report for senior management or external stakeholders.

Plan continuous improvement

Periodically reassess the plan to find new savings and make sure that the strategy is not slipping. Minor reviews could be scheduled at three and six-monthly intervals, with a full, annual analysis to keep the strategy on course. Remember to involve everyone, from the top levels, right through the organisation. One way of achieving ongoing involvement in energy management is to have an annual energy week to coincide with and promote the following year's plan.

Next steps

Now that you have gained a good appreciation of what is needed for effective energy management, you will wish to plan how to tailor and put in place a system for your organisation. If you are starting from scratch, the basic next steps should be to:

Understand your organisation's energy use, costs and legal obligations

- use our downloadable [energy analyser tool](#) to manage your data
- visit our [Metering, Monitoring & Targeting pages](#)
- visit our [Climate Change Legislation pages](#)

Assess where you are on the energy management journey

- download our [energy management self-assessment tool \(CTX614\)](#)

Gain senior management support and allocation of resources

- [Making the business case for a carbon reduction project \(CTV039\)](#)
- in this guide refer to: [Senior Management Commitment](#)

Develop an energy policy and initial strategy

- in this guide refer to: [Energy Policy](#), including the [energy policy template](#)

Work to formalise energy management and integrate it throughout the organisation

- download our [Creating an awareness campaign \(CTG056\)](#)

If you are already a long way down the energy management journey, then you should be:

- concentrating on delivering reductions
- reviewing the system
- promoting awareness
- identifying new opportunities.

No matter where you are on the journey, then the following information will help you. You can also call the Carbon Trust advice line on 0800 085 2005 or visit the Energy Management page on our web site: <http://www.carbontrust.co.uk/energymanagement>

Related publications and tools

The Carbon Trust has a wealth of publications and on-line tools that can assist you further.

Fact sheets

[Assessing the energy use at your industrial site \(CTL002\)](#)

[Assessing the energy use in your building \(CTL003\)](#)

[Climate Change Levy \(CTL005\)](#)

[Automatic Meter Reading \(CTL083\)](#)

Guides

[An introduction to energy management \(CTV045\)](#)

[Making the business case for a carbon reduction project \(CTV039\)](#)

[Creating an awareness campaign \(CTG056\)](#)

[Monitoring and targeting \(CTG008\)](#)

[Energy surveys \(CTG055\)](#)

[Better business guide to energy saving \(CTV034\)](#)

[Metering technology overview \(CTV027\)](#)

[Degree days for energy management \(CTG004\)](#)

Tools

[Energy management self-assessment tool \(CTX614\)](#)

[Project planning tool](#)

[Action plan tool](#)

[Energy analyser tool](#)

Abbreviations

AMR: Automatic Meter Reading. Automatic meter reading (AMR) ensures bills are based on actual, rather than estimated, consumption, and avoids the need for manual readings, which can be impractical and unreliable.

BS: British Standards. BS EN16001 is the British Standard and European Norm for Energy Management Systems.

CCAs: Climate Change Agreements – agreements between government and trade bodies enabling eligible businesses to receive a 65% 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.

CRC: CRC Energy Efficiency Scheme. Regulatory scheme aimed at larger users of energy, requiring them to report on their energy related carbon dioxide emissions, and purchase and submit allowances to cover those emissions.

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.

EMA: Energy Management Assessment. A Carbon Trust tool for analysing an organisation's current position around good practice in energy management.

EMAS: Eco-Management and Audit Scheme. A management tool for companies and other organisations to evaluate, report and improve their environmental performance.

EnMS: Energy Management System – a quality management process for managing an organisation's energy usage.

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 which have exceeded their allowance or need increased energy to expand.

ISO: The International Standards Organisation. ISO 14001 is standard for environmental management systems. ISO 50001 is the standard for energy management systems.

MM&T: Metering, Monitoring and Targeting – the process by which energy data are collected, analysed and used to inform consumption management strategy.

M&T: Monitoring and Targeting – essentially the same as MM&T.

