ENTERPRISE IRELAND
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Best Practice Guide


# ENERGY MANAGEMENT SYSTEMS

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# 1.0 Energy Management System

Energy can be a major cost to organisations, whatever their activities. Using energy more efficiently helps organisations save money as well as helping to conserve resources and tackle climate change. A number of organisations have integrated energy management systems to improve their energy efficiency.

## 1.1 History of Energy Management Systems in Ireland

The Irish Energy Management Standard IS 393 was developed in 2005 by NSAI in consultation with SEAI and in collaboration with Industry Representatives. This document was used as a blueprint for the European Energy Management Standard EN 16001:2009. In 2011 the International Standards Organisation (ISO) published an International Energy Management Standard **ISO 50001:2011 – Energy Management Systems – Requirements with guidance for use**. Since 2011, Irish companies have transitioned to ISO 50001. The Standard has international recognition and is considered the benchmark standard worldwide for Energy Management. It supports organisations to use energy more efficiently through the development of an energy management system (EnMS).

## 1.2 Other Management Systems

ISO 50001 is compatible with other ISO management system standards such as ISO14001, Environment Management Standard. It is based on the management system model of continual improvement used for other standards. The process follows a Plan-Do-Check-Act approach for continual improvement of the management system (i.e. energy/environment management system). ISO 50001 is data driven and focuses on energy performance improvement, while ISO 14001 provides a more qualitative look at all significant environmental impacts of an organisation.

Both standards can be implemented individually, or they can be integrated with each other, or with any other ISO management system standards, such as ISO 9001, the Quality Management System Standard. If energy is an organisation's most significant environmental impact, ISO 50001 might be more appropriate than ISO 14001. Many organisations will manage energy successfully via ISO 14001, but in those organisations where energy is a significant cost, ISO 50001 provides a more specific framework that enables them to apply a sharper focus to energy efficiency.

Like other ISO management system standards, certification to ISO 50001 is possible, but not obligatory. Some organisations decide to implement the Standard solely for the benefits it provides while others decide to get certified to it, to show external parties that they have implemented an energy management system. NSAI and Certification Ireland are accredited by the Irish National Accreditation Board (INAB) to provide certification to ISO 50001:2011.

The following ISO standards offer specific guidance and tools for implementing ISO 50001 and improving energy performance:

**"ISO 50002:2014 Energy audits -- Requirements with guidance for use"** *specifies the process requirements for carrying out an energy audit in relation to energy performance.* .

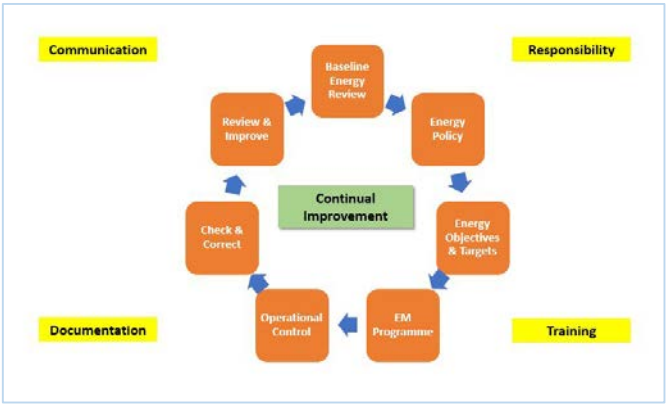
**"ISO 50004:2014, Energy management systems -- Guidance for the implementation, maintenance and improvement of an energy management system"** *provides practical guidance and examples for establishing, implementing, maintaining and improving an Energy Management System (EnMS) in accordance with the systematic approach of ISO 50001.*

**"ISO 50006:2014 Energy management systems -- Measuring energy performance using Energy Baselines (EnB) and energy performance indicators (EnPI) -- General principles and guidance"** *provides practical guidance on how to meet the requirements of ISO 50001, and thereby manage their energy performance.*

**ISO 50015:2014, Energy management systems -- Measurement and verification of energy performance of organizations -- General principles and guidance** *provides a set of principles and guidelines for Measurement and Verification, thereby increasing the credibility of energy performance.*

