An introduction to energy management

CARBON TRUST

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This guide

The purpose of this guide is to help all organisations – industrial, commercial and public sector – better understand the concept of energy management and how they can benefit from it and implement it.

It is an overview of the more comprehensive information provided in Energy Management (CTG054).

We recommend that you read this document first if you are new to energy management or if you represent a small organisation.

What is energy management?

Any organisation needs good management for long-term success and efficient operation, and energy management is no different. However, the management of energy is often neglected, even though there is considerable potential to save energy and reduce costs.

At the same time, there is also increasing pressure from rising energy prices, climate change legislation and the need to be seen to be environmentally responsible by customers and stakeholders.

Saving energy makes business sense, and having a structured, co-ordinated and integrated approach maximises these benefits. Without good energy management, cost-effective opportunities can be easily overlooked.

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

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

Like all management disciplines, energy management should be applied in a manner appropriate to the nature and scale of the organisation. Energy management for a small office-based organisation will be at a very different level to that for a complex industrial company with a multi-million pound energy bill. Nevertheless, the fundamental principles are much the same.

Energy management must be tailored to the nature and size of the organisation. The effort expended on energy management should be proportionate to the need and the benefits gained

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The Energy Manager

Some organisations employ an Energy Manager whose primary responsibility is ensuring that energy is used efficiently and sourced in the most cost-effective manner. In others, energy management may only be part of a person's job description, but for convenience we will use 'Energy Manager' as shorthand for whoever fulfils that function.

Energy management systems

An energy management system refers to a documented procedural system. Organisations can have their energy management system certified to a recognised standard, of which the main example is BS EN 16001:2009 Energy Management Systems.

The BS EN 16001 structure is similar to the ISO 14001 Environmental Management Standard in providing a framework and enabling a systematic approach for continuous improvement of an organisation's energy efficiency and sustainable use.

The international standard, ISO 50001 Energy Management Systems, is due to be published during 2011, and is expected to effectively replace BS EN 16001.

Visit www.bsigroup.co.uk and www.iso.org for more information.

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. For more information, call our advice line on 0800 085 2005 or visit the Carbon Trust Standard website www.carbontruststandard.com

Energy, carbon and environmental management

Carbon management is the management of an organisation's greenhouse gas emissions (GHGs). In addition to carbon dioxide from energy use, this includes the release of GHGs from other sources; for example, methane from landfill, leakages of refrigerant gases and emissions from chemical processes. However, for most organisations energy use is the main contributor to their carbon footprint, and so energy management is the principal element of carbon management (see Figure 1).

Environmental management is about managing the effects that the organisation and its activities have on the environment, and so it includes both carbon management and energy management.

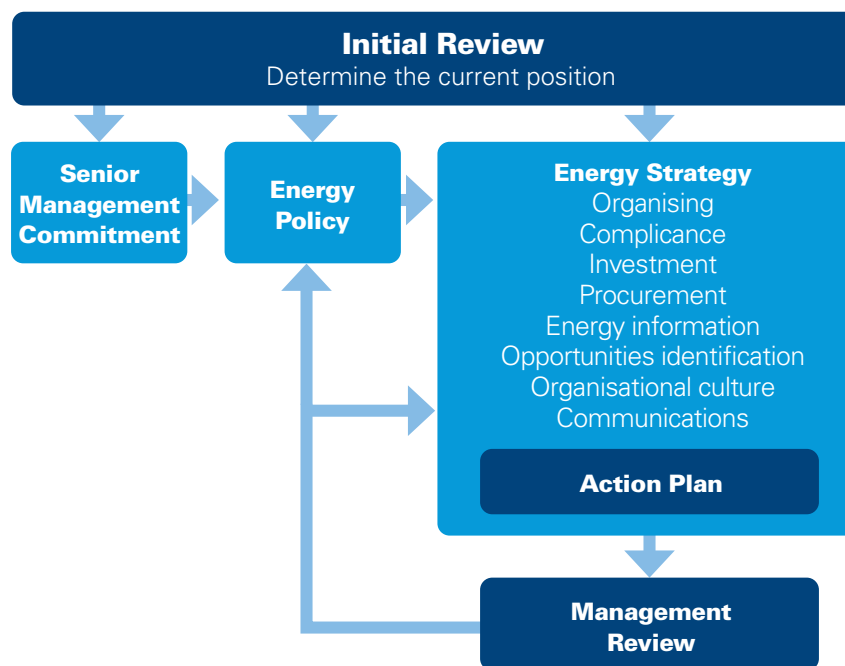*Figure 1* *Energy management in context*