Appendix A

A. The energy management matrix

Appendix A

The energy management matrix

Policy	Reporting	Training	Performance measurement	Communication	Improvement
<p>1. Energy policy, action plan and target energy base and/or commitment to energy management</p> <input type="checkbox"/>	<p>2. Reporting structure and communication with other departments for energy management</p> <input type="checkbox"/>	<p>3. Training and performance management system, with evaluation</p> <input type="checkbox"/>	<p>4. Performance measurement system, with energy management reporting</p> <input type="checkbox"/>	<p>5. Communication system, with energy management reporting</p> <input type="checkbox"/>	<p>6. Reporting structure and energy management system, with energy management reporting</p> <input type="checkbox"/>
<p>7. Energy policy, action plan and target energy base and/or commitment to energy management</p> <input type="checkbox"/>	<p>8. Reporting structure and communication with other departments for energy management</p> <input type="checkbox"/>	<p>9. Training and performance management system, with evaluation</p> <input type="checkbox"/>	<p>10. Performance measurement system, with energy management reporting</p> <input type="checkbox"/>	<p>11. Communication system, with energy management reporting</p> <input type="checkbox"/>	<p>12. Reporting structure and energy management system, with energy management reporting</p> <input type="checkbox"/>
<p>13. Energy policy, action plan and target energy base and/or commitment to energy management</p> <input type="checkbox"/>	<p>14. Reporting structure and communication with other departments for energy management</p> <input type="checkbox"/>	<p>15. Training and performance management system, with evaluation</p> <input type="checkbox"/>	<p>16. Performance measurement system, with energy management reporting</p> <input type="checkbox"/>	<p>17. Communication system, with energy management reporting</p> <input type="checkbox"/>	<p>18. Reporting structure and energy management system, with energy management reporting</p> <input type="checkbox"/>
<p>19. Energy policy, action plan and target energy base and/or commitment to energy management</p> <input type="checkbox"/>	<p>20. Reporting structure and communication with other departments for energy management</p> <input type="checkbox"/>	<p>21. Training and performance management system, with evaluation</p> <input type="checkbox"/>	<p>22. Performance measurement system, with energy management reporting</p> <input type="checkbox"/>	<p>23. Communication system, with energy management reporting</p> <input type="checkbox"/>	<p>24. Reporting structure and energy management system, with energy management reporting</p> <input type="checkbox"/>
<p>25. Energy policy, action plan and target energy base and/or commitment to energy management</p> <input type="checkbox"/>	<p>26. Reporting structure and communication with other departments for energy management</p> <input type="checkbox"/>	<p>27. Training and performance management system, with evaluation</p> <input type="checkbox"/>	<p>28. Performance measurement system, with energy management reporting</p> <input type="checkbox"/>	<p>29. Communication system, with energy management reporting</p> <input type="checkbox"/>	<p>30. Reporting structure and energy management system, with energy management reporting</p> <input type="checkbox"/>

PDF Adobe

This energy management matrix will enable you to assess your current performance. Use it to show, at a glance, areas that need improvement.

Download

Appendix B

B. Sample energy policy – Part A

Appendix B

Sample energy policy – Part A¹

Corporate policy statement

Our long and medium term corporate goals are:

- 1. Control operational expenses through management
- 2. Reduce our energy costs
- 3. Give high priority to energy efficiency investments
- 4. Consider the cycle energy costs for all new projects
- 5. Minimize CO₂ emissions

Business environmental impact

- 1. Where possible, to use energy from sustainable sources
- 2. Reduce a corporate energy policy

Our short-term objectives are:

- 1. Reduce environmental impact of fuels used by reducing our consumption of CO₂ by all three parties
- 2. Reduce consumption of energy by all three parties
- 3. Reduce energy consumption in targeted practice benchmark levels within a year
- 4. Achieve sustainability under the Energy Efficiency Acceleration Scheme

Endorsed by the Board _____
Date _____

¹The information on how to monitoring energy use, following report at page 10.
²Energy efficiency is all about the use of energy in a way that does not waste it. It is about doing things and controlling them in a way that does not waste energy.



