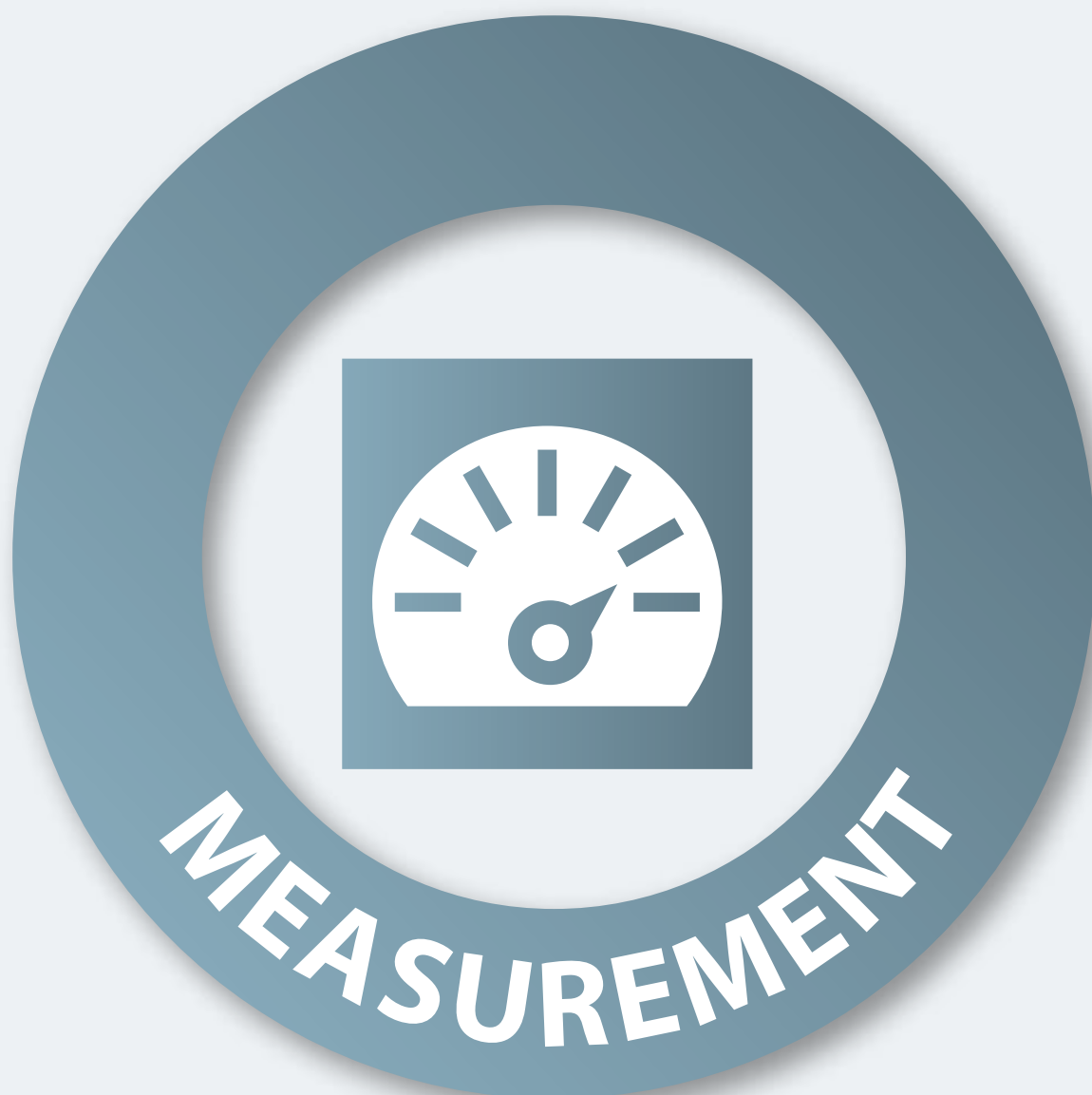


Implementing ISO 50001: 2018

Energy Efficiency



Introduction

Published in 2011, ISO 50001 is the international standard for energy management.

Its purpose is to allow companies* to put in place the necessary systems and procedures to improve their energy performance, including energy efficiency, energy use and consumption for all types of fluids (water, gas, electricity, etc.).

ISO 50001 company* objective

Implementing ISO 50001 aims at reducing:

- greenhouse gas emissions,
 - other associated environmental impacts,
 - energy-related costs
- by systematically implementing an energy management system (EnMS).

The success of the implementation depends on the commitment of each hierarchical level and, in particular, the management of the company.

** Note: ISO 50001 tends to use the term organization for company, corporation, firm, enterprise, authority or institution.*

ISO 50001 strategy

ISO 50001 specifies the requirements for an Energy Management System (EnMS) to allow a company to:

- develop, apply and uphold an energy policy,
- establish objectives, targets and action plans.

Take into account the legal requirements and information related to significant energy use.

But it does not establish requirements on Energy Performance.