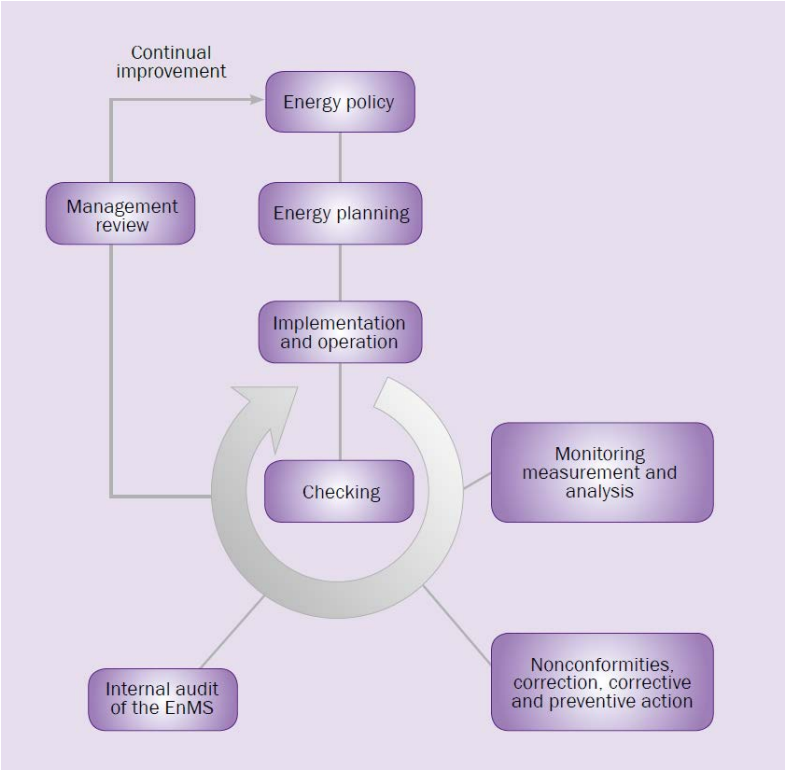
# 2.0 Energy Management System structure and elements

An Energy Management System (EnMS) focuses on the energy performance of an organisation whereas an Environmental Management System (EMS) encompasses all the activities and technologies necessary to manage an organisations environmental performance. While the specific components of an EnMS and an EMS may vary, the general structure behind the Management System concept is largely the same.




The International Standard ISO 50001:2011 follows the ''**P**lan-**D**o-**C**heck-**A**ct (PDCA) process for continual improvement and incorporates energy management into everyday organizational practices, as illustrated in Figure 1.

**Figure 1** *Energy Management System Model* (Source: ISO 50001:2011)




**Plan** conduct the energy review and establish the baseline, Energy Performance Indicators (EnPIs), objectives, targets and action plans necessary to deliver results in accordance with opportunities to improve energy performance and the organization's energy policy;

**Do** implement the energy management action plans;

**Check** monitor and measure processes and the key characteristics of its operations that determine energy performance against the energy policy and objectives and report the results;

**Act** take actions to continually improve energy performance and the EnMS.''

The implementation of an EnMS is intended to lead to reductions in energy cost, greenhouse gas emissions and other related environmental impacts, through systematic management of energy.

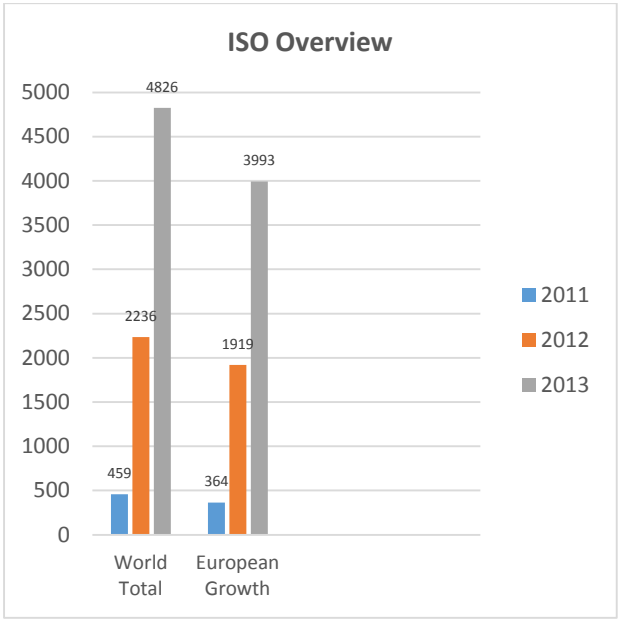
# 3.0 ISO 50001 EMS Uptake Worldwide and in Ireland

