

D 27v18

ISO 50001 readiness version 2018

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Goal of the module: Readiness for implementation, certification, maintenance and improvement of your energy management system (ISO 50001) in order to:

- optimize the energy performance
- reduce your carbon footprint
- decrease your internal costs

1 Energy approach

1.1 History

Energy consumption worldwide continues to grow. It will likely double in the next decade.

Among other things, energy is the main cause of climate change and contributes significantly to the production of greenhouse gas (GHG) emissions.

The International Organization for Standardization (ISO) was founded in 1947. ISO comes from the Greek "isos" (equal). The first energy management system standards date back to the early 2000s:

- ANSI/MSE 2000, A Management System for Energy, USA, 2000
- DS 2403, Energy Management – Specification, Denmark, 2001
- SS 627750, Energy Management System, Sweden, 2003
- IS 393, Energy Management Systems - Requirements With Guidance For Use, Ireland, 2005
- BP X30-120: Energy Diagnostics in Industry, France, 2006
- Directive 2006/32/EC on Energy End-Use Efficiency and Energy Services, EU, 2006
- UNE 216301, Energy management system. Requests. Spain, 2007
- KSA 4000, South Korea, 2007
- GB/T 2331, China, 2009
- EN 16001, Energy Management Systems - Requirements with Implementation Guidance, Sweden, 2009
- SANS 879, South Africa, 2009
- Directive 2009/28/EC on the Promotion of Renewable Energy
- FD CEN/CLC/TR 16103, Energy Management and Energy Efficiency - Glossary of Terms, France, 2010
- EN 15900, Energy Efficiency Services - Definitions and Requirements, Italy, 2010
- ISO 50001, Energy Management Systems - Requirements with Implementation Guidance, 2011
- EN 16212, Energy Efficiency and Savings Calculation: Top-Down and Bottom-Up Methods, 2012
- EN 16231, Energy Efficiency Benchmarking Methodology, 2012
- SOR/94-651, Energy Efficiency Regulations, Canada, 2013
- FD X 30 147, Measurement Plan for Monitoring Energy Performance, 2015
- FD X30 148, Energy Performance Measurement and Verification: Good Practices for Calculating Energy Savings, 2016
- ISO 17743, Definition of a Methodological Framework for Calculating and Reporting Energy Savings, 2016
- ISO 50001, Energy Management Systems — Requirements with Guidance for Implementation, 2018
- EN 17267, Measurement Plan and Energy Monitoring, 2019
- IPMVP (International Performance Measurement and Verification Protocol), 2019
- NF EN 16247-1, Energy Audits - Part 1: General Requirements, 2022

1.2 Implementation

The ISO 50001 standard is generic because it applies to the energy management system of any company, regardless of size, activity, or type. It is an international voluntary standard that allows certification by an accredited (certification) body.

More than a standard, ISO 50001 is an ongoing management commitment to energy effectiveness, environmental responsibility and sustainable development. This commitment requires a long-term investment of time and resources.

The standard does not set energy performance objectives.

All energy sources are covered: electricity, fuel, natural gas, steam, heat, compressed air, etc.

No distinction should be made between renewable and other energy sources.

The international unit of measurement for energy is the joule (J).

Energy performance comprises three distinct components, the measurable results of which are shown in figure 1-1:

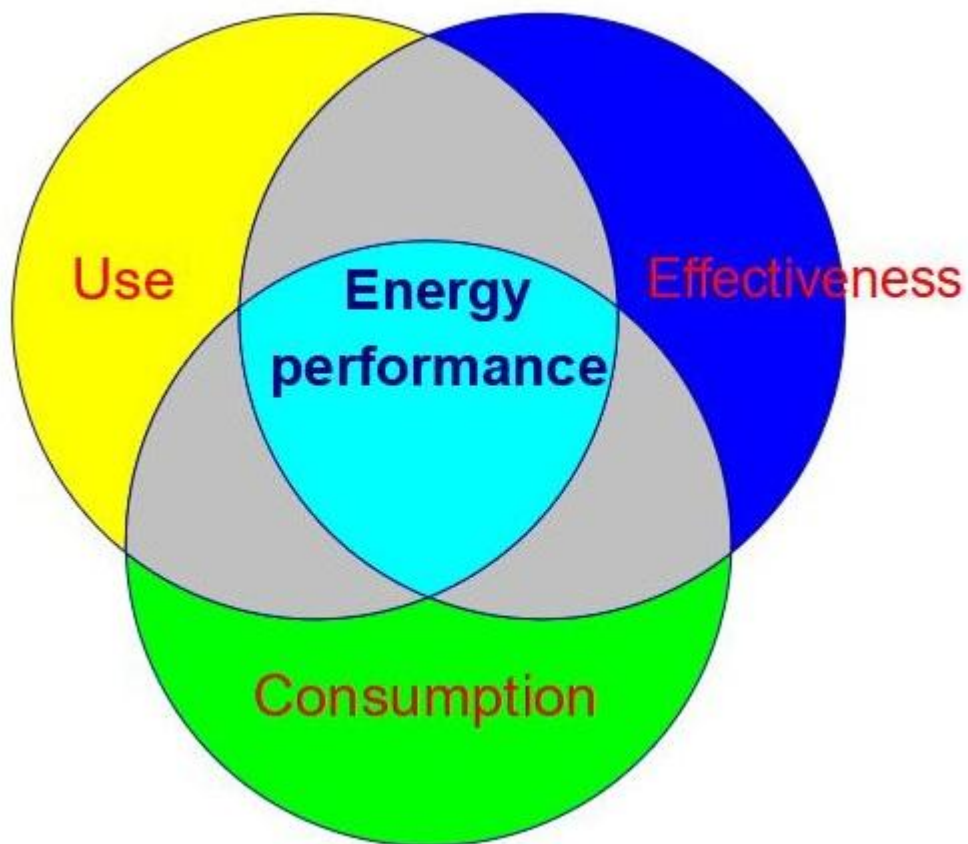


Figure 1-1. Components of energy performance

Energy usage includes, for example:

- powering production lines
- heating
- lighting
- ventilation
- cooling
- transportation
- processing

Energy effectiveness is, for example, the ratio between the energy required and the energy consumed.

Reference consumption serves as a quantified basis for comparing energy performance.

The ISO 50001 standard enables activities such as:

- establishing an energy policy
- defining energy objectives and targets
- analyzing energy performance
- making fact-based decisions
- monitoring and measuring performance
- evaluating results
- assessing compliance with legal requirements
- continually improving your EnMS

1.3 Principles and steps

Energy performance is a journey, not a destination

The energy approach is a mindset that begins with top management as a strategic decision and extends to all staff. Top management develops an energy policy, which sets objectives that are applicable to all activities. The tool used to achieve these objectives is the energy management system (EnMS). Optimizing daily energy consumption is the essential concept of the EnMS.

The seven quality management principles (see figure 1-2) will help us achieve sustainable performance (see ISO 9000:2015, § 2.3). Previously, there were eight principles, but now the system approach is integrated into the process approach.