Representation of Energy Performance

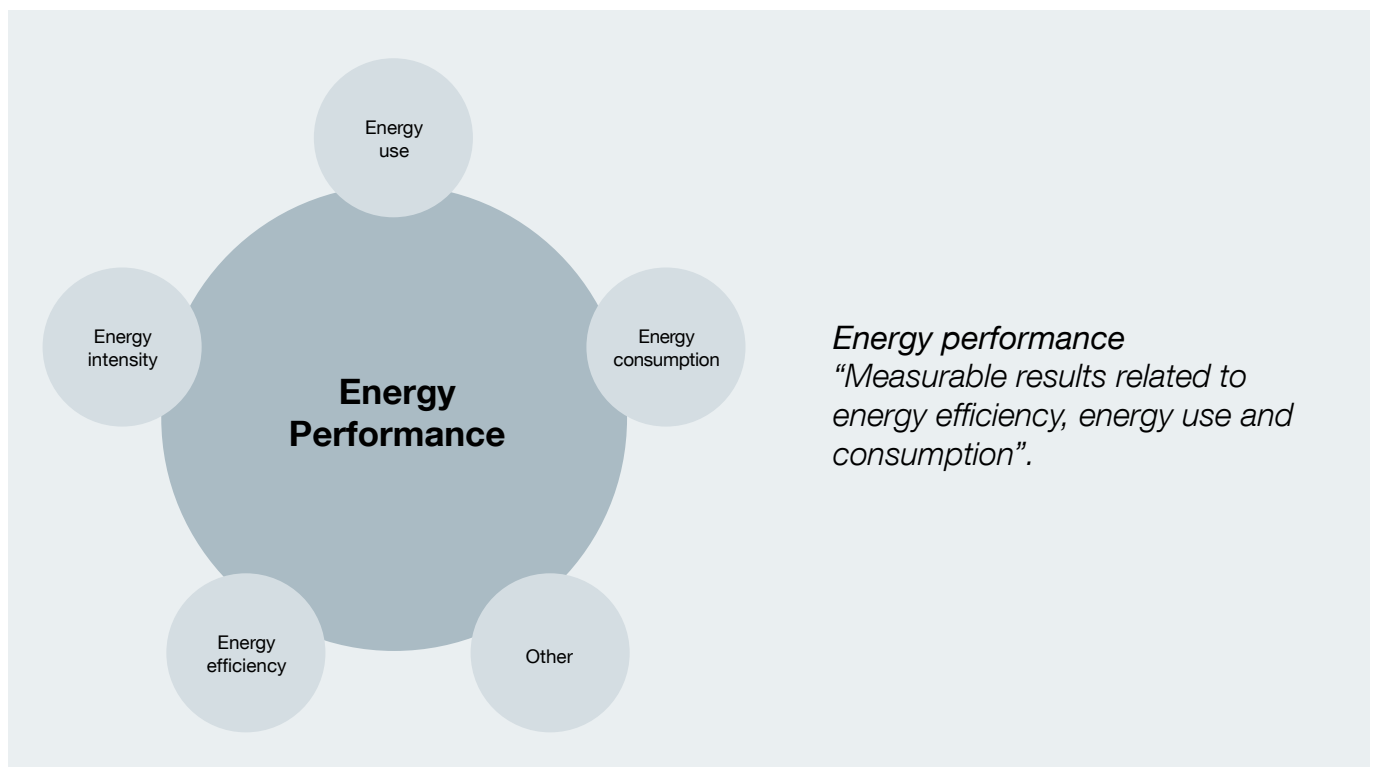


Fig. 1 - Representation of Energy Performance (Source ISO 50001).

The ISO 50001 standard integrates energy management into the company's daily practices. It is based on the same dynamic continual improvement as other system management standards, such as ISO 9001 (quality management) and ISO 14001 (environmental management), which makes it easier to implement in the company. It is based on the principle of continuous improvement PDCA (Plan-Do-Check-Act).

The PDCA principle

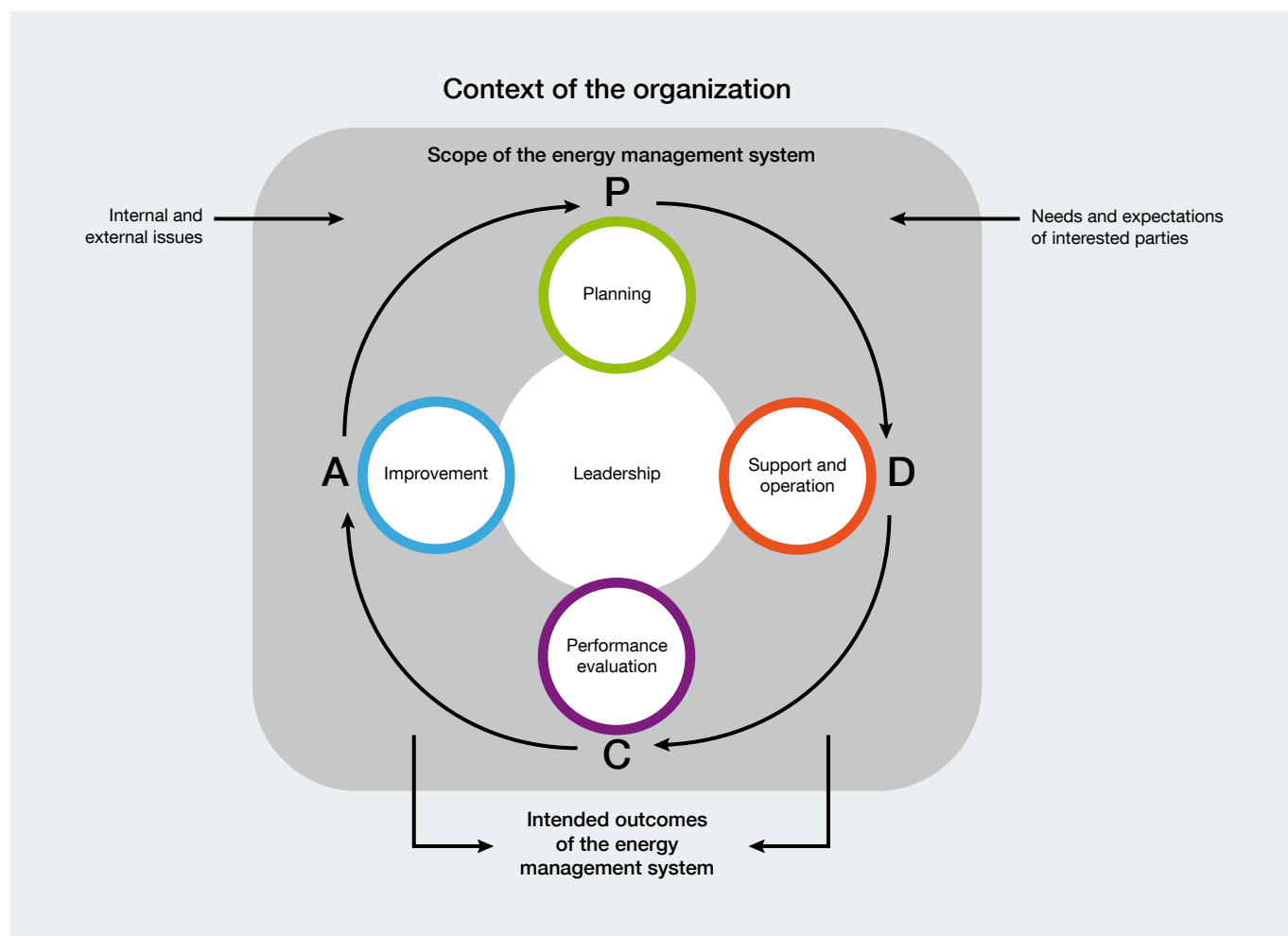


Fig. 2 - PDCA principle (Source: ISO 50001).