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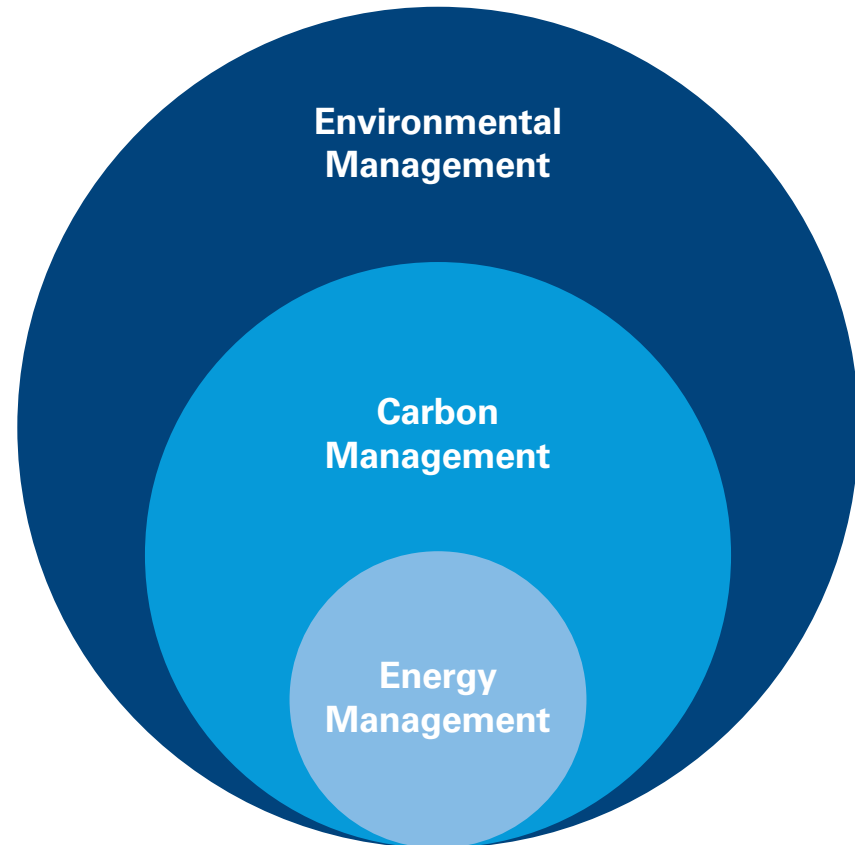
What is successful energy management?

Putting an energy management system in place takes time and it will continue to develop as energy performance improves and attention moves to different issues. The roadmap to the right (Figure 2) illustrates the main elements of energy management and the different stages of development. The road map 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
Determine the current position

Senior Management Commitment

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Investment
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Energy information
Opportunities identification
Organisational culture
Communications

Action Plan

Management Review

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Initial review

Your initial review should give you an understanding of:

- your organisation's energy use and costs

- factors affecting energy use, such as weather conditions or production rates

- key issues, such as regulatory obligations or planned organisational changes

- where your organisation stands in relation to its aims for energy management.

The Carbon Trust has resources that can assist you with your review including:

- Downloadable energy analyser tool to manage your data

- Metering, Monitoring & Targeting web pages with links to further guidance

- Climate change legislation pages with links to government websites

- Downloadable energy management self-assessment tools

- Energy surveys guide (CTG055)

The initial review should provide sufficient information for you to make a case to senior management to take an energy management strategy forward.

Senior management commitment

Without the support of senior managers, any energy management initiative is likely to falter. They will need to understand:

- 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) gives valuable guidance on what senior decision makers look for. High-level commitment provides the follow crucial components:

- advocacy from senior managers

- visibility of the issues across your organisation

- the organisational structure to implement energy management

- resources, both human and financial.