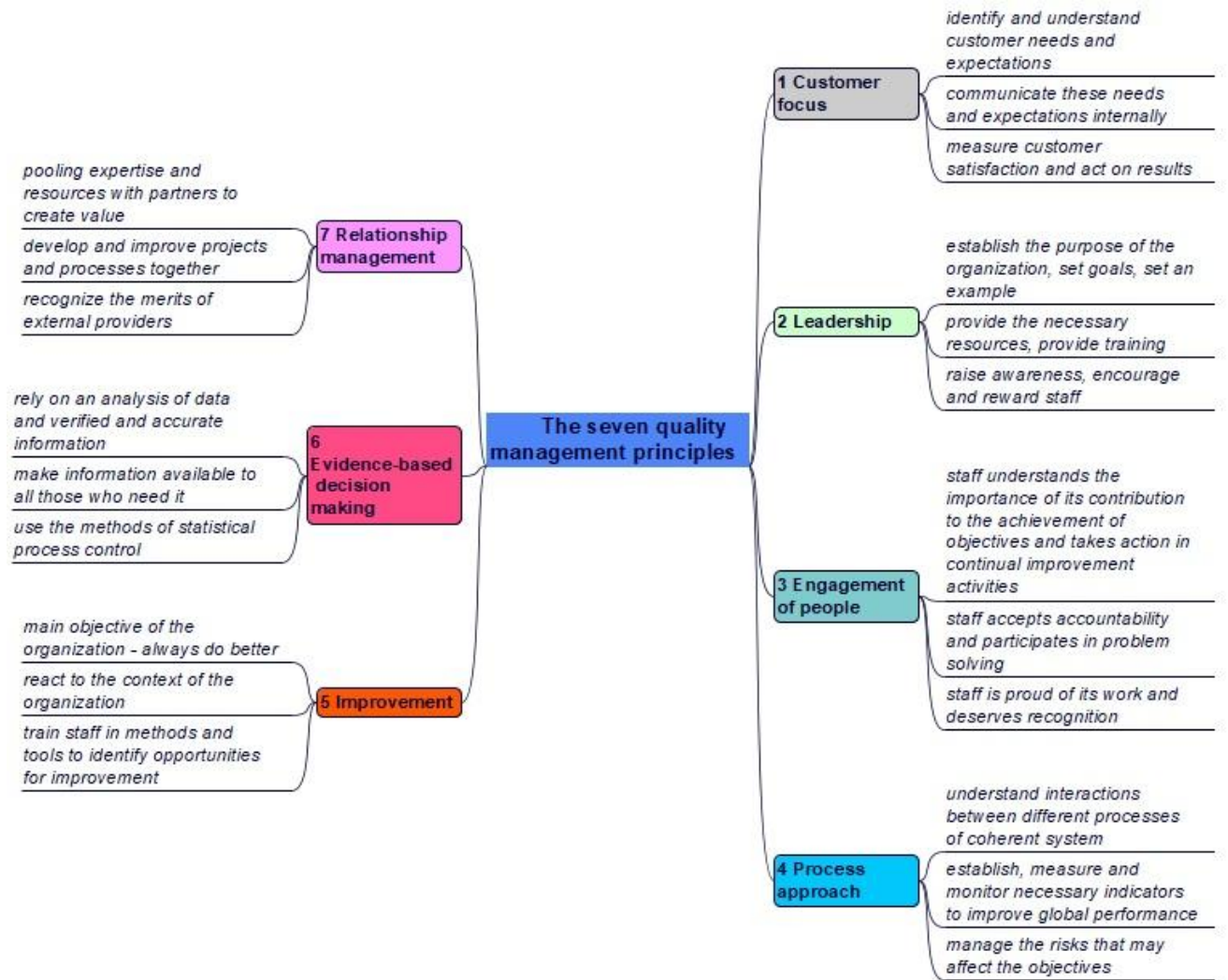


Figure 1-2. The seven quality management principles

A well-prepared approach is halfway to success

The approach to implementing an energy management system starts with preparation. An example is shown in figure 1-3.

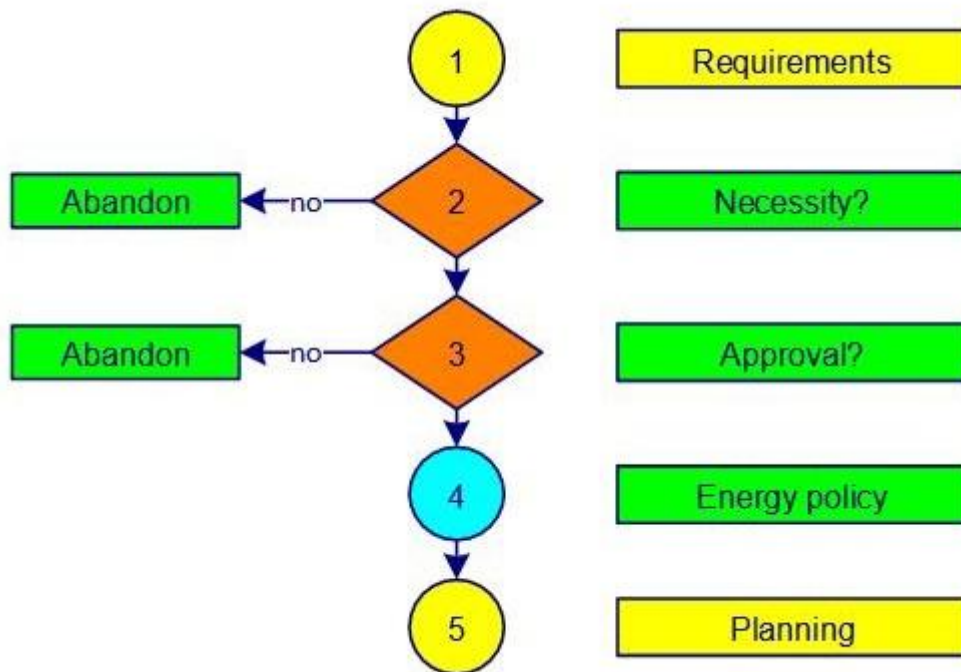


Figure 1-3. EnMS preparation

Step 1 involves identifying the needs and expectations (**requirements**) of stakeholders:

- staff
- customers, consumers
- competitors
- shareholders, investors
- external providers (suppliers, subcontractors, partners)
- organizations and branch associations
- statutory and regulatory authorities

The involvement of top management at its highest level is truly indispensable. The advice of a consultant is often solicited. Determining the current status of the management system (whole or partial) would be welcome at this stage. An external certification body is chosen.

One of the key questions that comes up quickly (**step 2**) is the **necessity** for this decision. If this is not really necessary or if the estimated costs of the certification approach exceed the available resources, it is better to reject this idea immediately.

The ISO 9000 family of standards will stop you making promises you can't fulfil and help you keep those you can. David Hoyle

The benefits of implementing an energy management system are often:

- an improved image of the company
- being one step ahead of the competition
- establish energy performance inspection and analysis activities
- be recognized as an environmental protection player
- unite staff around environmental protection
- promote greenhouse gas emission reduction projects
- reduce its ecological footprint

- facilitate communication on energy resource management
- foster a corporate culture based on efficiency and innovation
- apply innovations to make processes less energy-intensive
- prioritize the implementation of new high-energy performance technologies
- achieve a rapid return on investment
- provide a framework for improving energy efficiency
- ensure the company's sustainability
- optimize energy effectiveness throughout the supply chain
- make decisions based on relevant data
- promote best practices in energy consumption
- continuously seek to improve energy efficiency
- reduce its energy bills
- raise awareness and involve staff who are consulted, motivated and proud
- keep its legal obligations up to date

The benefits of the certification of an energy management system are often:

- new customers
- increased market share
- better financial performance because energy management is synonymous with efficiency and therefore, savings

More than one and a half million businesses worldwide cannot be wrong!

True story

The Hilton Group, one of the world's largest hotel chains, was the first company in the industry to obtain ISO 50001 certification for its entire portfolio. This was achieved after a complete overhaul of its system for measuring the group's performance.

The Hilton Group achieved significant savings, reducing its energy intensity by 20.6% and its carbon intensity by 30%.

"ISO 50001 has helped us validate the consistency of our energy management approach across all our properties. Since implementing the standard, energy management has remained a key focus for our management, and we continue to seek opportunities to further improve our performance." Maxime Verstraete, Vice President

The internalization of the spirit of the principles and requirements of an ISO standard significantly improves the overall performance of your business, especially when it is not considered as a constraint.

The **third step** shall determine whether this approach receives the **approval** of the staff. A communication campaign is launched in-house on the objectives of an energy management system (EnMS). The staff is aware and understands that, without their participation, the project cannot succeed.

Have confidence: success will come with the involvement and effort of all!

The vision (what we want to be), the mission (why we exist) and the business plan of the company are determined. The **following step (4)** includes the establishment of an outline of the **energy policy** and objectives. If you do not have a copy of the ISO 50001 standard, now is the time to get it (cf. sub-clause 2.1 of the present course).

Planning is the last **step (5)** of the project preparation for obtaining ISO 50001 certification. A reasonable period is between 5 to 8 months (each company is unique and specific). The financial resources and staff are confirmed by top management. An energy management team is appointed as project manager. Top management commitment is formalized in a document communicated to all staff. A person is appointed as project leader for obtaining ISO 50001 certification.

The establishment and implementation of an ISO 50001 energy management system are shown in figure 1-4.