Plan: conduct the energy review and define the baseline consumption points, energy performance indicators (EnPIs), objectives, targets and action plans.

Do: apply energy management action plans.

Check: monitor and measure operations that determine energy performance in terms of energy policy and energy objectives.

Act: carry out actions to improve energy performance and the EnMS.

These steps are detailed in the following chapters.

Contents

Introduction	2
The PDCA principle	3
Plan - Requirements of the Energy Management System.....	5
General requirements	5
Management responsibility	5
Energy planning.....	5
Do - Implementation and operation.....	8
Check - Measuring, internal audit and non-conformities.....	9
Act - Management review	10
Energy data collection plan.....	11
Example of a measurement plan.....	11
Energy data collection plan	12
Example of data collection and analysis in an ISO 50001 project.....	12
Implementing ISO 50001	13
In summary	14

Plan - Requirements of the Energy Management System

General requirements

The company should:

- establish, document, implement, maintain and improve its EnMS in accordance with ISO 50001 requirements,
- identify the scope (set of activities, facilities) and perimeter (geographical or organizational boundaries),
- determine how to comply with ISO 50001 to be in a continual improvement strategy.

Management responsibility

This is a very important aspect of ISO 50001, top management shall demonstrate leadership and commitment by:

- determining external and internal issues while respecting legal requirements and other,
- understanding the needs and expectations of interested parties,
- identifying the scope (geographical, organisational, etc.),
- establishing, documenting, implementing, maintaining and improving the EMS,
- being part of a continuous improvement process in compliance with ISO 50001,
- ensuring that the resources needed for the EnMS are available,
- ensuring that the EnMS is compatible with the strategic direction of the organization,
- ensuring the integration of the EnMS requirements into the organization's processes,
- ensuring that the resources needed for the EnMS are available,
- ensuring that the EnMS will achieve its intended outcomes.

Management responsibility and commitment is a key aspect of ISO 50001.

The energy policy must clearly define commitments, objectives and expectations.

As the management is responsible for the energy policy, it is necessary to provide them with a helpful starting point, in the form of an initial energy audit.

Energy planning

The company needs to complete and document a planning process. It is defined by implementing:

- energy policy,
- actions including the risks and opportunities to reach the objectives of energy performance and energy review,
- energy performance indicators.

It must be consistent with the energy policy and encourage continual improvement. The key aspect is the energy review.

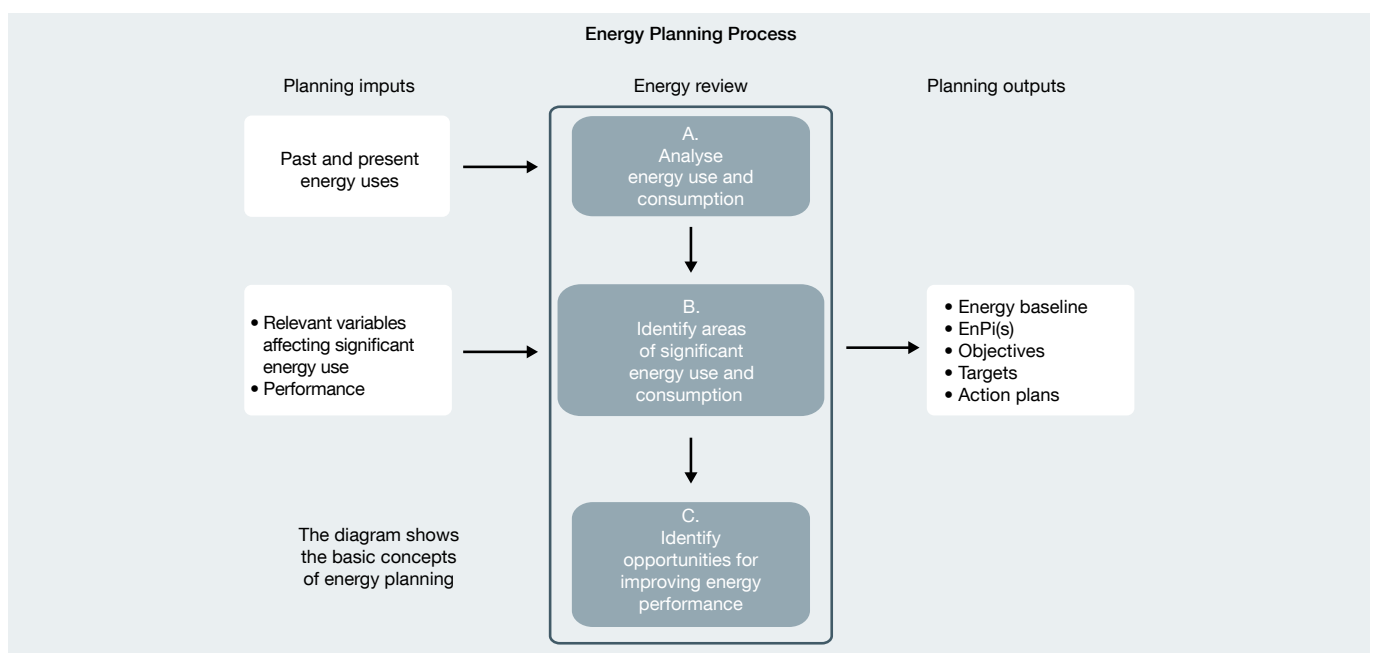
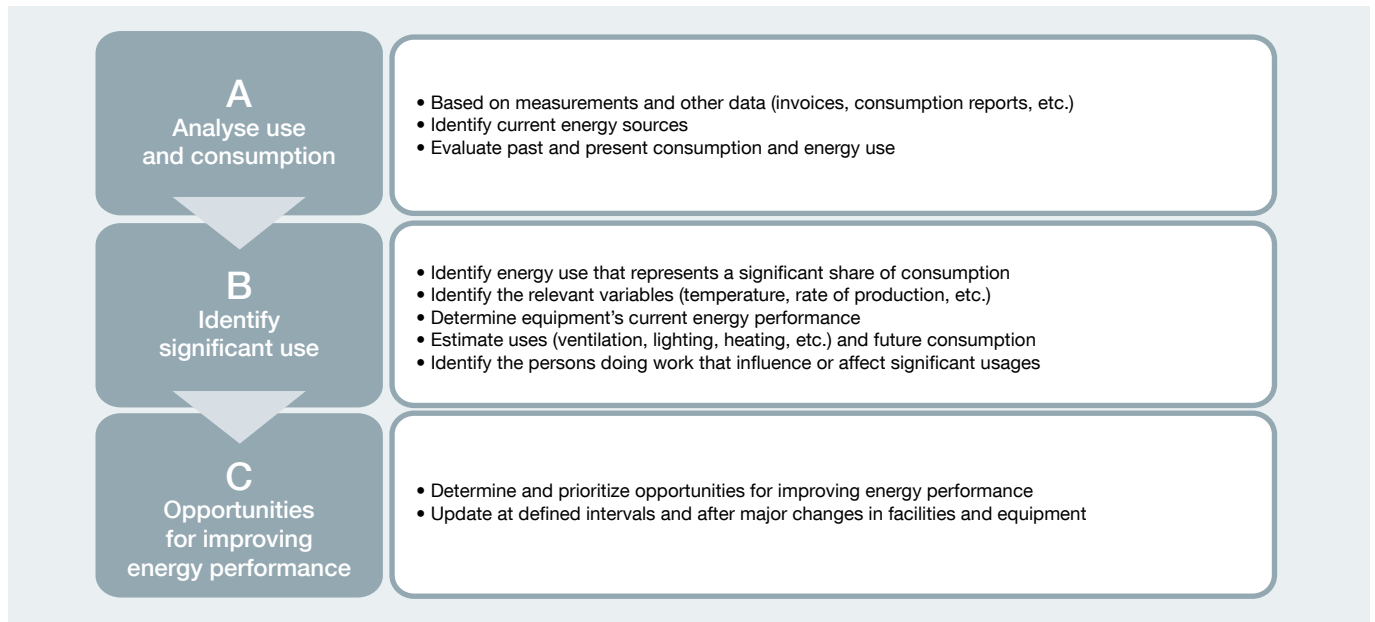


