

ENERGY MANAGEMENT SYSTEM (EnMS) GUIDEBOOK FOR LOCAL AUTHORITIES



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Author	Emanuele Cosenza, Marco Devetta (SOGESCA) Marika Rošā, Līga Žogla, Aiga Barisa (Ekodoma) Michaël Toma (MT Partenaires Ingénierie) George Stiff (ICLEI Europe)
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Summary

The EU has put in place ambitious policies and initiatives promoting on-the-ground solutions to address climate change. These include strong initiatives to increase urban resilience and promote renewable energies and low-carbon technologies¹. Energy sources are hardly an infinite resource, and since many people seem to be growing more and more in favour of anything “green”, they have also become more conscientious regarding the role their own energy use has on the environment.

With the rise of energy prices and the situation where energy is often an organization’s most significant environmental impact, a more specific Energy Management System (EnMS) – instead of merely an environmentally-friendly energy system – is become ever more essential.

In this regard, there already is the International Organization of Standards (ISO) 50001 standard in existence, established to support organizations to save money by using energy as efficiently as possible, while still helping to conserve (energy) resources and deal with climate change. ISO 50001’s purpose is to enable organizations to establish a system and processes necessary to improve its own energy performance, but also its implementation is intended to lead to a reduction in greenhouse gas emissions and other related environmental impacts.

Since the day it was established, ISO 50001 has been adopted in countless industrial and commercial activities. However, this standard established a framework which is not only valid for individual industrial or commercial facilities, but is also even applicable to entire organizations to manage energy, including governmental institutions and authorities. Nonetheless, European support is crucial to ensure the introduction of EnMS in Local Authorities (LAs) in a timely manner. Since EnMS according ISO 50001 has proven to be such a success in the industrial and commercial sectors, the replicable approach of the EU-funded project [Compete4SECAP](#)² (C4S) focuses on strategically addressing bottlenecks and shortages in eight EU Member States by assisting LAs’ contributions to reaching national energy efficiency, renewable energy and climate mitigation/adaptation targets.

The purpose of the present guidebook is to demonstrate that quality management and certification schemes through EnMS for improving energy efficiency, renewable energy, integrated energy/climate planning and management can capitalise on synergies and scale in the public sector to benefit LAs and their stakeholders, in particular those related to the Covenant of Mayors for Climate and Energy (CoM) like Signatories, Supporters and Coordinators. The guide is aimed at any LA interested in implementing an EnMS, intending to steer them through a *step-by-step* approach to EnMS and illustrate all the steps necessary to:

- know and understand the ISO 50001 methodology;
- build a working group within the LA;
- define the LA’s energy policy;
- correctly share roles and responsibilities among LA staff;
- motivate and incentivize politicians and technicians to contribute to the ISO 50001 approach;
- have the necessary tools and knowledge to establish, implement and monitor an EnMS;
- have the necessary expertise to achieve an ISO 50001 certification.

¹ [European Commission – Climate Action for Cities](#)

² For more: compete4secap.eu

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List of Abbreviations

C4S: Compete4SECAP
CoM: Covenant of Mayors for Climate and Energy
EEA: European Energy Award
EnB: Energy Baseline
EnMS: Energy Management System
EnPI: Energy Performance Indicator
GPP: Green Public Procurement
ISO: International Organization for Standardization
LA: Local Authority
O&M: Operations and Maintenance
PDCA: Plan, Do, Check, Act cycle
SE(C)AP: Sustainable Energy (and Climate) Action Plan

Introduction

Objective of the guidebook

Currently more and more local authorities around Europe acknowledge the benefits of an energy management system (EnMS), but fail to understand where to start, how much time, effort and money it will take to create and implement it, why it is important to certify it and much more. The purpose of this guidebook is to guide the reader through the process of establishing an effective EnMS system for a local authority (LA).

Target group

The guidebook is created for employees in LAs who have received the assignment to develop and/or organise the development of an EnMS in their own LA.

How was this guidebook made?

The guideline covers the meaning and benefits of an EnMS based on the international Standard “ISO 50001: Energy management systems – Requirements with guidance for use”³. Even though the ISO 50001 initially was designed for industries, even LAs are appropriate institutions who should apply such a systematic approach towards the reduction of their own energy consumption and CO₂ emissions.

There already exists plenty of good experience available from LAs around Europe introducing EnMS into their local context⁴. The authors of this guidebook, based on their own practical experience in facilitating LAs through previous projects⁵, have gathered here the main facts, necessary information to provide a better guidance on how EnMS can be adapted for the LA-context. It is a unique guidebook comprising experiences from those LAs with ISO 50001 certificates and front-running organisations which have supported them in achieving and maintaining them.

How to use the guidebook?