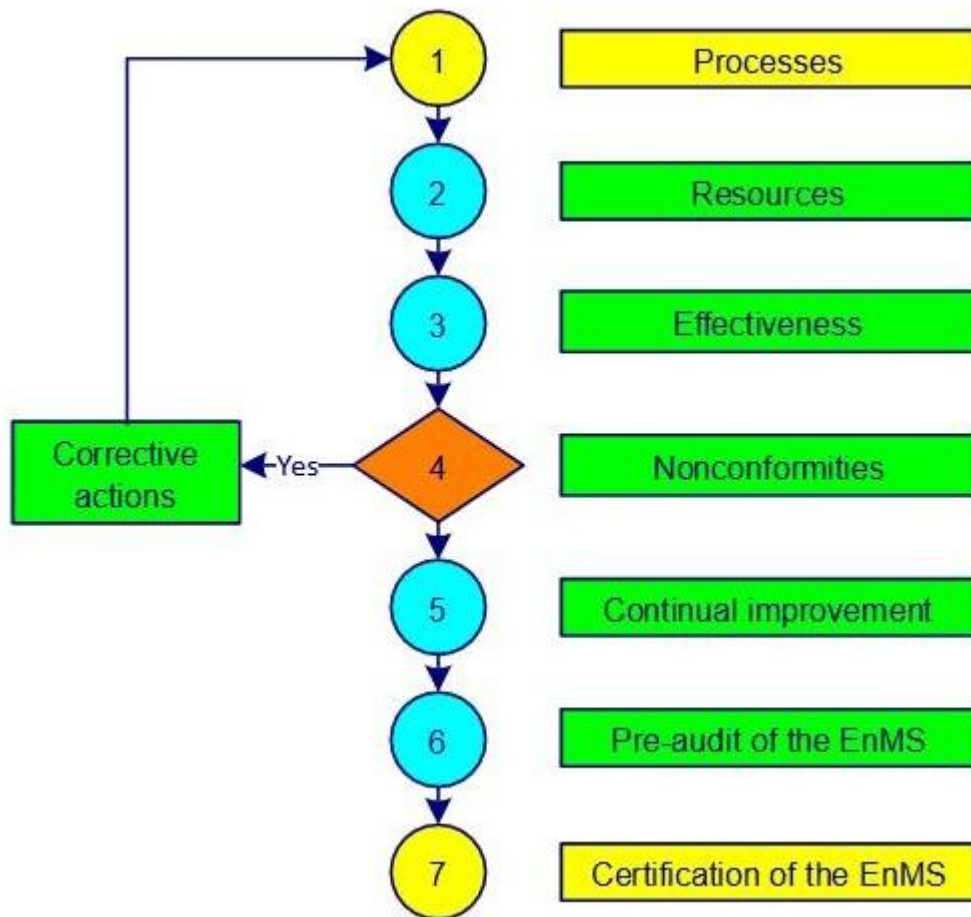


Figure 1-4. EnMS implementation

Step 1 aims to identify and determine the **processes**, interactions, owners, responsibilities and drafts of certain documents. The first versions of process sheets, job descriptions and work instructions are written with the participation of the maximum number of available persons.

The necessary **resources** to achieve the energy objectives are determined in **step 2**. Planning tasks, responsibilities and time frames are established. Training of internal auditors is taken into account.


Step 3 allows you to set and implement methods for measuring the **effectiveness** and efficiency of each process (**indicators**). Internal audits help to evaluate the degree of implementation of the system.

Nonconformities of all kinds are listed in **step 4**. A first draft for dealing with waste is established. Corrective actions are implemented and documented. A sorting out of corrective actions is introduced.

A first encounter with the tools and application areas of **continual improvement** is made in **step 5**. A table with the main costs of obtaining quality (COQ) is filled in by those with the information at hand. Risks are determined, actions are planned and opportunities for improvement are found. An approach to preventing nonconformities and eliminating causes is established. The internal and external communication is established and formalized.

To conduct the **pre-audit of the EnMS (step 6)**, the documentation is checked and approved by the appropriate people. A management review allows evaluation of compliance with applicable requirements. The energy policy and objectives are finalized. An energy manager from another company or a consultant can provide valuable feedback, suggestions and recommendations.

When the system is accurately implemented and followed, the **certification of the EnMS** by an external body is a breeze, a formality (**step 7**).

An example of a certification project plan with 26 steps is shown in [annex 01](#). 

An appropriate method for evaluating the performance of your energy management system is the RADAR logic model of excellence [EFQM](#) (European Foundation for Quality Management) with its nine criteria and overall score of 1000 points.

The Deming cycle (figure 1-5) is applied to control any process. The PDCA cycles (Plan, Do, Check, Act) are a universal base for continual improvement.

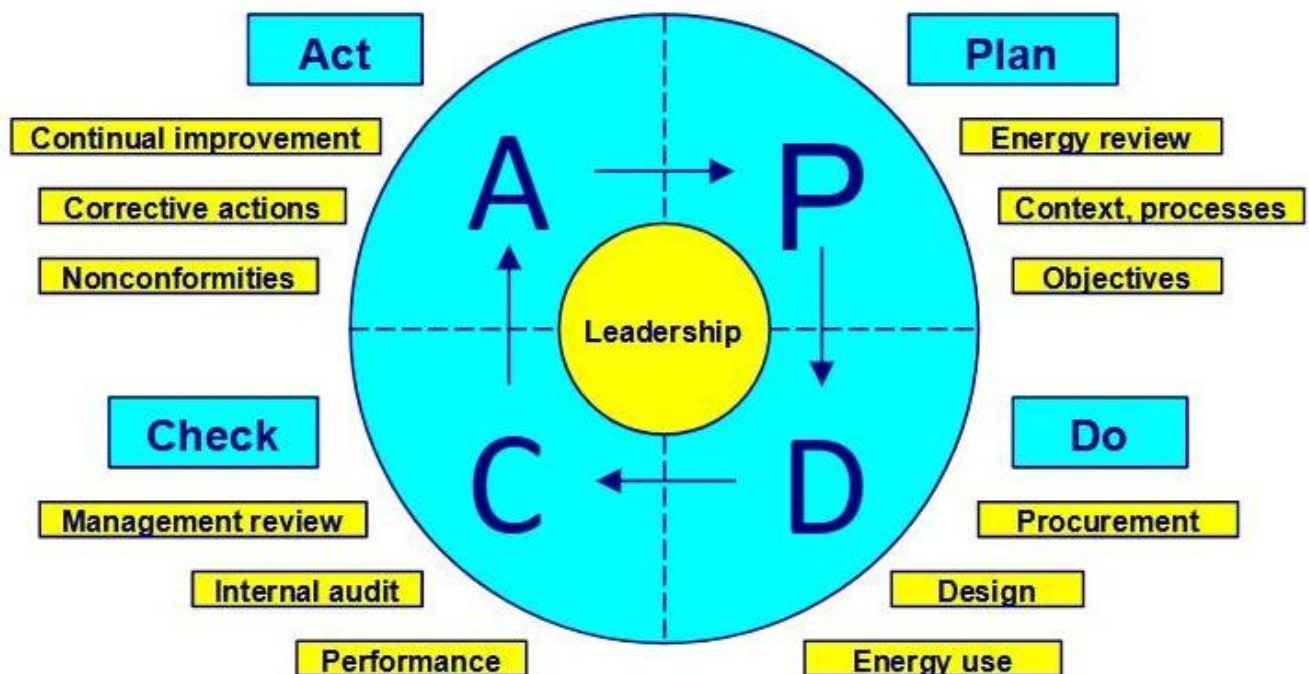


Figure 1-5. The Deming cycle

- Plan – define context, issues and processes, demonstrate leadership, realize energy review, establish energy policy and objectives (clauses 4, 5 and 6)

- Do – procure equipment, develop, implement and control processes, optimize energy uses, demonstrate leadership and bring support (clauses 5, 7 and 8)
- Check – compare, verify, evaluate, inspect, analyze data, conduct audits and management reviews and demonstrate leadership (clauses 5 and 9)
- Act – adapt, demonstrate leadership, treat nonconformities, react with corrective actions and find new improvements (new PDCA), (clauses 5 and 10)

For more information on the Deming cycle and its 14 points of management theory, you can consult the classic book "Out of the crisis", W. Edwards Deming, MIT press, 1982.

2 Standards, definitions, books

2.1 Standards



The ISO 50001 family mainly includes the standards:

- [ISO 50001](#) (2018), Energy management systems – Requirements with guidance for implementation
- [ISO 50002](#) (2014), Energy audits – Requirements with guidance for use
- [ISO 50003](#) (2021), Energy management systems – Requirements for bodies providing audit and certification of energy management systems
- [ISO 50004](#) (2020), Energy management systems – Guidelines for implementing, maintaining, and improving an energy management system
- [ISO 50005](#) (2021), Energy management systems – Guidelines for phased implementation
- [ISO 50006](#) (2023), Energy management systems — Evaluating energy performance using energy performance indicators and energy baselines
- [ISO 50007](#) (2017), Energy services — Guidelines for the assessment and improvement of the energy service to users
- [ISO 50015](#) (2014), Energy Management Systems – Measurement and verification of the energy performance of organizations – General principles and recommendations
- [ISO 50046](#) (2019), General methods for estimating energy savings
- [ISO 50047](#) (2016), Energy Saving – Determining energy savings in organizations

ISO standards (over 22,000) are used in countless fields and are recognized worldwide.