Fig. 3 - Diagram of the energy planning process.

Energy Review

The company must design and regularly carry out an energy review. For the design the company must:



Energy baseline (EnB)

The company must establish energy baseline profiles during the initial energy review:

- these profiles must cover a period relevant to the company (e.g. 1 year),
- they will provide a basis for setting out potential energy performance improvements,
- they will have to be adjusted according to the relevant variables.

Example of an energy baseline profile

Average monthly consumption over 1 year taking into account influence factors: level of production, building occupancy rate, outdoor temperature, etc.

Energy Performance Indicators (EnPIs)

The company must identify its EnPIs. They must be reviewed and compared with the reference EnPI value. They allow to demonstrate the energy performance improvement compare to the baseline period.

Examples of indicators

- site's annual consumption by fluid,
- energy efficiency: ratio of energy required ('useful' energy) to energy consumed (usually higher because of losses),
- statistical model: relationship between energy consumption and relevant variables such as temperature or degree day, using linear regression,
- annual consumption per unit area (kWh/m² per year).

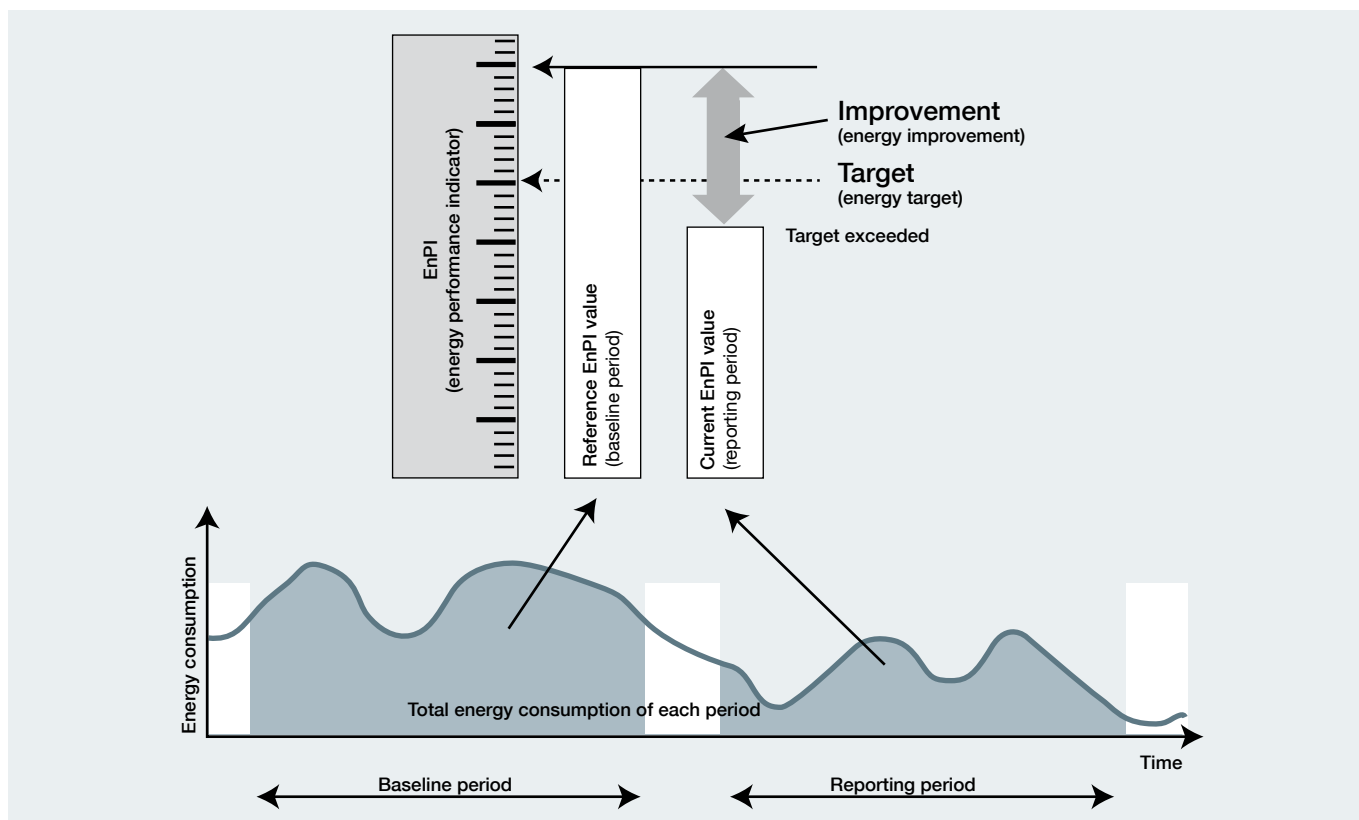


Fig. 4 - Energy performance indicator (EnPI) –Source: ISO 50001:2018.

The improvement in energy performance is represented by the difference between the reference period indicator and the current period indicator:

$$\text{Improvement} = \text{Reference EnPI} - \text{Current EnPI}$$

Objectives, targets and action plan

The company establishes implements and maintains energy objectives and targets. This must come with the corresponding action plans.

An energy review must be carried out regularly, to include:

- analysis of the consumption data,
- identification of significant energy uses,
- identification of uses and future consumptions.

The measurement and monitoring of EnPIs to assess how energy performance has improved

The company sets itself energy objectives and targets.

Planning for collection of energy data

Energy data must be identified, measured, monitored and analysed at planned intervals and an energy data collection plan has to be defined and implemented.

Data shall include:

- energy consumption related to significant energy uses,
- relevant variables (weather conditions, working hours, production output...) for significant energy uses,
- static factors (facility size, number of weekly shifts...),
- data specified in action plans.

The equipment used for measurement shall provide data which are accurate and repeatable.

Do - Implementation and operation

For the implementation and operation, the company must follow the action plans and other parts of the planning process.w

Competence

Under ISO 50001, the company must ensure that everyone working on behalf of the company has the right qualifications, training, skills and experience.

They must be informed of the importance and compliance of the energy policy, EnMS requirements and their roles and responsibilities.

Communication

The company must use its internal communication channels to inform its staff of its energy performance, by using e.g. a Totem (screen showing key consumption data) in the company lobby.

Anyone working for or on behalf of the company can make comments or suggestions on the EnMS.

The company may decide to share its energy policy externally.

Documentation

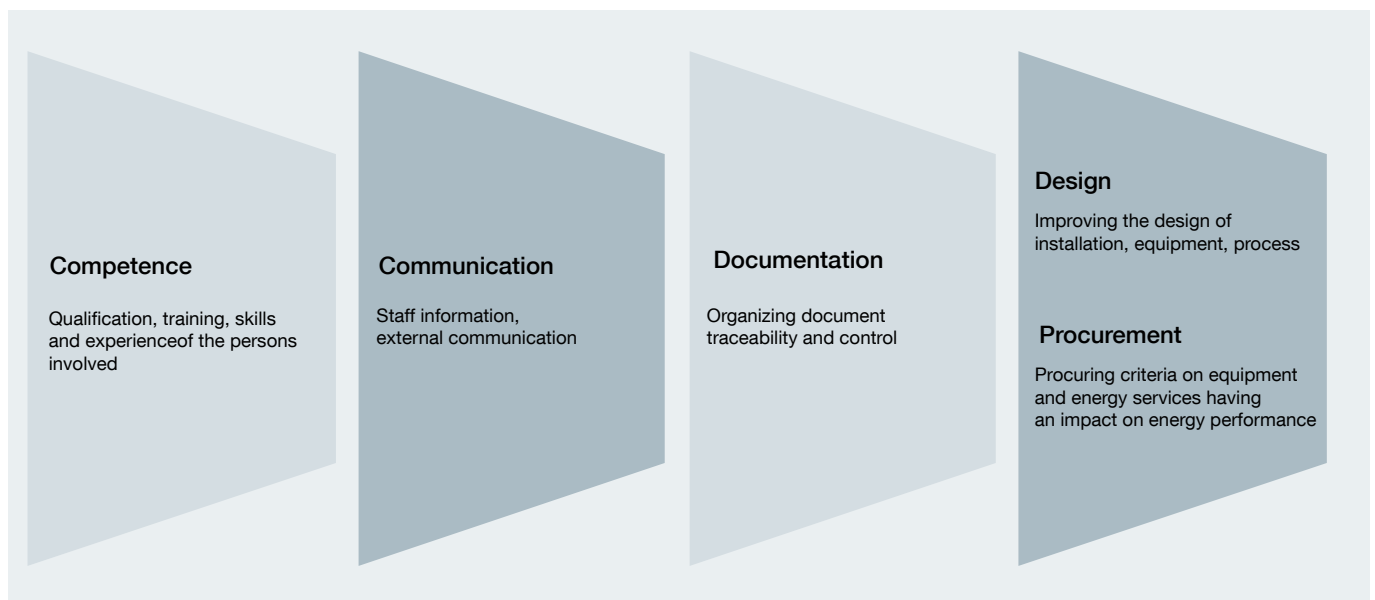
ISO 50001 lists the minimum requirements in terms of documentation, as it does for other management system standards (ISO 9001, ISO 14001...). To control these documents, the company has to establish a system to oversee documents and identify updates.

Design and procurement

The company must consider improvement opportunities when designing new, modified and renovated equipment, systems and processes, which may have a significant impact on energy performance.

Similarly, this must be taken into account when considering tenders for the procurement of energy services and equipment that could have a significant impact on energy performance.

Every company must identify the solutions that best suit its energy performance in terms of competence, communication, design and procurement.



Check - Measuring, internal audit and non-conformities

Monitoring, measuring and analysis

The company must monitor, measure and analyse the key characteristics of its energy performance activity:

- significant energy uses,
- relevant factors associated with these uses,
- energy consumption,
- EnPIs and comparison to EnPI reference values.

Compliance with legal requirements, internal audits and non-conformities

The company must regularly assess its compliance with legal requirements or other energy requirements (e.g. contractual provisions).

To ensure that the EnMS is consistent with the provisions, the company shall conduct internal audits at planned intervals by a qualified internal or external auditor.

The company must address non-conformities and proceed with corrective and preventive actions.

Control of records

As with other management system standards, the company should have a system to create and store legible, identifiable and traceable records.

Energy data collection plan

An energy measurement plan must be put in place.

The company decides on its measurement methods and devices: monitoring and measurement can range from the simple meter to a complete system connected to a software application providing data consolidation and analysis.

An example of implementing a measurement plan is provided in the next pages of this document.

Measured data

It is the responsibility of the company to ensure that the measured data is:

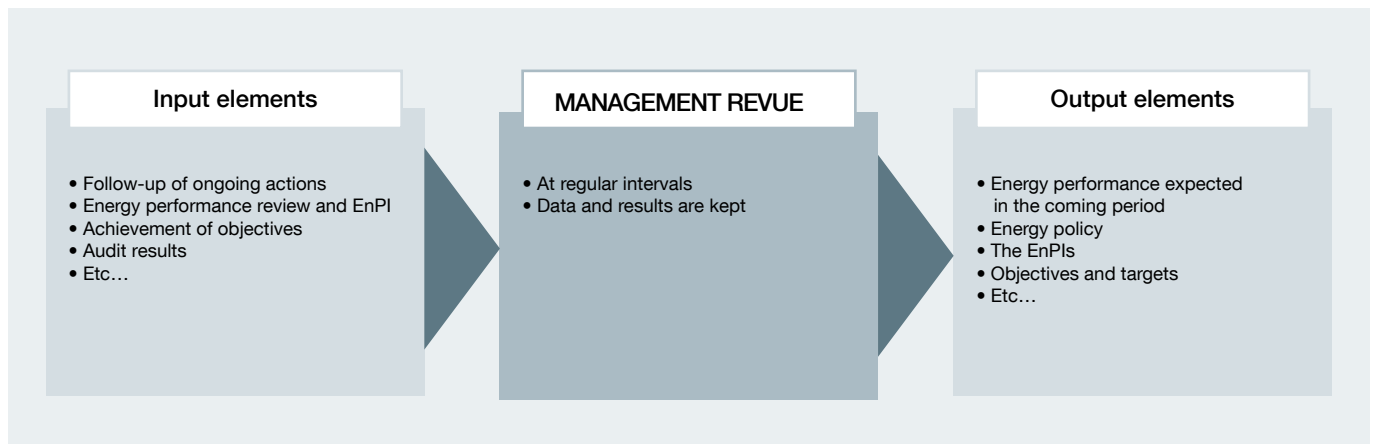
- analysed and revised to respond to significant deviations,
- accurate and repeatable, involving checks on devices,
- stored.

“The organization shall ensure that the equipment used for measurement of key characteristics provides data which are accurate and repeatable”.

Source ISO 50001

Act - Management review

The management review is used to decide on the actions to be taken as part of continuous improvement.



“The organization shall continually improve the suitability, adequacy and effectiveness of the EnMS. The organization shall demonstrate continual energy performance improvement”.

Source ISO 50001

Energy data collection plan

Example of a measurement plan

There will be a measurement plan to accompany every step of the continual improvement process. The following example illustrates how to make a measurement plan throughout all the sequential iterations of the ISO 50001 continuous improvement cycle.

Iteration 0

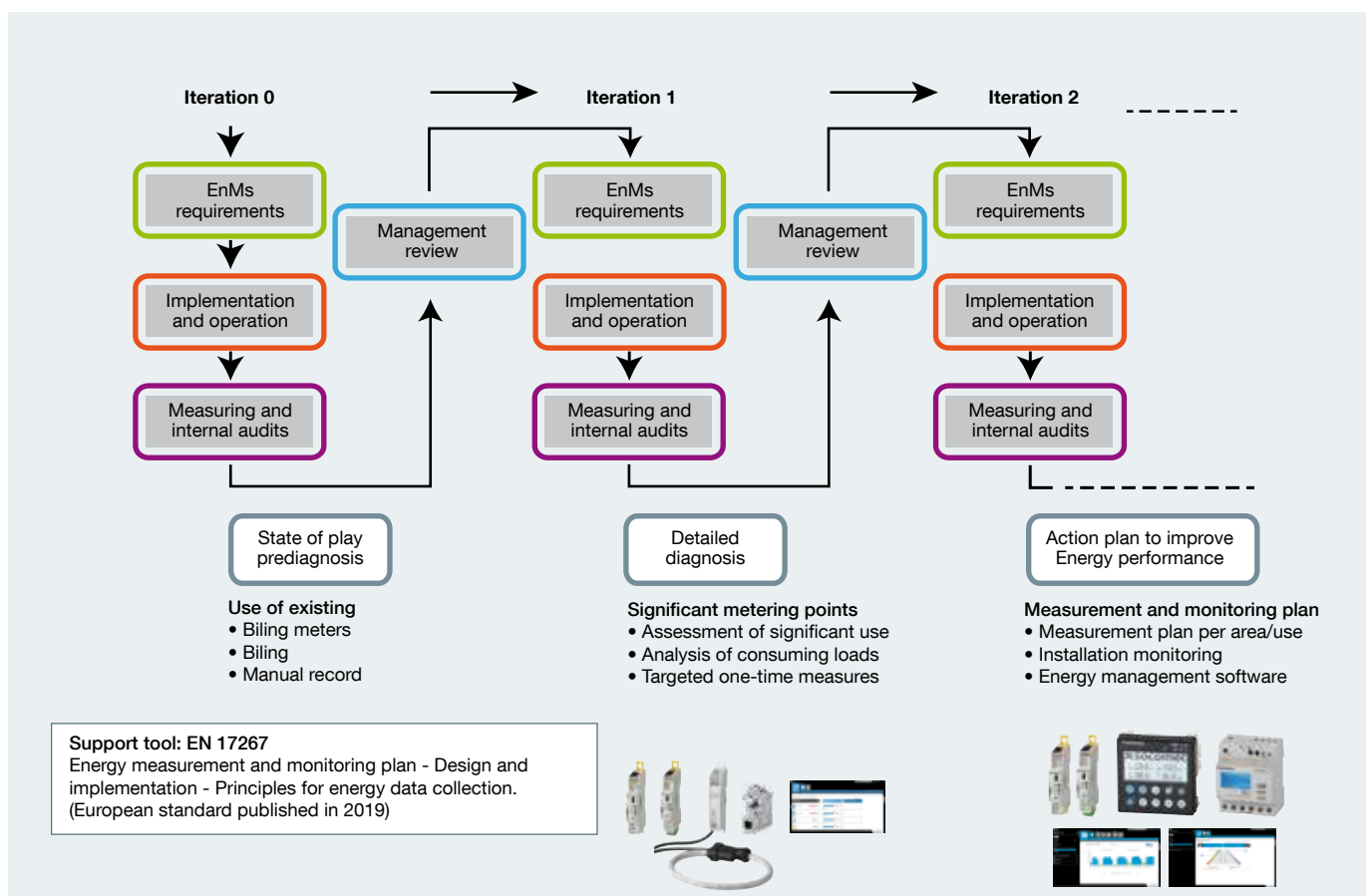
This usually involves establishing a pre-diagnosis based on studying the elements at hand: invoices, tariff meter indications. Actions to be implemented in this step include analysing this data. A manual record of consumption data can be added and, if necessary, one-time measures.

Iteration 1

At the end of this initial assessment, a detailed diagnosis will be done on the highest consuming areas or those which show the greatest potential in performance improvement. Measuring points will be set up so the company can analyse the largest uses (e.g. heating, air conditioning...) and the most consuming loads (e.g. an industrial process engine...). For electrical measurements, using split-core or flexible current sensors, for example, will bring flexibility for existing installations.

Iteration 2

Once the first references are established and the first actions completed, a comprehensive measurement plan is developed and implemented, to maintain performance in selected areas by way of continuous follow-up. As well as having its consumption analysed (kWh...), the electrical installation will be monitored (power, power factor, harmonic factors, etc.) using measurement devices. A DIRIS Digiware measurement system, with its diverse sensors (solid-core, flexible, split-core) and its flexibility allows to anticipate change in the number of measuring points during a continual improvement process. Digital inputs will also allow to measure multi-fluid consumption. An Energy Management Software (EMS) such as N'VIEW will become essential when the volume of data to collect, archive and analyse grows. The data could be provided to the different stakeholders of the project. This information will help support action plans, monitor their implementation, facilitate reviews and feed the documentation system.

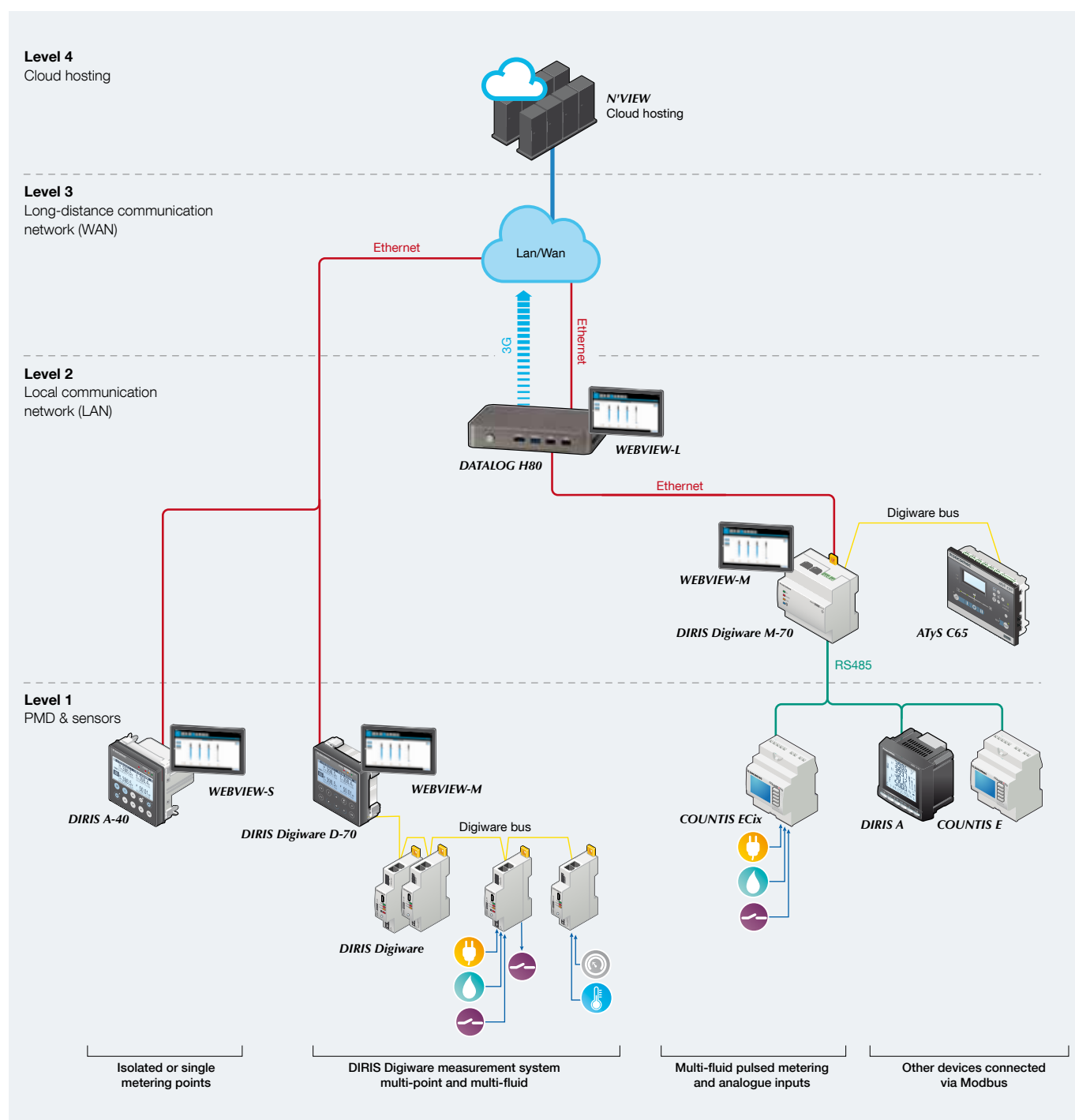


Energy data collection plan

Example of data collection and analysis in an ISO 50001 project

The company draws up a measurement plan to check its energy performance in a continuous improvement process.