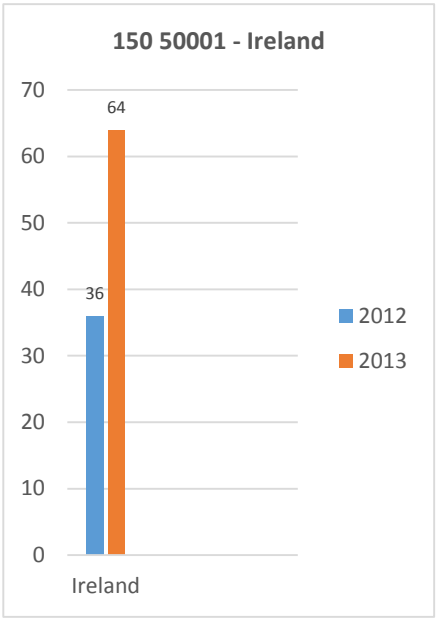
- Up to the end of December 2013, at least 4 826 ISO 50001:2011 certificates had been issued, a growth of 116%, in 78 countries worldwide with 64 certificates issued in Ireland.
- The top three countries for the total number of certificates and growth in number of certificates in 2013 were Germany, the UK and Italy.
- The top three Industrial sectors to obtain ISO 50001:2011 certification in 2013 were: 1. Agriculture, fishing, 2. Pulp, paper and paper products and 3. Food products, beverages and tobacco.

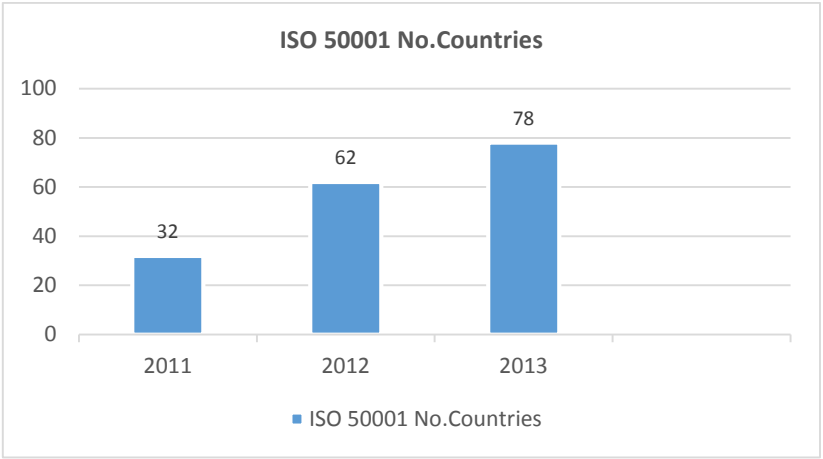
The global status of ISO 50001 certificates are illustrated below

(Source: The ISO Survey, 2013).

## ISO 50001 – Overview



| 2013 | | | | |
|---|---|---|---|---|
| # | Top 10 countries ISO 50001 Certificates | | Top 10 countries ISO 50001 Growth | |
| 1 | Germany | 2477 | Germany | 1344 |
| 2 | United Kingdom | 330 | United Kingdom | 194 |
| 3 | Italy | 258 | Italy | 184 |
| 4 | Spain | 196 | India | 98 |
| 5 | India | 172 | Thailand | 91 |
| 5 | Taipei, Chinese | 137 | Taipei, Chinese | 87 |
| 7 | Thailand | 132 | Spain | 69 |
| 8 | Korea, Republic of | 111 | Korea, Republic of | 63 |
| 9 | Sweden | 94 | France | 49 |
| 10 | France | 86 | Austria | 43 |

| Top five industrial sectors for ISO/IEC 50001 certificates 2013 | |
|---|---|
| **1** | Agriculture, fishing |
| **2** | Pulp, paper and paper products |
| **3** | Food products, beverages and tobacco |
| **4** | Textiles and textile products |
| **5** | Leather and leather products |

# 4.0 European Energy Efficiency Directive 2012 & ISO 50001

Under the DIRECTIVE 2012/27/EU Energy Efficiency Directive [EED] all EU countries are required to use energy more efficiently at all stages of the energy chain from its production to its final consumption. The EED establishes a set of binding measures to help the EU reach its 20% energy efficiency target by 2020. EU countries were required to transpose the Directive's provisions into their national laws by 5 June 2014.

Article 8 of the Directive has been transposed into Irish Law as S.I. No. 426 of 2014 European Union (Energy Efficiency) Regulations 2014.

Under the legislation large organisations (non-SME[1] and public body[2]) are required to carry out an energy audit by 5 December 2015 and every four years after that.

They can either conduct

- Energy audits to measure total energy consumption and identify cost-effective energy efficiency recommendations

OR

- Become certified to ISO 50001 / ISO 14001 (as outlined in section 3 below)

The two approaches both offer opportunities to identify energy savings. The business decision needs to be considered – is compliance the objective or is business performance improvement?