B. Sample energy policy – Part B

Sample energy policy – Part B

Statement of commitment

We are committed to:

- 1. Reducing energy of the most cost-effective price
- 2. Improving energy efficiency in terms of the energy energy consumed per unit of production for the industry
- 3. Reducing CO₂ emissions
- 4. Investing in new technology where the same investment can bring immediate energy savings
- 5. Considering the cycle energy costs when procuring new projects
- 6. Purchasing energy efficient plant and equipment (including after sales support)
- 7. Reducing energy efficient equipment associated with travel (including employee travel to work, business travel and distribution of goods)
- 8. Existing into a climate change agreement via our third commitment
- 9. Investing in energy saving technologies that are eligible for enhanced capital allowances

We will address energy efficiency in all areas of our business including:

- 1. Management issues
 - Better use and responsibilities for energy
 - Greater and clear awareness among staff
 - Encourage continued professional development CPDs for technical staff involved in energy
 - Establish clear reporting procedures
 - Regular performance and report series for improvement
- 2. Procurement issues
 - Procure equipment with low energy ratings
 - Consider the cycle energy costs for new projects and modifications to existing plant
 - Establish technical guidelines for new projects and modifications
- 3. Financial issues
 - Establish sustainability of energy costs as operational cost
 - Establish monitoring by the finance verification
- 4. Technical issues
 - Establish procedures for operation of plant and equipment

We will improve our past performance.

Over the past 3 years:

- 1. Our energy costs have increased/decreased by x%
- 2. Our energy efficiency has increased/decreased by x%
- 3. Our consumption of CO₂ has increased/decreased by x%
- 4. Our consumption of CO₂ has increased/decreased by x%
- 5. Our consumption of CO₂ has increased/decreased by x%
- 6. Our consumption of CO₂ has increased/decreased by x%
- 7. Our consumption of CO₂ has increased/decreased by x%
- 8. Our consumption of CO₂ has increased/decreased by x%
- 9. Our consumption of CO₂ has increased/decreased by x%
- 10. Our consumption of CO₂ has increased/decreased by x%
- 11. Our consumption of CO₂ has increased/decreased by x%
- 12. Our consumption of CO₂ has increased/decreased by x%
- 13. Our consumption of CO₂ has increased/decreased by x%
- 14. Our consumption of CO₂ has increased/decreased by x%
- 15. Our consumption of CO₂ has increased/decreased by x%
- 16. Our consumption of CO₂ has increased/decreased by x%
- 17. Our consumption of CO₂ has increased/decreased by x%
- 18. Our consumption of CO₂ has increased/decreased by x%
- 19. Our consumption of CO₂ has increased/decreased by x%
- 20. Our consumption of CO₂ has increased/decreased by x%

Chair's signature _____
Date _____



This is a sample statement of the principles and guidelines that your company could commit to.

Download

Appendix C

Energy Management roles and responsibilities

Chief Executive

The Chief Executive (or equivalent) is ultimately accountable for the implementation of the energy policy, energy strategy and other commitments made by the organisation.

The Chief Executive therefore has overall responsibility for ensuring that energy management is given the appropriate level of priority within the organisation so that energy policy objectives and commitments can be met.

In addition, the Chief Executive should:

- provide active and visible support for the implementation of the policy and strategy
- ensure that they regularly receive and review appropriate energy performance reports.

Senior Management Team (SMT)

Energy management is everyone's responsibility and touches all aspects of an organisation's activities. So it makes sense that all members of the SMT take appropriate individual and collective responsibility in support of the organisation's energy policy and strategy.

Responsible Senior Manager (RSM)

The Responsible Senior Manager (RSM) should be the SMT-level interface between senior management and the energy management function.

The RSM should:

- have first line reporting to the Chief Executive
- have the lead responsibility for the delivery, review and development of the energy strategy and be the senior advocate for energy management

- report regularly to the SMT on energy management, progress on targets, key investment projects and issues arising
- provide feedback, strategic advice and guidance to the Energy Manager and team.

Finance

Finance staff have an important role in energy management through:

- supporting energy management with the provision of timely relevant financial information
- involving the Energy Management Team in relevant decision-making and the development of budgets
- providing clear guidance, assistance and support on internal and external funding mechanisms
- supporting the use of life cycle costing and discounted cash flow based assessments.

Procurement

Procurement staff should support energy management by:

- ensuring energy efficiency is used as procurement criteria where relevant
- in partnership with the Energy Management Team, establishing appropriate procurement/purchasing guidelines and policies that 'integrate' energy into the procurement process
- encouraging suppliers to offer energy efficient alternatives/options where available
- including energy criteria/performance in service contracts
- encouraging energy efficiency in the supply chain: i.e. favouring suppliers that are active themselves in improving their overall energy efficiency.