- The flexible and scalable DIRIS Digiware measurement system enables the iterations of the measurement plan to be anticipated.
- The N'VIEW energy management software enables the collection and analysis of energy data.



Implementing ISO 50001

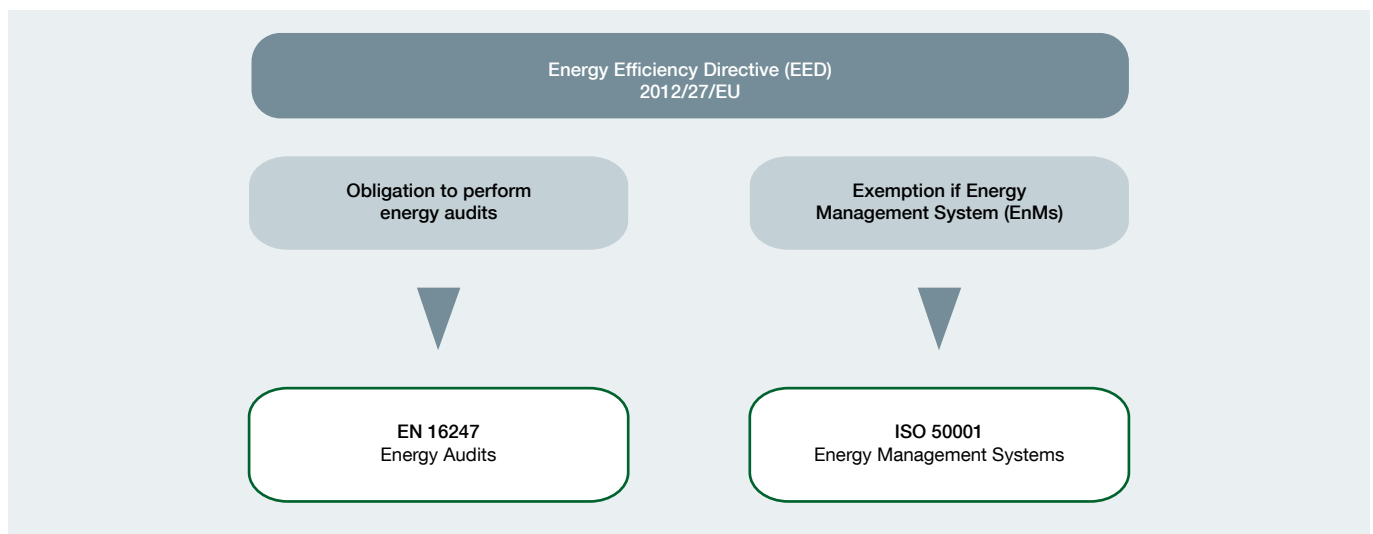
Time of implementation

It usually takes between 6 and 12 months to implement and to demonstrate that the energy management system works from the records required, with a typical expected return on investment of between 12 and 24 months.

ISO 50001 and EE Directive

The European energy efficiency directive 2012/27/EU sets out a requirement for performing an energy audit for large companies (staff of > 250 persons, a turnover of > €50 M and results of > €43 M). Carried out by independent experts, this energy audit must cover 80% of energy consumption and renewed every 4 years in compliance with standard EN 16247-1.

Companies implementing an energy management system certified by an independent body in accordance with standard ISO 50001, are not required to carry out an energy audit.



Country-dependent incentive devices

Some government policies grant subsidies to companies that implement an energy management system.

Here are a few examples:

In France, as part of its energy efficiency action programme, the government rewards those implementing ISO 50001 by awarding energy efficiency certificates (CEE).

ISO 50001 certification should be carried out by a certification body accredited by an accrediting body such as COFRAC.

In Germany, ISO 50001 certified companies benefit from a substantial reduction in, or even an exemption, from their renewable energy tax (German Renewable Energy Act (EEG)).

European directive 2012/27/EU stipulates mandatory energy audits in large companies.

ISO 50001 certified companies are exempted from this obligation.

In summary

Benefits

- Helps promote our corporate image
- Reduced environmental impact (carbon footprint).
- Concrete impact on energy quality and availability control.
- Energy savings.

Key points

- Top management leadership.
- Actions to address risks and opportunities.
- Continuous improvement strategy to develop systematic energy management.

Energy data collection plan

- Required to monitor, measure and analyse energy performance activity.
- This must evolve according to the maturity of the energy management system.

Socomec: our innovations supporting your energy performance

1 independent manufacturer

3,600 employees
worldwide

10 % of sales revenue
dedicated to R&D

400 experts
dedicated to service provision

Your power management expert



POWER
SWITCHING



POWER
MONITORING



POWER
CONVERSION



ENERGY
STORAGE



EXPERT
SERVICES

The specialist for critical applications

- Control, command of LV facilities
- Safety of persons and assets
- Measurement of electrical parameters
- Energy management
- Energy quality
- Energy availability
- Energy storage
- Prevention and repairs
- Measurement and analysis
- Optimisation
- Consultancy, commissioning and training

A worldwide presence

12 production sites

- France (x3)
- Italy (x2)
- Tunisia
- India
- China (x2)
- USA (x3)

28 subsidiaries and commercial locations

- Algeria • Australia • Belgium • China • Canada
- Dubai (United Arab Emirates) • France • Germany
- India • Indonesia • Italy • Ivory Coast • Netherlands
- Poland • Portugal • Romania • Serbia • Singapore
- Slovenia • South Africa • Spain • Switzerland
- Thailand • Tunisia • Turkey • UK • USA

80 countries

where our brand is distributed

HEAD OFFICE

SOCOMEK GROUP

SAS SOCOMEK capital 10 589 500 €
R.C.S. Strasbourg B 548 500 149
B.P. 60010 - 1, rue de Westhouse
F-67235 Benfeld Cedex
Tel. +33 3 88 57 41 41 - Fax +33 3 88 57 78 78
info.scp.isd@socomec.com

YOUR DISTRIBUTOR / PARTNER

www.socomec.com