The guidebook is based on the structure of the ISO 50001 standard. We have tried to explain each point that the ISO 50001 requires, but addressed them specifically to the context of LAs. Actually, experience shows that there is no single recipe for where to start and how to create an EnMS in your LA – it is more of an open process up to each LA to choose their own specific approach. LAs can start from the first points mentioned in this document, like the creation of an Energy Team and/or Energy Policy, or you can also start from the point of data gathering and monitoring.

³ <https://www.iso.org/standard/51297.html>

⁴ ec.europa.eu/easme/en/news/cities-save-thousands-euros-while-reducing-co2-through-energy-management-systems

⁵ Look for more at the project websites of “Energy for Mayors” (www.energyformayors.eu/en) and “50000&1SEAPs” (www.50001seaps.eu/resources/publications) for more information

The material here includes references to the ISO Standard and afterwards an explanation what it means for LAs in a more practical sense. Moreover, a series of FAQs addressing common questions such as *how do I choose priority actions, what are the first steps etc.* are included, as well as examples from leading LAs with ISO 50001 certificates.

What is not to be found inside the guidebook?

It is also important not to overly raise readers' expectations, and therefore is worth mentioning what is not found here. This guidebook does not address particular climate mitigation and adaptation issues within the territory of the LA, but rather it specifically focuses on explaining the relationship an EnMS has with the LA's relevant assets. Many LAs already have their own Sustainable Energy Action Plans (SEAP)⁶ where these operational-type of issues are addressed. The SEAPs-institutionalisation process, and the strong synergy potentials for integrating EnMS and SEAPs is already well covered in a separate guidebook from the previous 50000&1 SEAPs project "[How to develop a Sustainable Energy Action Plan integrated with an Energy Management System based on ISO 50001:2011 - Technical Guidelines](#)"⁷.

⁶ In some cases, LAs may even already have the upgraded version of SEAPs: Sustainable Energy and Climate Action Plans (SECAP). C4S also aims to strongly support SECAP development, though this is a task which will be outlined in more detail in a separate document in the future (D5.4, still upcoming).

⁷ Available:

50001seaps.eu/fileadmin/user_upload/Materials/deliverables/D5.5_50001_ans_SusEnPlanning_Final1.pdf

1. Briefly about ISO 50001

WHY WAS THE ISO 50001 STANDARD MADE?

The ISO 50001 was designed to allow any organisation to pursue, following a systematic approach, the continuous improvement of its own energy performance, including:

- *More efficient energy use and better use of the organisation's energy consuming assets;*
- *Energy efficiency;*
- *Reduction of energy costs.*

Based on the core concept of continuously improving energy performance, the ISO 50001 standard defines and addresses the most important requirements towards energy use and consumption, including measurement, procurement, documentation, design, equipment, processes and personnel. All these issues can affect the energy performance of any organisation.

IS THIS REALLY THE BEST WAY HOW TO CREATE AN ENMS IN LA?

The ISO 50001 standard is applicable for any organisation, including for LAs. Whether small, medium or large, a LA is in general also a kind of organisations using and paying for electricity, heat and fuel for its own assets. Even if the LA only maintains 1-2 public buildings or it operates 100 public buildings, a whole public lighting network, expansive public transport and/or a large municipal fleet of vehicles, EnMS is an effective approach which should be introduced.

The best way to create an EnMS for any organisation, LAs included, is to build up a tailor-made system that is suitable for its own goals. Therefore, ISO 50001 can be perfectly adapted to organisations such as LAs.

The ISO 50001 is a specifically designed tool for EnMS and it provides LAs with clear guidance for effective operations on a day-to-day basis which leads to energy and cost savings.

HOW IS THE STANDARD (AND THIS GUIDEBOOK) STRUCTURED?

The ISO 50001 standard, as well as this guidebook, is structured according to the general Plan-Do-Check-Act (PDCA) approach. PDCA is an applied, iterative, four-step management method widely used by businesses for the control and continual improvement of their own processes and products.

This guideline is structured in a manner to provide specific information for LAs on how to:

- **Plan:** establish energy balances of the LA's assets, as well as define necessary objectives, targets and action plans that will improve energy performance.
- **Do:** implement an effective energy management action plan.
- **Check:** provide a methodological and operational approach for monitoring and analysing the energy performance of the LA.
- **Act:** continually improve the LA's energy performance with the aim that the EnMS becomes not just a niche tool, but rather actually an integral part of the administration's Energy Policy and day-to-day operations.

Like the ISO 50001 standard itself, this guidebook is designed in a way to cover all the main aspects and requirements for more efficient energy use. The Figure 1 below summarises the main elements are that each LA should address in the EnMS process. Each section in this guidebook corresponds to a precise section in the ISO 50001 standard itself and provides a small explanation for how LAs might interpret and introduce these requirements into their daily routines.