IT department

The growth in IT in many organisations means greater demand for energy. IT departments can help control this by:

- considering and responding to the energy demand implications of IT decisions
- specifying low energy rated equipment – for example Energy Star
- ensuring energy saving features of equipment are understood, enabled and used
- involving the Energy Management Team in all projects to ensure energy issues are fully addressed.

Furthermore, the Energy Management Team may require specialist IT applications that need to be integrated with other systems on site and so will need IT support.

Human Resources

Staff behaviour can have a significant impact on energy efficiency. HR teams can support by:

- providing energy awareness as part of induction training for all new staff
- supporting the Energy Management Team in awareness raising campaigns
- developing job specifications for the posts in the Energy Management Team
- recruiting, training and retaining sufficient staff with appropriate skills to deliver the energy policy and strategy
- managing energy training and development as part of everyone's overall development.

Security, cleaners, janitors and caretakers

Such staff can be the eyes and ears of the Energy Management Team, particularly 'out-of-hours', and help by:

- supporting shut-down procedures
- looking for obvious energy waste and reporting it.

Go online to get more

The Carbon Trust provides a range of tools, services and information to help you implement energy and carbon saving measures, no matter what your level of experience.

➤ Call us on 0800 085 2005

Our experts offer independent, authoritative advice. Lines open 8.30am-5.30pm, Monday to Friday.

➤ Website

Visit us at www.carbontrust.co.uk for our full range of advice and services.

➤ Publications

We have a library of publications detailing energy saving techniques for a range of sectors and technologies.
www.carbontrust.co.uk/publications

➤ Energy Saving Plan

The Carbon Trust Advice Line can work with you to highlight areas for review within your organisation and can then provide you with a structured Energy Saving Plan. Call today on 0800 0852005 and ask one of our advisors how an Energy Saving Plan could help your business save money and cut carbon.

➤ Cut Carbon, Cut Costs

This tool gives you an introduction to energy saving and helps you create a personalised action plan for your site, estimating the cost and carbon savings you could make in your workplace. www.carbontrust.co.uk/onlinetraining

➤ Case studies

Our case studies show that it's often easier and less expensive than you might think to bring about real change.

www.carbontrust.co.uk/casestudies

➤ Energy Efficiency Financing

Investing in energy efficient equipment makes sound business and environmental sense, especially with the easy, affordable and flexible Energy Efficiency Financing scheme brought to you by Carbon Trust Implementation and Siemens Financial Services. To find out more visit www.energyefficiencyfinancing.co.uk

The Carbon Trust is a not-for-profit company with the mission to accelerate the move to a low carbon economy. We provide specialist support to business and the public sector to help cut carbon emissions, save energy and commercialise low carbon technologies. By stimulating low carbon action we contribute to key UK goals of lower carbon emissions, the development of low carbon businesses, increased energy security and associated jobs.

We help to cut carbon emissions now by:

- providing specialist advice and finance to help organisations cut carbon
- setting standards for carbon reduction.

We reduce potential future carbon emissions by:

- opening markets for low carbon technologies
- leading industry collaborations to commercialise technologies
- investing in early-stage low carbon companies.

www.carbontrust.co.uk
0800 085 2005

The Carbon Trust receives funding from Government including the Department of Energy and Climate Change, the Department for Transport, the Scottish Government, the Welsh Assembly Government and Invest Northern Ireland.

Whilst reasonable steps have been taken to ensure that the information contained within this publication is correct, the authors, the Carbon Trust, its agents, contractors and sub-contractors give no warranty and make no representation as to its accuracy and accept no liability for any errors or omissions. Any trademarks, service marks or logos used in this publication, and copyright in it, are the property of the Carbon Trust. Nothing in this publication shall be construed as granting any licence or right to use or reproduce any of the trademarks, service marks, logos, copyright or any proprietary information in any way without the Carbon Trust's prior written permission. The Carbon Trust enforces infringements of its intellectual property rights to the full extent permitted by law.

The Carbon Trust is a company limited by guarantee and registered in England and Wales under Company number 4190230 with its Registered Office at: 6th Floor, 5 New Street Square, London EC4A 3BF.

Published in the UK: September 2011.

© The Carbon Trust 2011. All rights reserved.