Energy policy

You will need an energy policy and strategy. At its simplest, an energy policy is a written statement of a commitment to managing energy and carbon emissions. An energy policy should normally include:

- Endorsement from senior management – preferably the chief executive or equivalent.

- The organisation's energy/carbon vision and aspirations, with specific objectives and targets.

- A commitment to ensuring the integration of energy management in all relevant decision making.

- A commitment to ensure that sufficient resources are in place to meet policy objectives.

- A commitment to meeting the training and development needs of energy management staff and to raise the energy awareness of all staff.

- A commitment to develop and maintain an up-to-date energy strategy and/or action plan to meet the objectives of the energy policy.

- A commitment to a regular and formal review.

Some smaller organisations may not need a specific energy policy – an environmental policy and a board-level mandate coupled with a good energy plan may be enough. However, for larger organisations a policy is normally a key component of energy management.

See Energy management - a comprehensive guide for controlling energy use (CTG054) for detailed guidance and a policy template.

Energy strategy

An energy strategy is a document setting out an action plan of how energy will be managed in the organisation to meet the policy objectives. There are eight key areas the strategy should address, although they are not all applicable to all organisations:

Organising energy management

Led by the Energy Manager, the energy management team has responsibility for the day-to-day delivery of the energy policy through the implementation of the energy strategy.

There is no ideal model for an energy management team –the structure will depend upon how your organisation works. Where the members of the team have other duties what is important is that they have sufficient time, expertise and resources to perform their energy management responsibilities effectively.

Formal responsibility for energy management should not reside exclusively with the energy management team as there are specific responsibilities that should be assigned to those whose support is necessary for delivering effective energy management. This might include:

- the chief executive and other senior managers

- other key managers and their departments, such as:

  — production or service delivery

  — asset management/property

    - facilities

    - estates

    - maintenance

    - capital projects

  — finance

  — procurement

  — IT

  — human resources

  — security, cleaners and caretakers.

Much like health and safety, everyone in the organisation should be responsible for their own actions with respect to energy efficiency.

However, where with health and safety there are legal obligations on all employees, energy efficient behaviour is more appropriately driven through developing an energy efficient culture.

Regulatory compliance and incentives

All organisations need to understand which regulations apply to them and what they need to do to comply. The main regulatory schemes are:

- The CRC Energy Efficiency Scheme (CRC).

- Building Regulations and Energy Certificates (EPCs and DECs).

- The Climate Change Levy (CCL) and Climate Change Agreements (CCAs). (CCAs are voluntary, but put requirements on those that participate).

- The EU Emissions Trading System (EU-ETS).

- Fluorinated Gas (F-gas) Regulations.

Effective energy management provides the basis for efficient regulatory compliance and allows organisations to take advantage of incentive schemes such as Enhanced Capital Allowances and Feed-in Tariffs.

The Carbon Trust's website www.carbontrust.co.uk/legislation provides details of relevant legislation.

Investment

Most organisations will need investment to take full advantage of cost-effective energy efficiency opportunities. Projects that cut energy costs should be compared on a rational basis with other investment opportunities. It is common for energy efficiency projects to lose out to other demands on funds perceived to be of greater importance.

Good investment practice can be characterised by:

- A ring-fenced budget for energy efficiency/sustainable energy under the control of the Energy Manager. This avoids the danger of funds being diverted.

- Retention of a proportion of energy savings by the function to which they relate. This provides an incentive and reward for pursuing energy efficiency.

- Appraisal on a whole lifecycle basis when comparing energy efficiency investment with competing demands on capital.

- Presenting senior managers with clear and thorough business cases for investment.