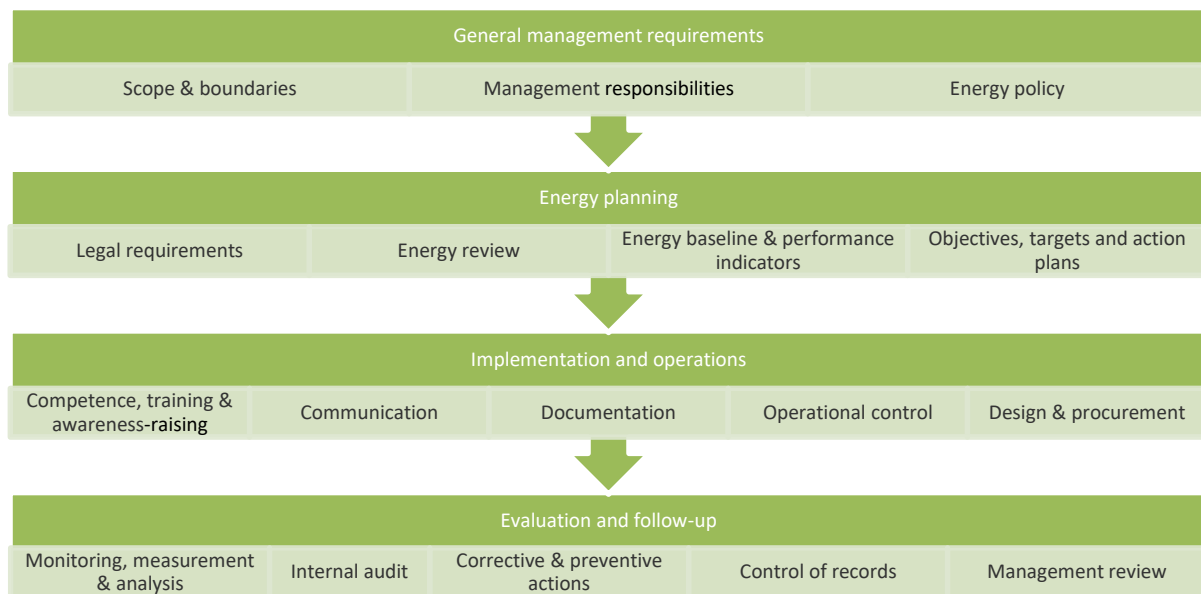


Figure 1: Main elements of ISO 50001 standard and this guidebook

WHAT DOES THE ENMS LOOK LIKE?

The ISO 50001 is based on common elements found in many other ISO management system standards, which ensures a high level of compatibility with other ISOs you may already have in place, notably with ISO 9001 (Quality Management System) and ISO 14001 (Environmental Management System).

As in other ISO management systems, your organisation is given some degree of flexibility in how it actually implements the EnMS, for example your organisation can determine its own rate, extent and timescale of the continual improvement process. This flexibility helps make EnMS to be a so-called “organic system” made up of documents, processes, people, physical and organisational boundaries, energy objectives and targets.

For easier use, the LA is recommended to have a manual acting as the main document which describes its whole EnMS process (see Figure 2). In case if person changes or new employee arrives in the LA, the main rules are written down, shouldn't be reinvented again and can be easily communicated.

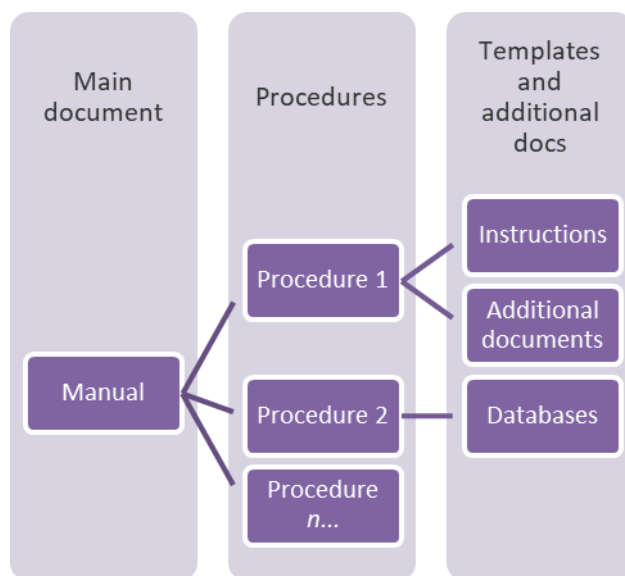


Figure 2: Documentation of an EnMS

Then there are procedures which define in more details how a particular activity (e.g. the energy review) is actually achieved. This means in a practical sense that precise responsibilities, methodology and other aspects are already clearly established and approved beforehand.