The ISO 9000 family of standards includes three essential booklets (and guidelines):

- [ISO 9000](#) (2015): Quality management systems – Fundamentals and vocabulary
- [ISO 9001](#) (2015): Quality management systems – Requirements
- [ISO/TS 9002](#) (2016): Quality management systems – Guidelines for the application of ISO 9001:2015
- [ISO 9004](#) (2018): Quality management – Quality of an organization – Guidelines for achieving sustained performance

A standard added in 2002 (and revised in 2018) is:

[ISO 19011](#) (2018): “Guidelines for auditing management systems”

[ISO 31000](#):2018 “Risk management – Guidelines” establishes the principles and process risk management, risk assessment, and risk treatment.

Three French documents related to best practices and processes with explanations, recommendations, and examples:

- [AC X50-178](#) (agreement, 2002) Quality Management – Process Management – Best Practices and Feedback
- [BP X30-120](#) (Best Practices, 2006) Energy – Energy Diagnostics in Industry
- [FD X50-176](#) (documentation booklet, 2017) Management Tools – Process Management

The NF [EN 17267](#) (2019) standard “Energy Measurement and Monitoring Plan – Design and Implementation – Principles for Collecting Energy Data” specifies the requirements and principles for the design and implementation of an energy measurement and monitoring plan.

[ISO 37301](#) (2021) "Compliance management systems — Requirements with guidance for implementation" helps you comply with laws, regulations, and ethical standards and reduce risks.

All of these standards and many others can be ordered (in electronic or paper format) from the [AFNOR](#) (French Association for Standardization) website in the shop, catalog, standards section, or from the [ISO](#) website.

More than 28,000 standards (in English and other languages) are available free of charge on [Public.resource.org](#).

The new versions of ISO 9001 and ISO 9000 were published in September 2015.

2.2 Definitions

The beginning of wisdom is the definition of terms. Socrates

Specific quality and energy terms:

Competence: *personal skills, knowledge and experiences*

Conformity: *fulfillment of a specified requirement*

Corrective action: *action to eliminate the causes of nonconformity or any other undesirable event and to prevent their recurrence*

Customer: *anyone who receives a product*

Customer satisfaction: *top priority objective of every quality management system related to the satisfaction of customer requirements*

Documented information: *any support allowing the treatment of information*

Effectiveness: *capacity to realize planned activities with minimum effort*

Efficiency: *financial relationship between achieved results and used resources*

Energy baseline (EnB): *quantified reference of energy performance*

Energy management system (EnMS): *set of processes allowing energy objectives to be achieved*

Energy manager: *leader in the journey towards energy excellence*

Energy performance: *measurable result of energy consumption, use and effectiveness*

Energy performance indicator (EnPI): *value of a parameter, allowing energy performance to be measured*

Energy review: *analysis of energy performance to identify opportunities for improvement*

External provider (supplier): *an entity that provides a product*

Indicator (target): *value of a parameter, associated with an objective, allowing the objective measure of its effectiveness*

Management system: *set of processes allowing objectives to be achieved*

Nonconformity: *non-fulfillment of a specified requirement*

Organization (company): *a structure that satisfies a need*

Procedure: *document describing the actions to be taken to carry out a process*

Process: *activities that transform inputs into outputs*

Product (or service): *every result of a process or activity*

Quality: *aptitude to fulfill requirements*

Quality management: *activities allowing the control of a company with regard to quality*

Quality objective: *quality related, measurable goal that must be achieved*

Requirement: *explicit or implicit need or expectation*

Risk: *likelihood of occurrence of a threat or an opportunity*

Significant energy use (SEU): *significant part of consumption with potential for improvement*

Stakeholder: *person, group or company affected by the impacts of an organization*

Top management: *group or persons in charge of the company's control at the highest level*

In the terminology of management systems, do not confuse:

- accident and incident
 - an accident is an unexpected serious event
 - an incident is an event that can lead to an accident
- anomaly, defect, dysfunction, failure, nonconformity, reject and waste:
 - anomaly is a deviation from what is expected
 - defect is the non-fulfillment of a requirement related to an intended use
 - dysfunction is a degraded function that can lead to a failure
 - failure is when a function has become unfit
 - nonconformity is the non-fulfillment of a requirement in production
 - reject is a nonconforming product that will be destroyed
 - waste is when there are added costs but no value
- audit program and plan
 - an audit program is the annual planning of the audits
 - an audit plan is the description of the audit activities
- audit, inspection, auditee and auditor
 - an audit is the process of obtaining audit evidence
 - an inspection is the conformity verification of a process or product
 - an auditee is the one who is audited
 - an auditor is the one who conducts the audit
- control and optimize
 - control is meeting the objectives
 - optimize is searching for the best possible results
- customer, external provider and subcontractor
 - a customer receives a product
 - an external provider provides a product on which specific work is done
 - a subcontractor provides a service or product on which specific work is done
- effectiveness and efficiency
 - effectiveness is the level of achievement of planned results
 - efficiency is the ratio between results and resources
- energy review, internal audit and management review
 - energy review is the analysis of energy consumption
 - internal audit is the assessment of the compliance of the EnMS
 - management review is the assessment of the effectiveness of the EnMS
- follow-up and review
 - follow-up is the verification of the obtained results of an action
 - review is the analysis of the effectiveness in achieving objectives
- inform and communicate
 - to inform is to give someone meaningful data
 - to communicate is to pass on a message, to listen to the reaction and discuss
- objective and indicator
 - an objective is a sought after commitment
 - an indicator is the information on the difference between the pre-set objective and the achieved result
- organization and enterprise, society, company



- organization is the term used by the ISO 50001 standard as the entity between the supplier and the customer
 - an enterprise, society and company are examples of organizations
- process, procedure, product, activity and task
 - a process is how we satisfy the customer using people to achieve the objectives
 - a procedure is the description of how we should conform to the rules
 - a product is the result of a process
 - an activity is a set of tasks
 - a task is a sequence of simple operations



Remark 1: the use of ISO 50001 definitions is recommended. The most important thing is to determine a common and unequivocal vocabulary for everyone in the company.

Remark 2: the customer can also be the user, the beneficiary, the trigger, the ordering party or the consumer.

Remark 3: between indicator and target our preference is for indicator.

Remark 4: between stakeholder and interested party our preference is for stakeholder.

Remark 5: documented information is any information that we must maintain (procedure ) or retain (record .

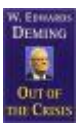


For other definitions, comments, explanations and interpretations that you don't find in this module and in [annex 06](#), you can consult:  












- ISO [Online Browsing platform](#) (OBP)
- IEC [Electropedia](#)
- [ISO 9000](#): 2015 - Quality management systems. Fundamentals and vocabulary, (ISO, 2015)

2.3 Books



Books for further reading on quality and energy:

-  Edwards Deming, [Out of the Crisis](#), MIT Press, 1982
-  Eliyahu Goldratt, Jeff Cox, [The Goal, A Process of Ongoing Improvement](#), North River Press, 1984
-  Masaaki Imai, [KAIZEN, The Key to Japan's Competitive Success](#), McGraw-Hill, 1986

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 • James Harrington, [Poor-Quality Cost](#), Dekker, 1987
- 
 • Larry Webber, Michael Wallace, [Quality Control for Dummies](#), Wiley, 2007
- 
 • Johannes Kals, [ISO 50001 Energy Management Systems: What Managers Need to Know About Energy and Business Administration](#), Business Expert Press, 2015
- 
 • Gerrit Schutz, [Computer-Aided Assistance of an Energy Management System for ISO 50001](#), Lambert, 2019
- 
 • Alan Field, [Iso 50001: A Strategic Guide to Establishing an Energy Management System](#), IT Governance, 2019
- 
 • Ramesh Lakhe et al, [ISO 50001:2018 Energy Management System Requirements & Implementation](#), 2019
- 
 • The Art of Service, [ISO 50001 A Complete Guide - 2021 Edition](#), The Art of Service, 2020
- 
 • Waqas Imam, [ISO 50001 - Fundamentals of Energy Management System \(EnMS\): An Expert Overview of the Energy Management System \(EnMS\) along with ISO 50001:2018 context analysis, and clauses](#), Exoexcellence, 2021
- 
 • Kris Hermans, [Mastering ISO 50001: A Comprehensive Guide To Understand And Implement The ISO 50001 Standard](#), Independently published, 2023
- 
 • Fabricio Silva, [ISO 50001 Energy Management: Guidelines for Independent Implementation](#), Independently published, 2024
- 
 • Gerardus Blokdyk, [The Operational Excellence Library; Mastering ISO 50001 Energy Management](#), 5STARCOoks, 2024


**When I think of all the books still left for me to read, I am certain of further happiness.
Jules Renard**

3 Process approach

3.1 Process

If you cannot describe what you are doing as a process, you do not know what you're doing. Edwards Deming

The word process comes from the Latin root *procedere* = go, development, progress (Pro = forward, *cedere* = go). Each process transforms inputs into outputs, creating added value and potential nuisances.