The Carbon Trust Management Guide Making the business case for a carbon reduction project (CTV039) provides valuable guidance on ensuring that projects dealing with energy cost cutting and carbon reduction get the best chance of implementation.
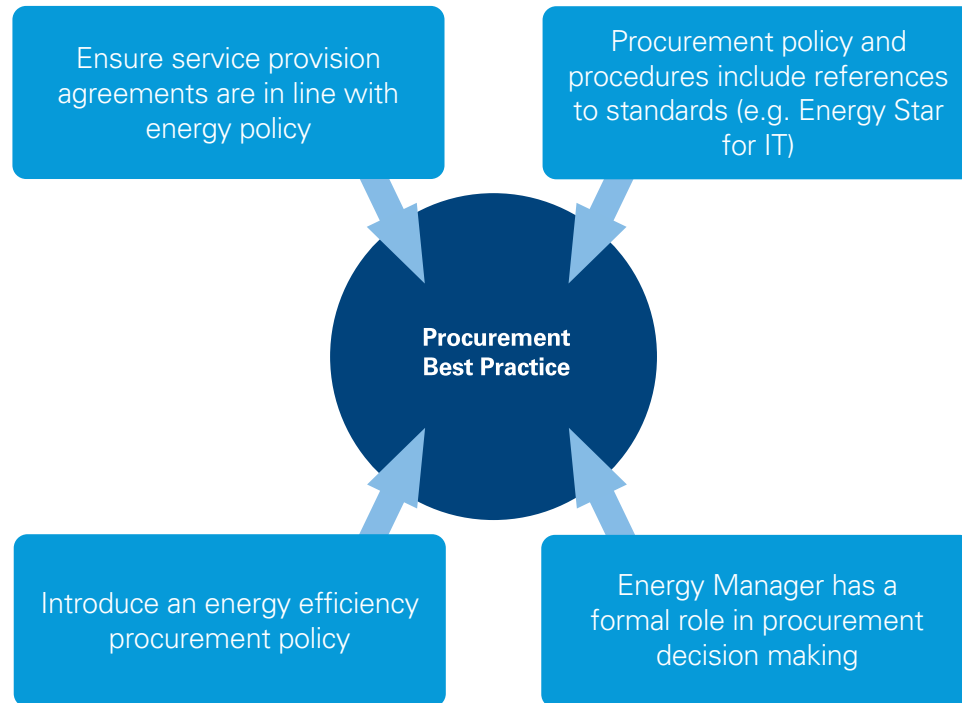
Procurement

There are two areas of procurement critical to an effective energy management strategy: one is the procurement of energy itself; the other is procuring energy-using equipment, services and buildings. The following schematic summarises best practice.

Energy procurement

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

Figure 3 **Procurement best practice**

For example, a finance department is often responsible for buying energy, but not for managing it, so it's important that they have access to the relevant information in order to make decisions about procurement. They can only save money if they understand the markets and know how your organisation uses and will use energy.

Procurement of equipment and services
The energy performance of an organisation is influenced by the equipment and services it uses. Best practice requires that the energy performance of such items is taken into account when procurement decisions are being made. This will normally involve formal input from the energy management function.

Procurement of buildings
Procuring buildings, whether through a lease or purchase, can be a key factor in an organisation's long-term energy performance. As a matter of policy it would be appropriate to only lease, purchase or commission new buildings that meet the highest of energy efficiency standards. In the longer-term this will be a far more cost-effective way of reducing carbon emissions than improving existing stock.

Metering, monitoring and targeting

Energy metering, monitoring and targeting (MM&T) is the management information system that supports energy management. Also known as just monitoring and targeting (M&T), it is central to good energy management. Simply, you cannot manage what you don't measure and what is not measured is not managed.

Effective MM&T enables you to reduce costs through understanding your organisation's energy consumption and identifying waste and targeting inefficiency.

The stages of MM&T are:

- collection of data on energy and on influencing factors such as weather conditions or production volumes

- analysis to convert data to information

- communication to convert information to knowledge

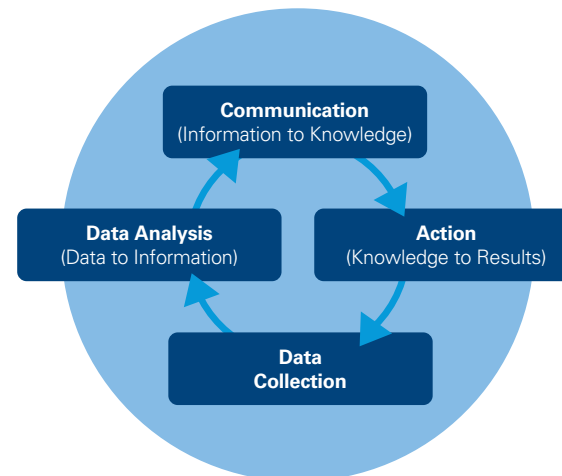- actions to improve efficiency and eliminate waste.

This is a continuous process, and once established should not be overly complex or time consuming. MM&T allows you to:

- detect avoidable energy waste that might otherwise remain hidden

- quantify savings achieved by energy projects and campaigns

- identify fruitful lines of investigation for energy surveys

- provide feedback for staff awareness, improve budget setting and undertake benchmarking

- calculate energy and carbon reduction targets rationally to reflect achievable performance – often, targets are set without consideration of practical application or achievability.

MM&T also supports energy invoice checking and tariff negotiation. Sometimes the term is inaccurately used to just mean bill validation, whereas true MM&T provides much more.

Figure 4 *The MM&T process model*

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Automatic metering (AMR) systems use meters that do not have to be read manually. AMR considerably eases meter reading and makes it possible to collect energy data at a more detailed level. This brings with it the risk of 'data overload',

but you should balance the practicality and cost of metering with the benefits it will deliver.

The Carbon Trust has detailed guidance on metering and MM&T, visit www.carbontrust.co.uk/mmant

Opportunities identification

Opportunities for improving energy efficiency can be identified through:

- Analysing energy data through MM&T, including comparisons with internal or external benchmarks.

- Carrying out energy surveys or equivalent. These range from surveys of staff behaviour to detailed appraisals of particular technical plant or the physical condition of buildings.

You may also find useful information from existing building and equipment condition surveys, asset registers and building energy certificates.

The only way to be really sure of what opportunities there are 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 with applied common sense.

The Carbon Trust publication Energy surveys (CTG054) provides detailed advice for undertaking or commissioning an energy 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

An energy management strategy must include engagement with staff at all levels, from the chief executive to the part-time worker. This means you must make 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 habits if they understand how their actions affect consumption. Staff should feel confident to make suggestions and be informed enough to take action. Senior management should be seen to be leading this and setting a good example. Behavioural change can be encouraged by including energy efficiency tasks in everyday operating procedures, for example, shut-down procedures and maintenance schedules.

Visit the Carbon Trust's Employee Awareness web page for further information and materials to support awareness campaigns.

Communications

Good internal communications are an important part of developing a culture supportive of energy efficiency. To demonstrate their green credentials, some organisations will communicate their endeavours externally to customers, suppliers, shareholders, the local community and other stakeholders.

Spreading good news is important because it encourages people who have contributed towards the success and lets stakeholders know their interests are being met.

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

- the promotion of results can be rewarding and motivational to those directly and indirectly involved

- the publicising of energy achievements can enhance the reputation of the organisation.

Management review

As with any management process, regular energy management reviews are vital to ensure that progress is being made and that policy, strategy and action plan documents are up-to-date and relevant.

An action plan will help keep an 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.

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 gives the opportunity to manage unsatisfactory performance straight away, before it starts to have a negative impact.

Assessments will 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.

Minor reviews could be scheduled at three or six-monthly intervals, with a full annual analysis to keep the strategy on course. Remember to involve all staff. One way of achieving ongoing involvement in energy management is to have an annual energy week to promote the next year's plan.

Next steps

Now that you have gained a good appreciation of what is required for effective energy management, you can plan how you are going to put in place a system for your organisation. The 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)

- Energy management (CTG054)

Develop an energy policy and initial strategy

- Energy management (CTG054)

Work to formalise energy management and integrate it throughout the organisation

- Energy management (CTG054)

- Creating an awareness campaign (CTG056)

If you are already well down the energy management journey, you should be:

- concentrating on delivering reductions

- reviewing the system

- promoting awareness

- identifying new opportunities.

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

Energy management (CTG054)

Making the business case for a carbon reduction project (CTV039)

Energy surveys (CTG055)

Creating an awareness campaign (CTG056)

Monitoring and targeting (CTG008)

Metering technology overview (CTV027)

Better business guide to energy saving (CTV034)

Tools

Energy management self-assessment tool (CTX614)

Project planning tool

Action plan tool

Energy analyser tool

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
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