In several cases, additional templates and supporting documents are needed, including also databases (e.g. spreadsheets and/or monitoring tools as part of the EnMS etc.).

HOW LONG APPROXIMATELY WILL IT TAKE FOR AN AVERAGE LA TO CREATE AND IMPLEMENT ITS OWN EnMS?

The exact timing to develop from scratch an EnMS, all the way up to its certification, will be different for each LA. It largely depends on aspects such as:

- the political will of the LA's administration,
- already existing processes and activities in the LA related to EnMS,
- properly organising internally, the staff dedicated to the EnMS,
- the availability of adequate human and technical resources,
- sufficient access to past and present data related to the LA's assets, and
- the chosen dimensions of the boundaries and scope of the EnMS.

Previous experiences of other LAs which have developed and certified their own EnMS indicate an average timeframe of one year to obtain ISO 50001 certification (at least for LAs with a population up to 100,000). Experience shows how this timing can be deemed relatively reliable only in case the aspects mentioned above are duly respected and adequately managed within the LA. It is also important to specify that the timing of development and certification can of course be better ensured through the support of external consultants who are experts in EnMS development, implementation and certification.

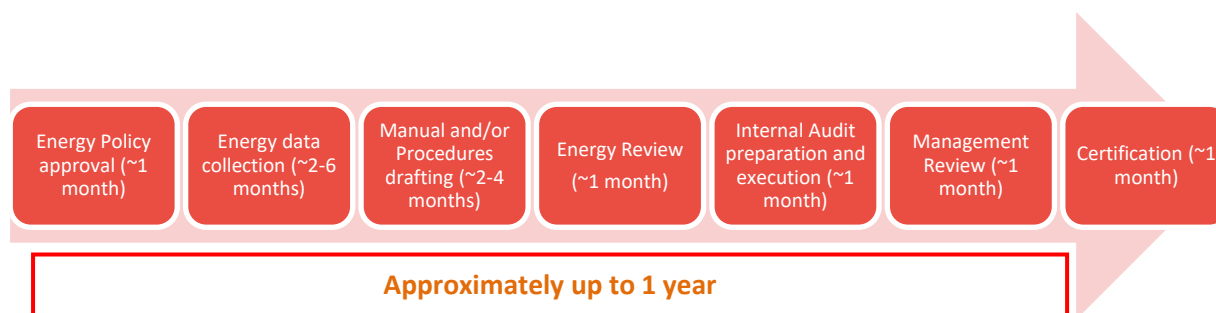


Figure 3. Milestones from EnMS decision to Certification, step-by-step (from 6 months to 1 year)

2. General requirements

ISO 50001 (SECTION 4.3 AND 4.4) DEFINES THAT:

- The LA should set up its EnMS to the prerequisites found in the ISO 50001 standard, as well select the scope and boundaries of its EnMS and ensure its continuity towards more efficient energy use.

WHAT DOES IT MEAN IN A PRACTICAL SENSE FOR LAs?

As an opening part describing on which basis and how an EnMS should be introduced and implemented, including for a LA. It means that the LA clarifies for itself exactly why it is introducing an EnMS, what are the LA's relevant obligations (if any) to implement an EnMS and defines the scope and boundaries (for more on this, please refer to the next section on this precise topic).

HOW IS IT DOCUMENTED IN AN ENMS?

In the manual, a short paragraph on the background information for why the EnMS is being introduced in the LA should be provided. Also its scope and boundaries should be defined here.

SOME IDEAS AND SUGGESTIONS WHERE TO START:

- You will be able to fill in this part once it is clearer what are the scope and boundaries of your EnMS. Therefore, you start with energy data collection for all assets and identification of the significant energy use.
- It might be that the administration of your LA has already defined its scope and boundaries, which you can then use/adapt for describing it in your EnMS manual.

QUESTIONS THAT OFTEN RISE IN THIS RESPECT AND ANSWERS TO THEM

- Q: WHY SHOULD LAs DEVELOP AND IMPLEMENT ENMS?

There is more than one reason why LA should introduce an EnMS but here are few most popular arguments:

- To define a clear and adequate internal organization with an unambiguous division of roles and responsibilities with regard to the LA's energy management.
- To have a full awareness of the LA's energy uses and of the improvement opportunities which could be realistically achieved.
- To reduce consumption and energy costs with a view to a more rational management of resources, and in compliance with current legislative requirements.

- Q: HOW AND WHERE TO START WHEN ESTABLISHING THE ENMS?

- The political commitment and the establishment of a working group dedicated to energy management are two of the most fundamental steps to be taken in the beginning. Political will, together with (enhancing) the skills of the working group itself, are aspects which can often determine success or failure of an EnMS.