The 'Energy audit requirements and exemptions' in S.I. 426 of 2014 are as follows:
*(1)* Companies that are not SMEs **(**and public bodies**)** shall carry out an energy audit in accordance with the following principles:

(a) the first audit shall take place prior to 5 December 2015;

(b) the next audit and subsequent audits shall take place within 4 years of the previous energy audit;

(c) the audits shall be carried out either by—

(I) independent registered energy auditors, or

[1] SME means an enterprise which employs fewer than 250 employees and which has (a) an annual turnover not exceeding €50m or (b) an annual balance sheet total not exceeding €43m.

[2] A public body is defined in S.I 426 of 2014 as a public body with individual buildings with a total useful floor area of more than 500m2 or an annual energy spend of more than €35,000

(ii) in-house energy auditors provided they are registered under the energy audit scheme and who shall provide audit details to the SEAI upon request.

(2) Energy audits shall be considered as fulfilling the requirements of paragraph (*1*) when they are carried out in an independent manner, on the basis of the minimum criteria set out in Annex VI, and implemented under programmes the SEAI may designate as meeting the minimum requirements of the Directive.

(3) Companies that are not SMEs and that are implementing an energy or environmental management system, certified by an independent body according to the relevant European or international standards, shall be exempted from the requirements of paragraph (*1*), provided that the SEAI ensures that the management system concerned includes an energy audit on the basis of the minimum criteria set out in Annex VI.

(4) Energy audits may stand alone or be part of a broader environmental audit. The SEAI may require that an assessment of the technical and economic feasibility of connection to an existing or planned district heating or cooling network shall be part of the energy audit.

(5) The findings of an energy audit may be transferred to any qualified or accredited energy service provider, on condition that the customer does not object.

(6) A person who fails to comply with paragraph (1) commits an offence.

The Minimum criteria for energy audits including those carried out as part of energy management systems are given in Annex VI of the Directive. The energy audits shall be based on the following guidelines:

The **energy audits** shall be based on the following guidelines:

(a) be based on up-to-date, measured, traceable operational data on energy consumption and (for electricity) load profiles;
(b) comprise a detailed review of the energy consumption profile of buildings or groups of buildings, industrial operations or installations, including transportation;
(c) build, whenever possible, on life-cycle cost analysis (LCCA) instead of Simple Payback Periods (SPP) in order to take account of long-term savings, residual values of long-term investments and discount rates;
(d) be proportionate, and sufficiently representative to permit the drawing of a reliable picture of overall energy performance and the reliable identification of the most significant opportunities for improvement.

Energy audits shall allow detailed and validated calculations for the proposed measures so as to provide clear information on potential savings.
The data used in energy audits shall be storable for historical analysis and tracking performance

S.I. No. 426/2014 - European Union (Energy Efficiency) Regulations 2014 requires SEAI to establish and maintain a national registration scheme of Energy Auditors

## 5.0 Funding/Supports

Enterprise Ireland Business Process Improvement Grant/GreenPlus Assignment: Enterprise Ireland client companies (SME's and Large Companies) can apply for funding to develop the capability within the company to install and manage a recognised environmental standard such as ISO 50001. Eligible costs include the cost of hiring external consultant/trainers. A company may also choose to allocate the costs of an internal company project champion/manager subject to Enterprise Ireland approval.

**SEAI :** SEAI provides support for SME's, Large Energy Users and the Public Sector through information, training and special initiatives.

**Green Business:** Green Business facilitates free and confidential onsite Resource Efficiency Assessments (REAs), to help reduce energy, water and waste bills.

## 6.0 Useful Publications/Links

NSAI ISO 50001 Energy Management System Detailed Guide

NSAI ISO 50001 transition policy and summary of changes from EN 16001 to ISO 50001

SEAI Energy Auditing Scheme

ISO Survey 2013

Win the energy challenge with ISO 50001

European Commission Energy Efficiency Directive Overview

Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC

S.I. No. 426 of 2014 European Union (Energy Efficiency) Regulations 2014

Implementing the Energy Efficiency Directive – Commission Guidance

Guidance note on Directive 2012/27/EU on energy efficiency, amending Directives 2009/125/EC and 2010/30/EC, and repealing Directives 2004/8/EC and 2006/32/EC **Article 8**: Energy audits and energy management systems

Department of Communications, Energy & Natural Resources Ireland's Report under Article 3 of the EU Directive on Energy Efficiency (2012/27/EU) on Energy Efficiency Targets

NSAI National Standards Authority of Ireland

INAB Irish National Accreditation Board; Management System Certification Body

Certification Europe Management System Certification Body