A process has three basic elements: inputs, activities and outputs. 

A process can be very complex (launch a rocket) or relatively simple (audit a product). A process is:


- repeatable
- foreseeable
- measurable
- definable
- dependent on its context
- responsible for its external providers

A process is, among other things, determined by its:

- title and type
- purpose (why?)
- beneficiary (for whom?)
- scope and activities
- initiators
- documentation
- inputs
- outputs (intentional and not intentional)
- restraints
- people
- material resources
- objectives and indicators
- person in charge (owner) and actors (participants)
- means of inspection (monitoring, measurement)
- mapping
- interaction with other processes
- risks and potential deviations
- opportunities for continual improvement

A process review is conducted periodically by the process owner (cf. [annex 02](#)). 

Review: *a survey of a file, product or process so as to verify if pre-set objectives are achieved*

The components of a process are shown in figure 3-1: 

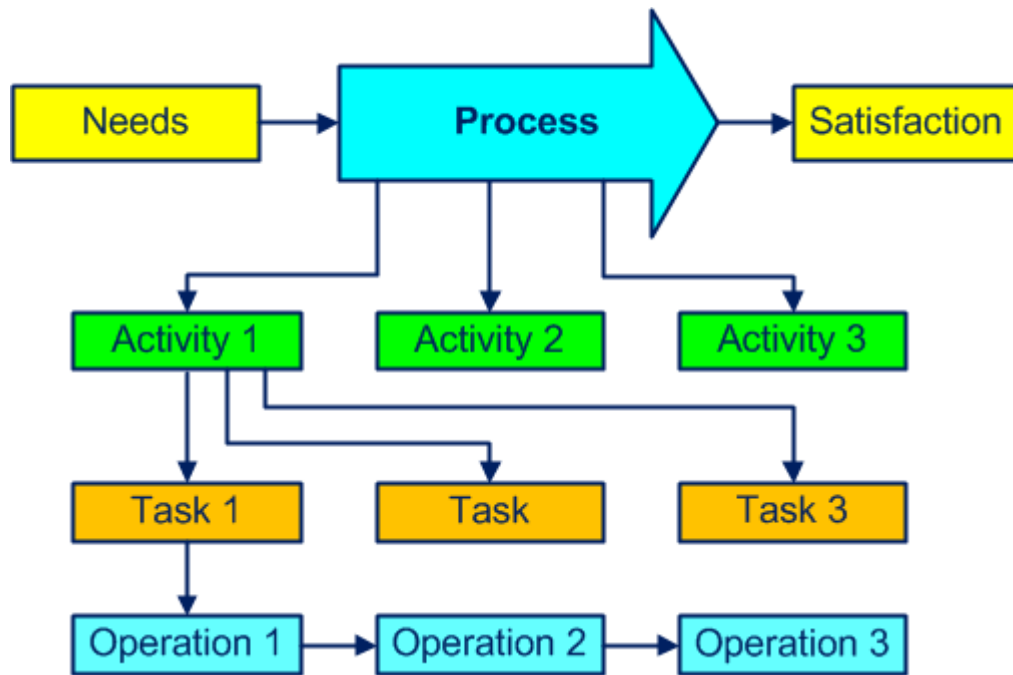


Figure 3-1. Components of a process

Figure 3-2 shows an example that helps to answer some questions:

- which materials, which documents, which tooling? (inputs)
- which title, what objective, which activities, requirements, constraints? (process)
- which products, which documents? (outputs)
- how, which inspections? (methods)
- what is the level of performance? (indicators)
- who, with what competence? (people)
- with what, which machines, which equipment? (material resources)

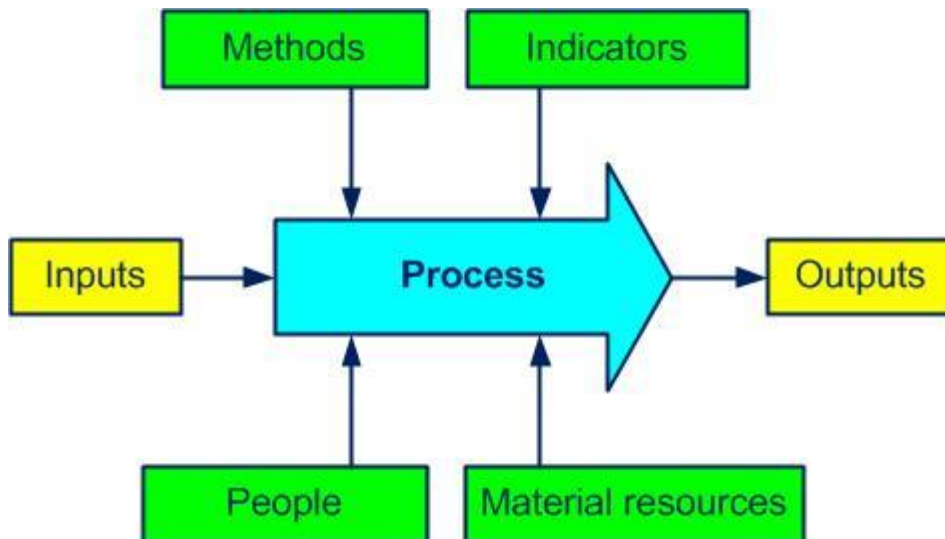



Figure 3-2. Some elements of a process

Often the output of a process is the input of the next process.

You can find some examples of process sheets in the document pack [D 02](#) and a list of processes in [annex 03](#). 

Any organization (company) can be considered as a macro process, with its purpose, its inputs (customer needs and expectations) and its outputs (products/services to meet customer requirements).

Our preference is to identify a process using a verb (buy, produce, sell) instead of a noun (purchases, production, sales) to differentiate the process from the company's department or procedure and recall the purpose of the process.

The processes are (as we shall see in the following paragraphs) of management, realization and support types. Do not attach too much importance to process categorizing (sometimes it's very relative) but ensure that all the company's activities at least fall into one process.

3.1.1 Management processes

Management processes are also known as piloting, decision, key or major processes. They take part in the overall organization and include elaboration of the policy, deployment of the objectives and all needed checks. They are the glue of all the realization and support processes.

The following processes can be part of this family:

- develop strategy
- develop policy
- deploy objectives
- plan the EnMS
- acquire and manage resources
- address risks
- establish process ownership
- conduct an audit
- conduct management review
- communicate
- improve
- meet requirements

3.1.2 Realization processes

The realization (operational) processes are related to the product, increase the added value and contribute directly to customer satisfaction.

They are mainly:

- design
- plan SEUs
- purchase components
- produce
- assess compliance with legal requirements
- maintain equipment
- receive, store and deliver
- inspect
- control nonconformities
- implement corrective action
- plan energy review
- plan energy data collection

- sell products

3.1.3 Support processes

The support processes provide the resources necessary for the proper functioning of all other processes. They are not directly related to a contribution of the product's added value, but are still essential.

The support processes are often:

- control documentation
- acquire and maintain infrastructure
- provide training
- manage inspection means
- provide information
- manage staff
- keep accountability

3.2 Process mapping

Par excellence process “mapping” is a multidisciplinary work. This is not a formal requirement of the ISO 50001 standard but is always welcome.

The three types of processes and some interactions are shown in figure 3-3.

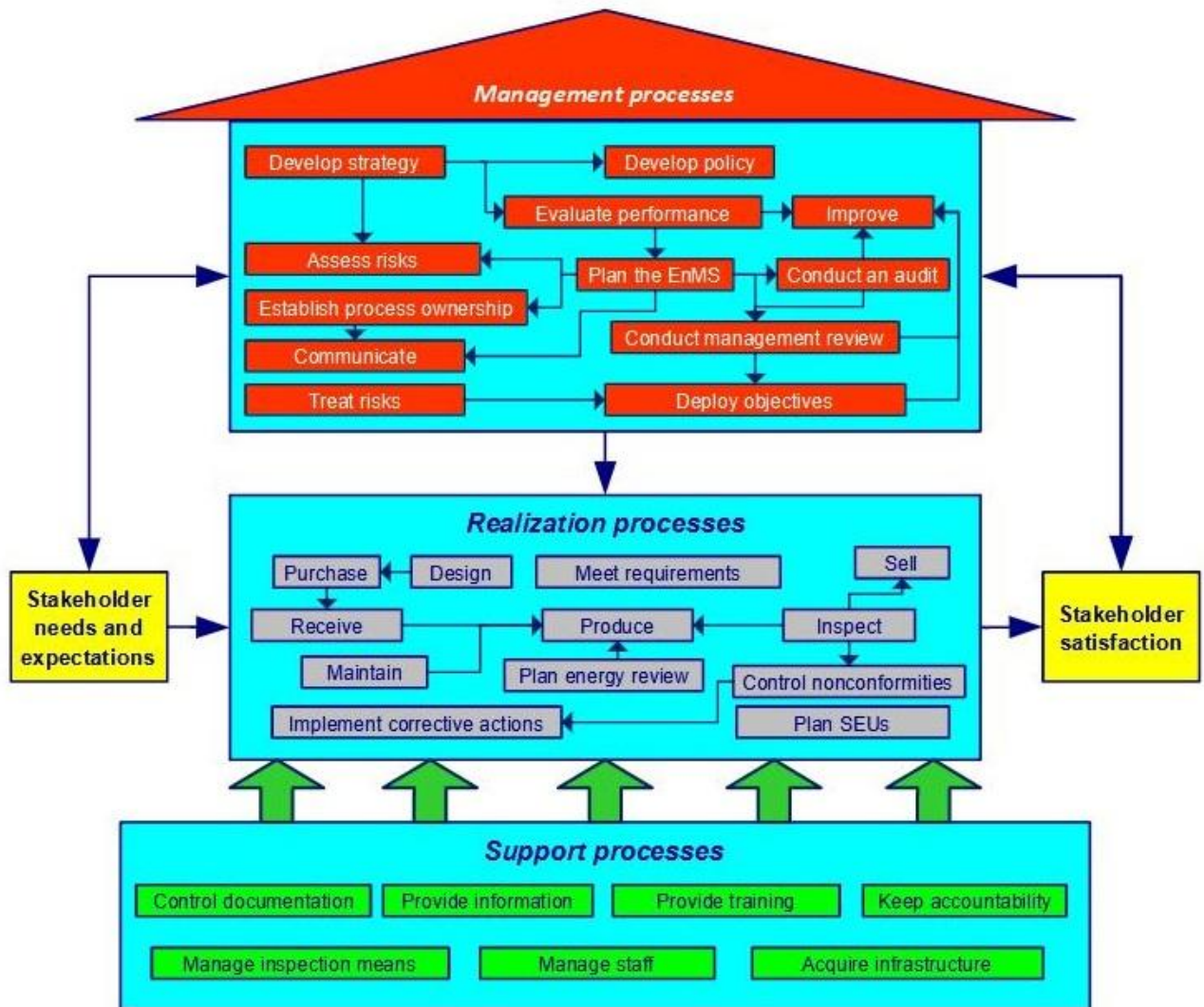


Figure 3-3. The process house

In the outputs, do not underestimate unwanted products such as rubbish, pollution and rejects.

Mapping, among other things, allows you to:

- obtain a global vision of the company
- identify the beneficiaries (customers), flows and interactions
- define rules (simple) for communication between processes

To obtain a clearer picture, you can simplify by using a total of about 15 core processes. A core process can contain several sub-processes: for example, the process "develop the

EnMS" can involve: 

- develop strategy
- develop policy
- address risks
- plan the EnMS
- deploy objectives
- acquire resources
- establish process ownership

- improve

Two other process examples (“design”, figure 3-4 and “produce”, figure 3-5) are:

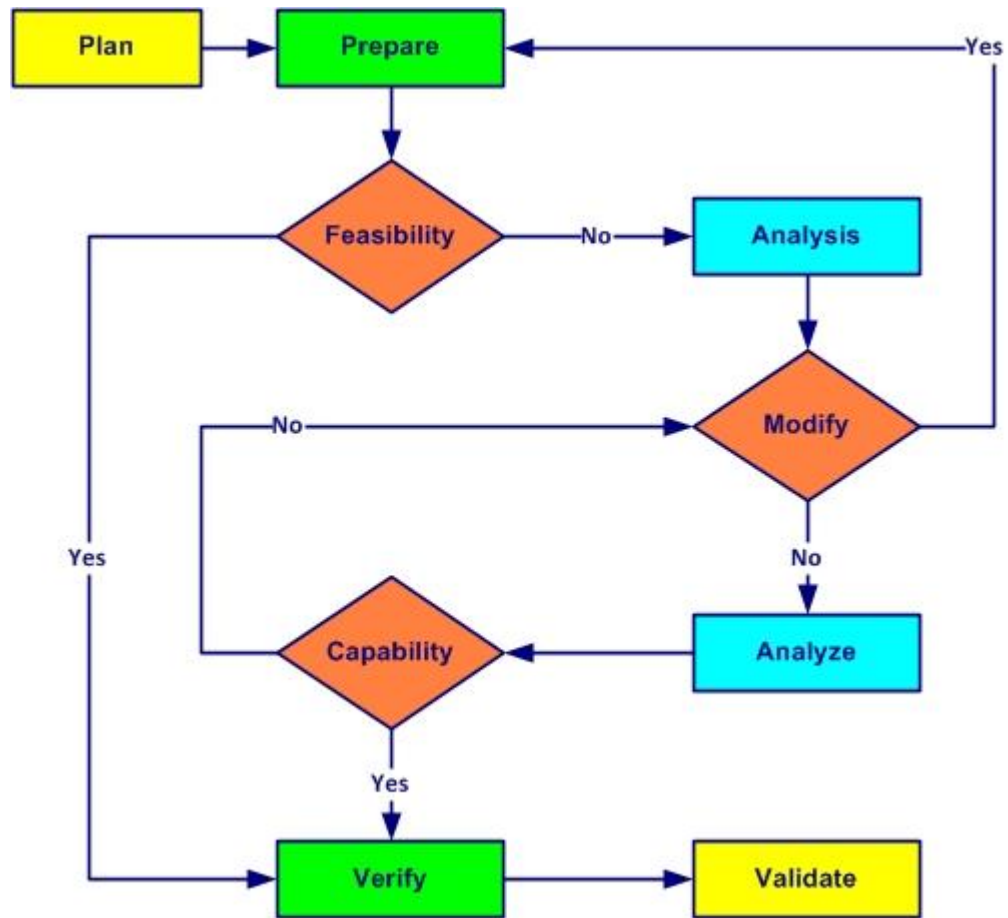


Figure 3-4. Design process

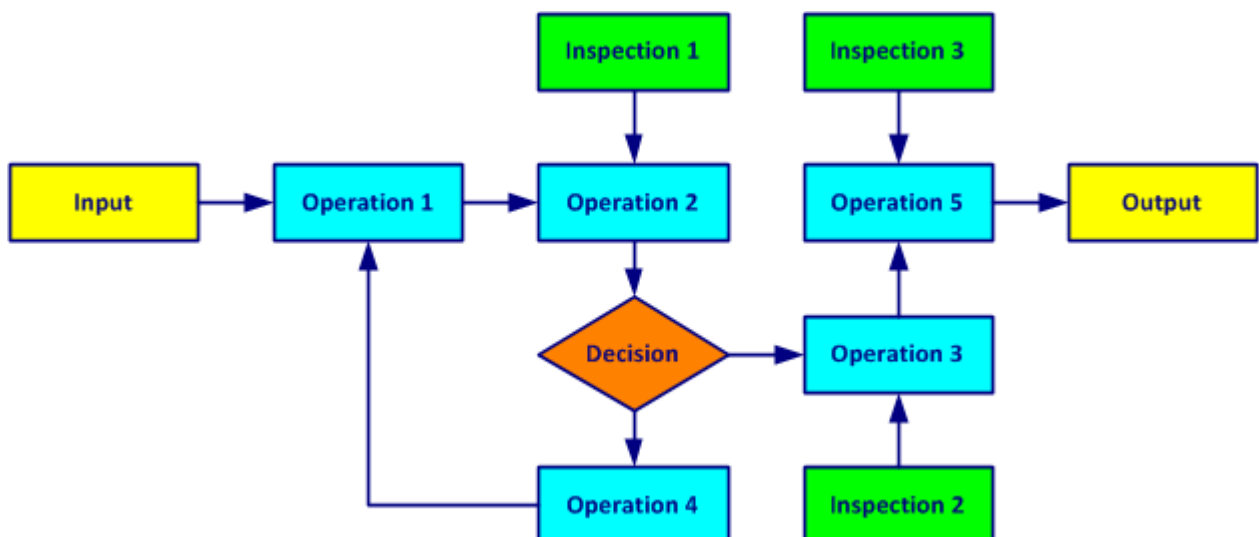



Figure 3-5. Produce process

3.3 Process approach

Simple solutions for now, perfection for later

The process approach contributes enormously to the efficient management of the company (cf. [annex 04](#)). 

Process approach: *management by the processes to better satisfy customers, improve the effectiveness of all processes and increase global efficiency*

When the process approach is integrated during the development, implementation and continual improvement of an energy management system, it allows one to achieve objectives that are related to energy performance optimization, as is shown in figure 3-6.

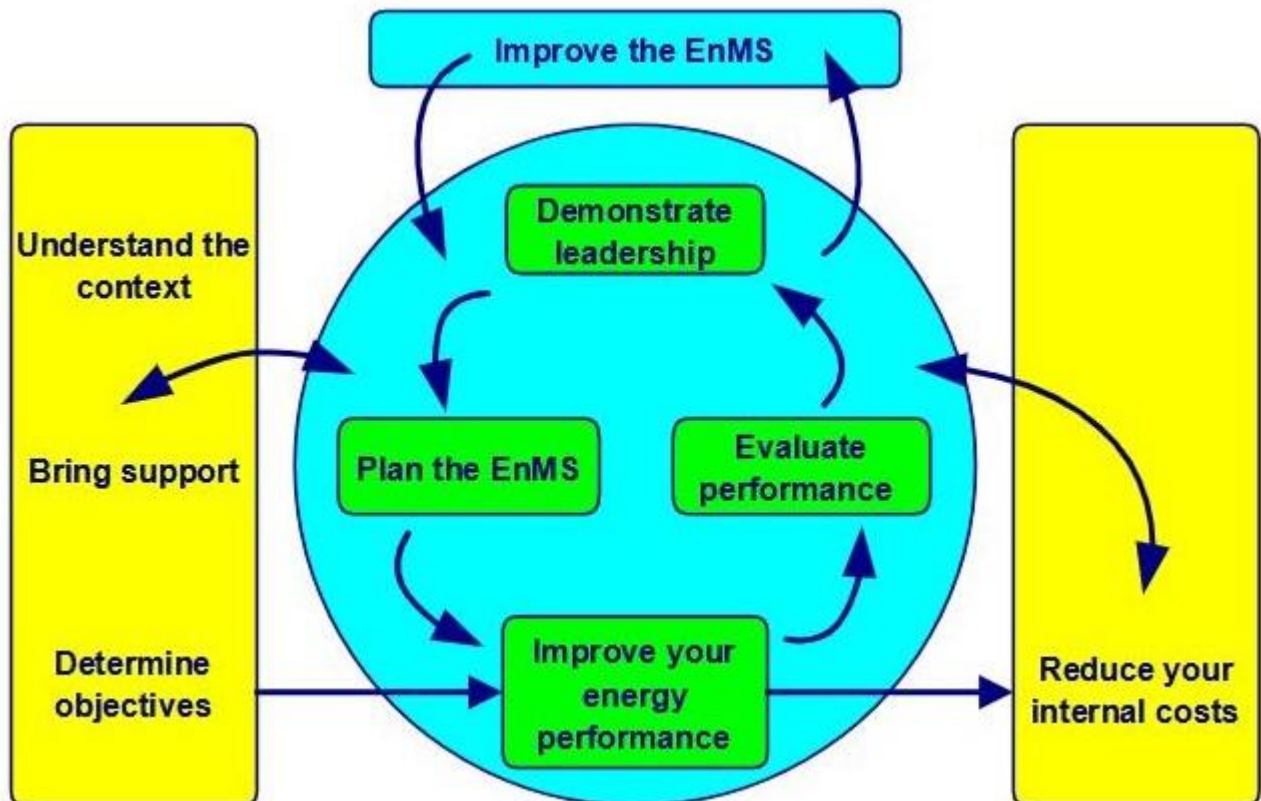


Figure 3-6. Model of an EnMS based on process approach and continual improvement

The process approach:

- emphasizes the importance of:
 - understanding and complying with stakeholder requirements
 - prevention so as to react to unwanted elements such as:
 - high energy bills
 - increasing energy consumption
 - measuring process performance, effectiveness and efficiency
 - permanently improving objectives based on pertinent measurements
 - process added value
- relies on:
 - methodical identification
 - interactions
 - the sequence and
 - process management, which consists of:
 - determining objectives and their indicators

- piloting related activities
 - analyzing obtained results
 - permanently undertaking improvements
- allows one to:
 - better view inputs and outputs and their relationship
 - clarify roles and responsibilities
 - judiciously assign necessary resources
 - break down barriers between departments
 - decrease costs, delays and waste
- and ensures in the long run:
 - control
 - monitoring and
 - continual improvement of processes

The process approach **is not**:

- crisis management ("You will not solve the problems by addressing the effects")
- blaming people ("Poor quality is the result of poor management." Masaaki Imai)
- prioritizing investments ("Use your brain, not your money." Taiichi Ohno)




4 Context

4.1 The organization and its context (requirements [1 to 2](#))

The two most important in a company do not appear in its balance sheet: its reputation and its people. Henry Ford

To successfully implement an energy management system, we must understand and evaluate everything that can influence the reason for being and business performance. You should think carefully about a few key activities:

- develop a thorough diagnosis of the unique context in which your company exists, taking into account:
 - external issues such as the environment like:
 - social
 - regulatory, standards, regulations
 - economic, energy costs
 - technological, energy types
 - restrictions on energy supply, security and reliability
 - effects of weather conditions
 - effects of climate change
 - effects of greenhouse gas (GHG) emissions
 - energy costs
 - availability of energy types
 - regulatory
 - internal issues like:
 - specific aspects of the corporate culture:
 - vision
 - rationale, purpose and mission
 - core values, sustainable development
 - personnel
 - products and services
 - infrastructure
 - mastery of energy management
 - mastery of existing technology
 - asset management plans
 - contingency plans in the event of energy supply interruption
 - financial resources
 - operational risks
- monitor and review regularly any information relating to external and internal issues
- analyze the factors that may influence the achievement of business objectives
- determine whether issues arise from climate change

The SWOT and PESTEL analyses can be useful for relevant analysis of business context (cf. [annex 05](#)). 

An example of a SWOT analysis is shown in figure 4-1:

Internal factors	
Strengths	Weaknesses
<ul style="list-style-type: none"> • specific ISO 50001 energy standard 	<ul style="list-style-type: none"> • too much independence in

<ul style="list-style-type: none"> improved financial results addressing supply chain issues relevant energy review securing production facilitated integration with QSE management systems reducing environmental impacts 	<ul style="list-style-type: none"> implementing the EnMS lack of staff involvement/availability (additional work) poor prioritization of investments inadequate monitoring tools excessively long process to implement the EnMS
External factors	
Opportunities	Threats
<ul style="list-style-type: none"> anticipating risks (rising energy prices, competitive environment) anticipating regulatory changes improving brand image government financial aid 	<ul style="list-style-type: none"> current economic environment unfavorable to investment tightening of energy regulations and policies

Figure 4-1. Energy SWOT analysis

A list of external and internal issues is carried out by a multidisciplinary team. Each issue is identified by its level of influence and control. Priority is given to issues with great influence and poor control.

Good practices

- diagnosis of the context includes the main external and internal issues*
- the core values as part of the corporate culture are taken into account in the context of the company*
- the results of the context analysis are widely diffused*
- the SWOT analysis includes many relevant examples*
- the SWOT analysis is a powerful tool for identifying the main threats and opportunities*

Bad practices

- the issues of the context of the company, such as the competitive environment, are not taken into account*
- in some cases, the corporate culture is not taken into account*
- risk analysis does not take into account strategic issues*
- no clear link between the SWOT analysis and the actions undertaken*

4.2 Stakeholders (requirements [3 to 9](#))

There is only one valid definition of a business purpose: to create a customer. Peter Drucker

To understand the needs and expectations of stakeholders, we must begin by determining those who may be affected by the energy management system, such as:

- employees
- customers
- external providers
- owners
- shareholders
- bankers
- distributors

- competitors
- citizens
- neighbors
- social and political organizations

A list of stakeholders is created by a multidisciplinary team. Every stakeholder is determined by its level of influence and control. Priority is given to stakeholders with great influence and poor control.

True story

The customer is king but we still can fight against rudeness. This example is taken from the restaurant La petite Syrah in Nice and its coffee prices:



"A coffee" 7 €
 "A coffee, please" 4,25 €
 "Hello, a coffee, please" 1,40 €

Anticipating the reasonable and relevant needs and expectations of stakeholders involves:

- meeting the legal and other requirements applicable to the EnMS
- meeting the requirements of the product or service offered
- preparing to address risks
- finding improvement opportunities

When a requirement is accepted, it becomes an internal requirement of the EnMS.

For more details on compliance management see the [ISO 37301](#) standard (see § 2.1).

Good practices


- *the list of stakeholders is updated*
- *the needs and expectations of stakeholders are established through meetings on-site, surveys, roundtables and meetings (monthly or frequent)*
- *the application of statutory and regulatory requirements is a prevention approach and not a constraint*

Bad practices

- *regulatory and legal requirements are not taken into account*
- *regulatory monitoring activities are not carried out regularly*
- *delivery times are not validated by the customer*
- *stakeholder expectations are not determined*
- *the list of stakeholders does not include their areas of activity*

4.3 Scope (requirements [10 to 15](#))

In many areas, the winner is the one who is best informed. André Muller

The scope (or in other words, the perimeter) of the energy management system is defined. When a requirement cannot be applied, a justification is included in the procedure that is maintained, cf. [annex 20](#). 

The specific context of the company is taken into account to determine the scope of the EnMS, including:

- issues (cf. sub-clause 4.1)
- products and services
- corporate culture
- environment:
 - social
 - financial
 - technology
 - economic
- requirements of stakeholders (cf. sub-clause 4.2)
- outsourced processes

Good practices

- *the scope is relevant and available upon request*
- *non-applicable requirements are justified in writing*

Bad practices

- *some products are outside the scope of the EnMS without justification*
- *the paint shop is not included in the scope of the EnMS*
- *the scope is obsolete (a new subsidiary is not included)*

4.4 Energy management system and its processes (requirements [16 to 17](#))



Quality management, in its essence, concerns the description of processes and their improvement. Isaac Getz

The requirements of the ISO 50001 standard include the:


- EnMS
- energy performance
- control of business processes
- continual improvement

To do this:

- the energy management system is:
 - established
 - documented (a simple and sufficient documentation system is set up)
 - implemented and
 - continually improved
- the energy policy, objectives, resources and the work environment are determined

- threats are determined and actions to reduce them are established (cf. sub-clause 6.1)
- the core necessary EnMS processes are controlled:
 - corresponding resources are ensured
 - the inputs and outputs are determined
 - the necessary information is available
 - owners are appointed (responsibilities and authorities defined)
 - sequences and interactions are determined
 - each process is measured and monitored (established criteria)
 - objectives are set and performance indicators analyzed
 - process performance is evaluated
 - necessary changes are implemented to achieve the expected results
 - actions to obtain the continual improvement of processes are established
- the necessary minimum ("as much as needed") of documentation on the processes is maintained and retained ( )




The energy manual is not a requirement of ISO 50001 version 2018, but it is always a possible method to present the company, its EnMS and its procedures and processes (cf.

[annex 07](#)). 

The ISO guide "[The integrated use of management system standards](#)" of 2018, contains relevant recommendations on the integration of management systems.



Pitfalls to avoid:

- going overboard on quality: 
 - a useless operation is performed without adding value and without the customer asking for it - it is a waste, cf. quality tools [D 12](#)
- having all procedures written by the energy manager: 
 - energy is everybody's business, "the staff is conscious of the relevance and importance of each to the contribution to energy objectives", which is even more true for department heads and process owners
- forgetting to take into account the specificities related to the corporate culture: 
 - innovation, luxury, secrecy, authoritarian management (Apple)
 - strong culture related to ecology, action and struggle, while cultivating secrecy (Greenpeace)
 - fun and quirky corporate culture (Michel & Augustin)
 - liberated company, the man is good, love your customer, shared dream (Favi), cf. [T 60](#)

The requirements of the ISO 50001 standard are shown in figures 4-2:

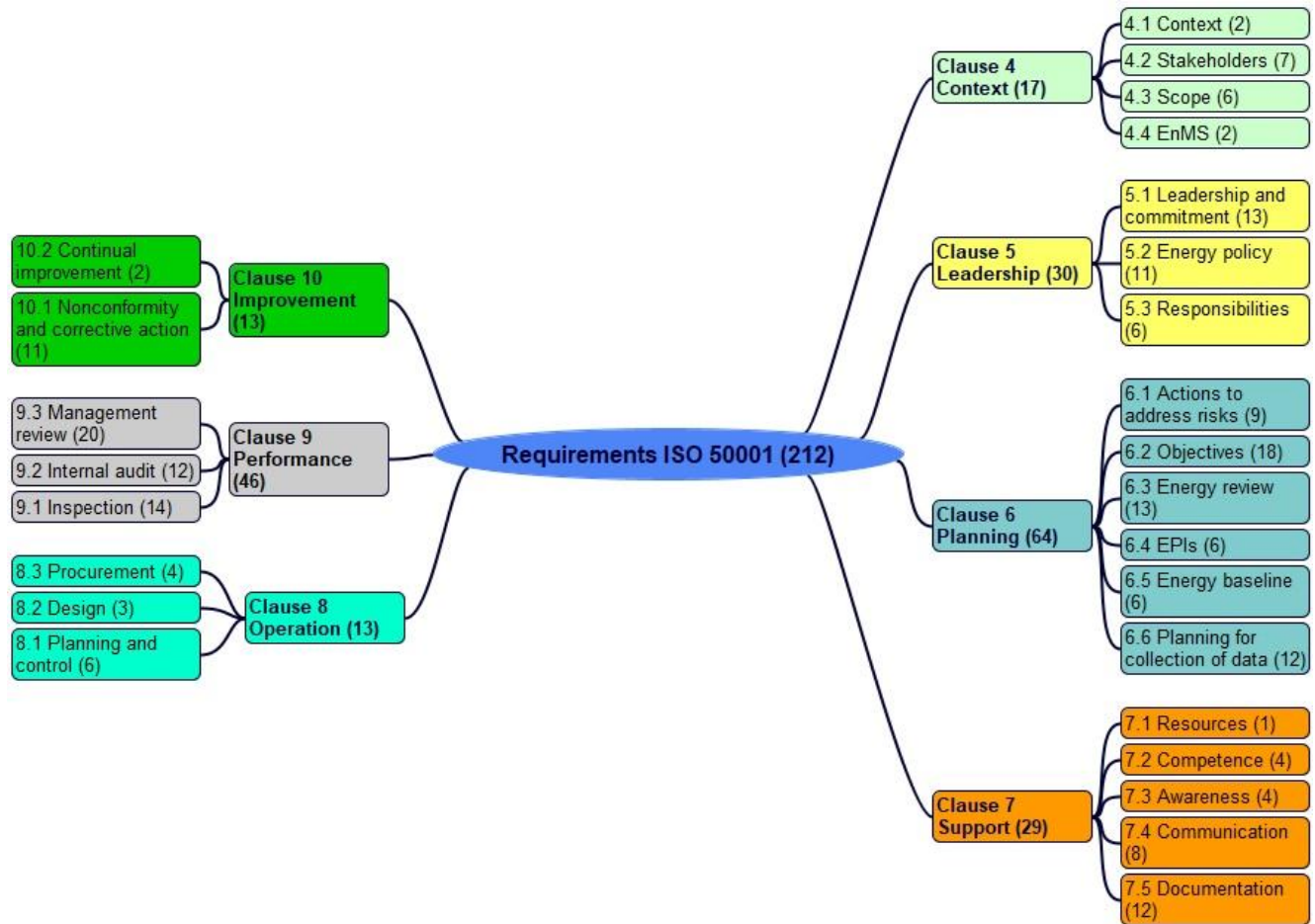


Figure 4-1. The requirements of the ISO 50001:2018 standard

Good practices

- the process map has enough arrows to show who the customer (internal or external) is
- for a process, it is better to use a lot of arrows (several customers) rather than to forget one
- reveal the added value of the process during the process review
- the analysis of process performance is an example of continual improvement and evidence of the effectiveness of the EnMS
- top management regularly monitors the objectives and action plans
- the purpose of each process is clearly defined

Bad practices

- some process outputs are not set correctly (customers not considered)
- process effectiveness criteria are not established
- the process owners are not formalized
- outsourced processes are not determined
- control of outsourced services is not described
- sequences and interactions of certain processes are not determined
- criteria and methods for ensuring effective processes are not determined
- monitoring the effectiveness of certain processes is not established
- the EnMS resources do not allow achievement of energy objectives
- the EnMS is not updated (new processes are not determined)
- the threats and weaknesses identified in the SWOT analysis remain without actions