- Q: WHICH RESOURCES ARE NEEDED? HOW MUCH DOES IT COST?
 - Establishing and properly implementing an EnMS in a LA means involving all the departments and offices that directly deal with typical energy uses in a LA. Procurement, billing, supply, operation and maintenance (O&M), design, planning and measurements are all areas which should be covered, and the units dealing with them should be engaged.
 - Although it does not require full-time resources, an EnMS is based on the concept of continuous improvement. This means that on annual basis persons intensely involved in the working group or Energy Team should expect to spend a total of about 0.5-1 months on EnMS development, implementation and certification. Most of the work will perform Energy Manager.
 - Certification costs of course vary from country to country, and rely on diverse factors (e.g. the LA's scope and boundaries), but in general could be said to cost on the order of 2500-12000 €. For more information, you are referred to section 6.3.
- Q: HOW MUCH CAN WE SAVE?
 - Among numerous other drivers, the potential reduction of energy costs through the EnMS often depends on the size of the LA, on the selected boundaries of the EnMS (i.e. the types of assets included) and the availability of LA resources devoted to planning and monitoring. In general, field experiences show that around 3-8% of energy costs can be saved by addressing a LA's energy use in public buildings, public (street) lighting, public transport and municipal fleet of vehicles.
- Q: DO WE NEED TO COMPLY DIRECTLY WITH THE ISO 50001 REQUIREMENTS?
 - The most important and immediate step is to ensure your LA complies with relevant legislative requirements in force for public buildings, public lighting systems public transport and municipal fleet of vehicles. Only after that should the next step related to compliance with ISO 50001 requirements be considered, as reported in the document "UNI EN ISO 50001 Requirements and guidelines for use"⁸.

⁸ https://www.iso.org/files/live/sites/isoorg/files/archive/pdf/en/50001_handbook_preview.pdf

2.1. Scope & boundaries

ISO 50001 (SECTION 1) DEFINES THAT:

- The scope and boundaries should be set by the LA, and can be represented by: a process, a group of processes, a site, an entire organisation or even multiple sites under control of the LA. The concept of the scope and boundaries allows a certain degree of flexibility to the LA to define for itself what should be included in its own EnMS.

WHAT DOES IT MEAN IN A PRACTICAL SENSE FOR LAs?

The EnMS scope and boundaries for the LA can include up to its entire operation and processes, as well as all or part of its assets. Typically, the scope for a LA includes, within the perimeter of its EnMS, all its activities and assets, defined as follows:

“The provision of municipal services through the energy management of public buildings, such as municipal offices, schools, socio-cultural and recreational sports facilities, etc., as well as the management of public (street) lighting, municipal vehicle fleet, renewable energy plants, etc.”.

In the meantime, the boundaries quantify the limits of the EnMS. For example, if the LA owns 50 public buildings in total – but only part of its buildings are connected to a district heating system while others have their own local heating source – then one possible scope of the EnMS for this LA might be the “O&M of public buildings connected to the centralised district heating system” while the boundaries of such an EnMS could be “the heat and electricity consumption of 20 public buildings”.

Under its strictest sense, EnMS standards are usually applicable to single organizations, not to entire territories. Therefore, in the EnMS context, the LA itself is to be considered as an organization energetically managing its own assets, rather than simply a geographical administrative entity.

At the same time, the LA decides on any potential extension of its EnMS. For example, the LA can decide that its own EnMS boundaries include only certain public buildings and/or only part of its public street lighting network, but possibly with plans to extend to include other assets in the future. Furthermore, the EnMS boundaries is one of the factors influencing the certification process and its related costs. Therefore, the scope and boundaries should be declared already early on in order to make an early request for a price quote from the certification body.

In some certified LAs, the choice on EnMS boundaries has been limited only to those assets with significant energy use. In other cases, LAs decide to include all energy uses directly managed within the LA’s mandated boundaries.

HOW IS IT DOCUMENTED IN AN ENMS?

The scope and boundaries as well as the context analysis are defined in the manual under general requirements for the EnMS. All the supportive documentation, including calculations, are declared and documented in the energy review (see section 3.2 in this guidebook).

SOME IDEAS AND SUGGESTIONS WHERE TO START:

- Check if your scope and boundaries are consistent with the objectives of the Energy Policy of your LA. Remember that choice on the scope and boundaries of the EnMS can be adapted later if deemed necessary.
- Start with a few of your largest energy consumers (to also cope with the "significant energy uses" requirement of the standard) and include also your LA’s municipal fleet and its public lighting.
- In general, it is always recommended to start with what you already know in terms of energy performance and opportunities for feasible improvement. However, you could also include into your EnMS those assets for which you do not yet have an appropriate energy control-mechanism in place, in order to improve its management. A feasible, forward-looking

solution could be to combine both approaches, by choosing one set of assets where you already have extensive knowledge and another set with information gaps, in order to improve the energy management of both categories.

QUESTIONS THAT OFTEN RISE IN THIS RESPECT AND ANSWERS TO THEM

- Q: HOW TO CHOOSE THE SCOPE AND BOUNDARIES FOR THE LA?
 - The first important step is to make sure you know what the size and characteristics of your assets are. Remember that the continuous improvement of the EnMS should be demonstrable at least already from the first certification. Therefore, it's recommendable to make sure you can immediately demonstrate the improvement of energy performance on the selected assets.
 - You should choose a scope and boundaries in which the LA has the ability to directly influence energy management, also in regards to control of those who work for or on behalf of the administration.
 - It can help that, at least for your first EnMS, to choose only a limited number of facilities (e.g. its largest energy consumers and/or just a few examples of venues representative of other buildings for the kind(s) of improvement you want to achieve on a wider scale (e.g. 1-2 schools)). In the meantime, you should organise collecting reliable data for all the energy uses.
- Q: WHY IS IT NECESSARY TO SET THE SCOPE AND BOUNDARIES?
 - The key principle of EnMS is the continuous improvement of energy performance. This improvement is verified for all the assets of the organization defined with the EnMS' scope and boundaries.
- Q: CAN WE CHANGE THE SCOPE AND BOUNDARIES LATER?
 - The scope and boundaries of the EnMS can be extended at any time. Any such changes must be documented, communicated to the certification body and officially included in the (new) boundaries during the surveillance inspection and re-certification visits.

2.2. Organization and context

ISO 50001:2018 (SECTIONS 4 AND 4.1) DEFINES:

- The municipality should define the external and internal conditions (framework or context of action) in relation to its operational objectives, which affect the ability of the municipality to achieve the planned results of the energy management system and improve energy performance.

WHAT DOES IT MEAN IN A PRACTICAL SENSE FOR LAS?

The purpose of the operational framework or context analysis is to determine the internal and external conditions that affect (or may affect) the municipal energy consumption and the municipality's ability to achieve the planned results of the energy management system. These effects can be both positive (reduce energy consumption) and negative (increase energy consumption).

- Examples of internal influencing factors: availability of financial and human resources;
- general knowledge and understanding of energy management;
- Existing development plans;
- etc.

Examples of external influencing factors:

- national level policy planning documents, objectives, requirements or standards;
- power supply restrictions;
- energy prices;
- Weather conditions;
- the effects of climate change;
- etc.

The results of the context analysis are taken into account when defining the scope and boundaries of the EPS and developing energy policy.

HOW IS IT DOCUMENTED IN AN EnMS?

The EnMS Manual should briefly describe the identified internal and external conditions and their impact on the municipal energy consumption and energy management system (positive or negative impact, impact, etc.).

The standard does not specify a specific method for making this assessment. Municipalities can use widely used techniques such as SWOT analysis (strengths, weaknesses, opportunities and threats) or PESTEL analysis (political, economic, social, technological, environmental and regulatory). It is desirable to set up a procedure for internal and external evaluation, which defines in more detail what factors / aspects should be taken into account, how to determine the significance of each impact and what actions should be followed.

SOME IDEAS AND SUGGESTIONS WHERE TO START:

- Make a list of factors / conditions that you think affect the municipality's energy performance and EnMS within the Energy Management Working Group. Include both internal and external conditions.
- Consider the method you will use to analyze the impact conditions. It can be either a SWOT, a PESTEL or any other method or combination of methods that you are sure of. If your municipality has a good experience with SWOT analysis (such as planning documents), start with it and make additions to the EnMS.
- Evaluate the influencing circumstances by their importance and consider the most important (or potentially most important) issues when planning your EnMS.

2.3. Interested parties

ISO 50001:2018 (SECTION 4.2) DEFINES:

The municipality should identify stakeholders with regard to its energy consumption and EPS, the requirements for stakeholders and which of these requirements and the needs and wishes of stakeholders will be addressed by the municipality to its EMU.

WHAT DOES IT MEAN IN A PRACTICAL SENSE FOR LAS?

Interested (involved) parties are individuals and organizations that, through their activities, may influence the municipal EnMS and energy performance and / or whose activities may be affected by decisions taken by the municipality. This includes, for example, municipal customers, service providers, suppliers, employees. When designing an EnMS, the Energy Management System Task Force should identify the actors involved and analyze their interests, including both binding requirements and needs and desires. The EnMS working group should decide on their inclusion and ensure that the EnMS takes into account the binding normative and other requirements and needs and wishes of the parties involved.

HOW IS IT DOCUMENTED IN AN EnMS?

The EnMS Handbook/Manual/procedures should include a section defining the municipal energy performance and EPS-related stakeholders and describing the binding legal and other requirements as well as the needs and expectations of stakeholders, which the municipality has assessed as significant and included in its EnMS.

SOME IDEAS AND SUGGESTIONS WHERE TO START:

- In the framework of the EnMS Working Group, discuss the current situation and identify the parties (people, organizations) related to municipal energy performance.
- Organize face-to-face meetings with stakeholders to discuss municipal plans in the field of EnMS and identify their views. Keep meeting minutes.

2.4. Management responsibility

ISO 50001 (SECTIONS 5.1) DEFINES THAT:

- The roles, commitment and duties of the LA's top management and management representative(s) should be clearly defined.

WHAT DOES IT MEAN IN A PRACTICAL SENSE FOR LAs?

LAs should understand who among their staff will be involved, and assign clear tasks in the implementation of the EnMS at three levels. The LA should delegate clear responsibilities and define them in the local decisions and/or ordinances.

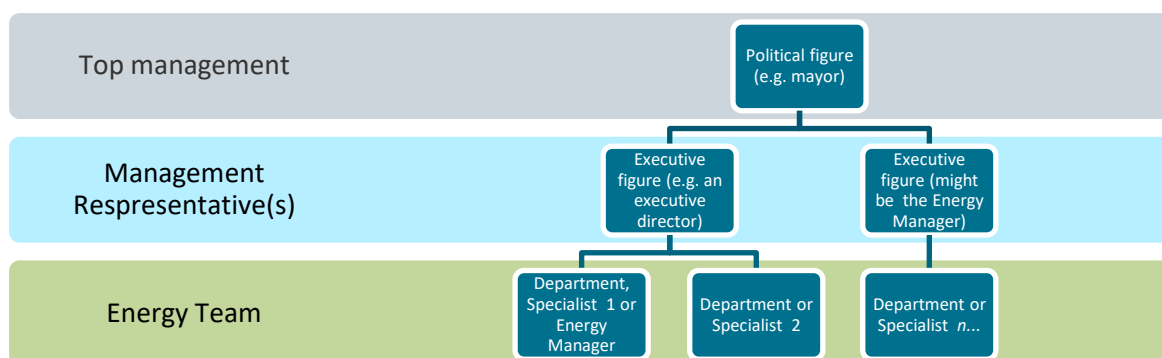


Figure 4. Organizational diagram for how a possible EnMS management structure.

The LA is free to select and assign roles, and/or use existing structures. For example, if it has already appointed an Energy Team, then the ordinances should be updated specifically to integrate their (new) tasks in relation to the EnMS. However, the LA should be clear about the responsibilities and capacity for each involved member, and report on that appropriately (e.g. in an official decision of the Council or an ordinance of the top manager).

HOW IS IT DOCUMENTED IN AN ENMS?

Initial descriptions can be included in the manual – though this is not mandatory, it does simplify things for others to understand better who is involved and how their responsibilities are assigned. On the other hand, including such information in relevant Council decisions and/or ordinances *is* mandatory.

SOME IDEAS AND SUGGESTIONS WHERE TO START:

- You should ensure your LA's political commitment. For example, you could make a short presentation for the Mayor and/or other relevant (top) management representatives about the benefits of the EnMS for your LA.
- Thereafter, it's recommended to prepare official documentation appointing Management Representative(s), Energy Team Coordinator/Manager and Energy Team members, being sure to identify staff with appropriate, complementary skills in order to create a capable and effective energy management group within scope and boundaries of the EnMS.
- Once this group has been established, it's important to define clear internal roles, responsibilities and targets within EnMS development and implementation.

QUESTIONS THAT OFTEN RISE IN THIS RESPECT AND ANSWERS TO THEM

- Q: WHAT IS THE ROLE OF THE TOP MANAGEMENT IN THE ENMS (I.E. THEIR ENGAGEMENT NEEDS)?
 - Top management should first define, establish, approve and implement the LA's Energy Policy (please refer to the next section 2.3 of this guidebook).
 - It also should appoint one or more Management Representatives and approve the formation of the Energy Team, and ensure the provision of the resources needed to establish, implement, maintain and improve the EnMS within the identified scope and boundaries.
 - Top management should support in communicating the importance of the EnMS to those in the organization, as well as ensuring and approving energy objectives and targets, and evaluating their implementation results by conducting the Management Review.
- Q: DOES THE LA NEED AN ENERGY MANAGER AND WHY? WHAT IS HIS/HER ROLE? WHAT SKILLS AND KNOWLEDGE DOES HE/SHE NEEDS TO HAVE?
 - Past experience from LAs has shown that the appointment of a qualified Energy Manager significantly facilitates the development and implementation of an EnMS. In an EnMS context, the Energy Manager can take on the role of a Management Representative and/or Energy Team Coordinator. In the case of an organisation as complex as a LA, the Energy Manager would preferably already be a manager heading a group of predominantly technical staff.
 - Despite a preference towards technical skills, EnMS tasks must also be adequately supported by organizational and communication abilities, management and coordination within the Energy Team, as well as analytical skills in terms of planning and verification of the results achieved.
- Q: WHICH ORGANIZATIONS, DEPARTMENTS AND PERSONS SHOULD BE INVOLVED?
 - All sectors and personnel which do or can influence the energy performance of the LA should be involved. This would typically include people who work for or on behalf of the LA and who manage services, processes, purchases, O&M and facilities related to energy uses.
 - In a LA, departments frequently involved in EnMS usually include the following: Public Works, O&M, Procurement, Accountants, Urban Planning, Development and any working with external suppliers of energy goods and services.

2.5. Energy Policy

ISO 50001 (SECTION 5.2) DEFINES THAT:

- The Energy Policy should state the LA's commitment to achieving energy performance improvement. Top Management should define the Energy Policy and ensure that it corresponds to the 8 objectives of ISO 50001 (e.g. that it is appropriate to the nature and scale of the organization's energy use and consumption).

WHAT DOES IT MEAN IN A PRACTICAL SENSE FOR LAs?

Practically speaking, the Energy Policy need be no more than a one-page commitment signed by the Mayor of the LA committing it to:

- Continuously improve its energy performance and reduce its energy consumption in its most important sectors, among which the main ones tend to be buildings, public lighting and transport;
- Ensure adequate information flows and the necessary resources in order to achieve the objectives and targets set by the management system;
- Comply with applicable legislative and other requirements relevant to energy efficiency and the use/consumption of energy;
- Activate those actions necessary so that all those operating within the LA's administration are required to abide by the Policy in the adoption of official decisions and choices, in their implementation and in the general performance of their work.

HOW IS IT DOCUMENTED IN AN ENMS?

The Energy Policy can be a separate document and/or it can also be a part of the manual. In some LAs, Top management finds it effective to even have the Energy Policy signed and prominently posted (as a reminder to all staff).

SOME IDEAS AND SUGGESTIONS WHERE TO START:

- In order to get inspiration for how to develop an actionable Energy Policy, it is recommended to look at prime examples from other LAs and organisations (in your area).
- It can be particularly useful to find out if your LA has its own SEAP, EEA or a similar kind of energy planning document and discover if it's possible to be inspired by and/or update some form of energy policy already to be found there.

QUESTIONS THAT OFTEN RISE IN THIS RESPECT AND ANSWERS TO THEM

- Q: WHAT DOES "ENERGY POLICY" REALLY MEAN?
 - The Energy Policy is a document (usually not more than one page) in which the LA officially and publicly declares its commitment to reducing its own energy consumption and related environmental impacts. In effect, it is the first milestone of an EnMS, in which its commitments, objectives and expected results are officially declared and approved by the highest governing body of the LA: its City Council.
- Q: WHY IS IT IMPORTANT TO HAVE AN ENERGY POLICY IN THE LA?
 - The Energy Policy traces the guidelines of the administration in terms of energy management of the LA. This document has internal value in outlining clear objectives and expected results, but also external value as credible proof of sustainable practices for the citizens, as the final beneficiary of the services provided by the LA.

3. Energy planning

ISO 50001 (SECTION 6) DEFINES THAT:

- The LA should describe the energy planning process. The main purpose of energy planning is to ensure continuous improvement of the energy performance within the LA. In order to achieve that, the LA should cover all aspects that influence energy performance.

WHAT DOES IT MEAN IN A PRACTICAL SENSE FOR LAs?

If an LA has approved already its Sustainable Energy Action Plan (SEAP) and/or European Energy Award (EEA), the implementation of the EnMS is closely linked to its implementation of its own SEAP/EEA. The objectives set in the energy management and the energy planning process ought to be linked directly to appropriate aspects of the SEAP and/or EEA it already has in place. If the LA has no SEAP, EEA or any other similar document, its EnMS should describe the energy planning processes that it does/will have.

HOW IS IT DOCUMENTED IN AN ENMS?

In the manual, a reference to general energy planning documents in the LA should be included. If no documents are available in the LA, a short paragraph on energy planning process in the LA should be provided.

SOME IDEAS AND SUGGESTIONS WHERE TO START:

- Find out if your LA has a SEAP, EEA or any other kind of energy planning document already developed and/or approved.
- If yes, go through it and estimate its relevance to EnMS.
- If not, start working on an energy review and take notes about the process. