

ENERGY MANAGEMENT IN THE BUILT ENVIRONMENT

A review of best practice

Andy Lewry



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Registered Office: Bucknalls Lane, Garston, Watford, Herts WD25 9XX

BRE Trust
Garston, Watford WD25 9XX
Tel: 01923 664743
Email: secretary@bretrust.co.uk
www.bretrust.org.uk

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or
IHS BRE Press
Willoughby Road
Bracknell RG12 8FB
Tel: 01344 328038
Fax: 01344 328005
Email: brepres@ihs.com

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ESTA ID03

The Energy Services and Technology Association (ESTA) is the UK's leading energy management industry association. ESTA focuses on demand-side energy efficiency of buildings, building services and process services. ESTA considers issues beyond pure energy consumption to those systems and processes that influence the whole-life cost of a building. These include maintenance and management costs and the effectiveness of the working space in creating a better environment that can positively impact on staff output.

ESTA, Energy Services and Technology Association
PO Box 77, Benfleet, Essex SS7 5EX
T: 01268 569010
E: info@esta.org.uk
www.esta.org.uk

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EXECUTIVE SUMMARY

The objective of this report is to bring together BRE's wide-ranging knowledge and experience in energy management into a single publication. The guidance in the report is intended to be applicable by anyone responsible for energy management in an organisation, from board level to operational staff.

A step-by-step approach to energy management is explained, together with the use of a matrix tool to underpin the implementation of energy management initiatives within an organisation. The tool can be used to help organisations to identify areas for improvement, prioritise energy management activities and maximise potential benefits.

Although most of the examples are from the built environment, the underlying principles can be employed in any organisation or industry sector. In addition, the publication:

- examines how data from sources such as BRE Environmental Assessment Method (BREEAM) assessments, energy audits, energy performance certificates (EPCs), display energy certificates (DECs) and monitoring and targeting can underpin energy management;
 - addresses asset and operational performance and discusses how information from both is needed to adequately assess the energy performance of a building;
 - illustrates how undertaking an energy management programme can improve EPC and DEC ratings; and
 - introduces the new International Energy Management Standard ISO 50001:2011 and explains its contribution to an auditable energy management programme.
-

1 INTRODUCTION: WHY MANAGE ENERGY?

There are a number of key reasons to improve energy management in your organisation:

- to save costs
- to comply with legislation
- to manage risk.

The rising cost of energy in the UK since 2000 has highlighted the need for improved management of this resource. The Department of Energy and Climate Change (DECC) updates its predictions of fossil fuel prices annually^[1] and its modelling of gas prices based on four scenarios^[2] is shown in Figure 1. These scenarios have been chosen by DECC to model the range of probable market conditions with a view to predicting price increases on an annual basis until 2030.

The worst of these scenarios predicts a 100% increase in prices over the 10 years from 2008. Scenario 3, based on high demand and producers' market power, currently appears to be the most realistic. This predicts a two-thirds price increase over the same period.

As well as rising prices, security of energy supply has also become an issue, particularly since the UK changed from being a net exporter of gas to being a net importer in 2004. UK production satisfied only about 70% of our demand in 2010^[3] (Figure 2).

This loss of capacity has led to increasing concern over energy security, as reported in an article in *The Guardian* in January 2010^[4]. This highlighted the risk of the National Grid cutting off gas supply to factories due to severe weather and an ageing power infrastructure.

When managing energy one has to overcome the false perception that it is a fixed cost to business and can be reduced only by tariff negotiation. Considering energy as a variable cost to a business provides the opportunity to discover the size of the potential savings. UK businesses spend £2.4 billion on energy annually, of which 21% is wasted^[5] (Figure 3).

Companies that embrace energy management normally do so as part of a larger programme of resource management or environmental management. As well as

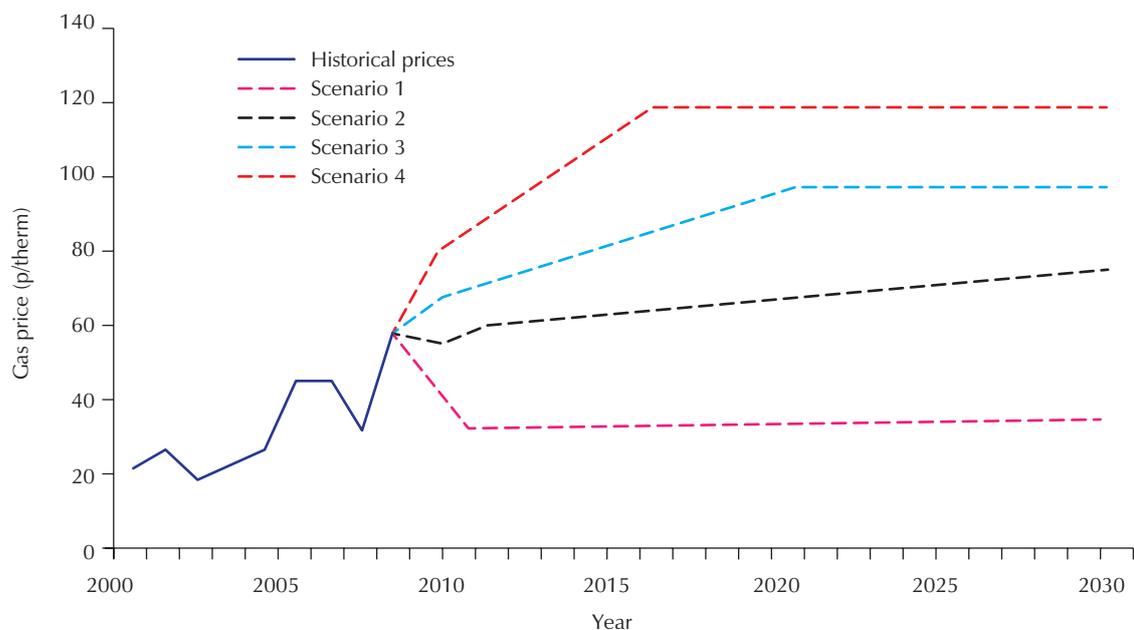


Figure 1: Historical and predicted trends in gas prices (Reproduced from the Department of Energy and Climate Change (DECC), *Communication on DECC fossil fuel price assumptions*^[1], which updates the price assumptions published in spring 2008)

In developing an energy policy, these key points should be addressed:

- state the way energy is used
- state global targets
- state managerial responsibilities
- state staff responsibilities
- lay out future plans.

The energy policy is typically in two parts, where the first part is a high-level statement. The second part should have specific objectives and targets and be used to:

- communicate board commitment
- raise staff awareness
- demonstrate commitment to key stakeholders
- underpin the energy strategy
- provide a structure for implementation.

Although this approach is a great step forward to integrating energy management within an organisation's managerial processes, it has a fundamental flaw: it does not close the loop and produce an iterative process where the lessons learned feed back into the process, which is then improved.

For the last few years BRE has been advocating a 'five-step-plus' approach (Figure 6), where the loop is closed by a review and audit step whose analysis produces the lessons learned. These are then fed into a plan for improvement, which embraces all aspects of the process and includes an action plan for change.

This approach is in line with the approach of a new International Energy Management Standard (EnMS), which was published in June 2011. ISO 50001:2011^[12] took approximately three years to write, drawing on the skills of approximately 60 delegates from 23 countries.

Although the discipline is well developed and has been applied around the world for many decades, there have been a variety of concepts and interpretations. Those involved in the drafting process have faced a major challenge to harmonise viewpoints and develop a common approach.

At the outset, the International Organization for Standardization (ISO) stressed the importance and urgency of this standard to offer a common global approach to a key discipline, against the background of the low-carbon future and expected short-term energy price rises. It was within their top three priorities. Compatibility with the International EnMS ISO 14001:2004^[13] was also seen as key. The European Standard on the same subject, BS EN 16001:2009^[14], was published in 2009 and this is now to be withdrawn on a phased basis to allow a transition to the new International EnMS, ISO 50001:2011.

ISO 50001 specifies requirements for an organisation to establish, implement, maintain and improve an energy management system. This allows organisations to take a systematic approach to the continuous improvement of energy performance, including efficiency, end use and consumption. Even for organisations that have been committed to energy management for a long time, or that may already be certified to ISO 14001, case studies indicate that the more formalised processes required by the new standard can lead to new opportunities and procedures being identified and implemented.

The framework and the major aims of the standard are as follows:

- Improve energy performance in a systematic way through objectives, monitoring, use of targets and investment programmes. This is the key purpose of the standard.

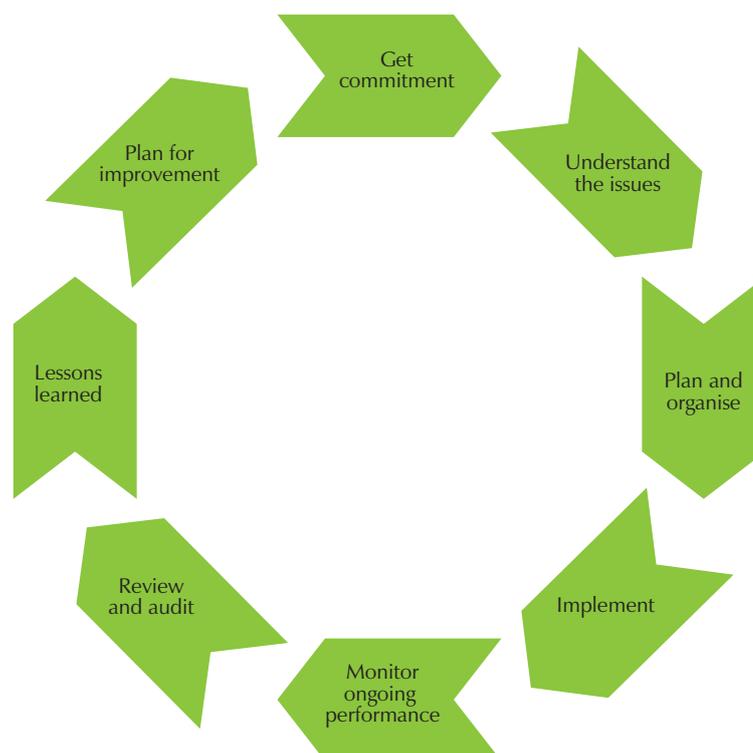


Figure 6: BRE's five-step-plus approach to energy management

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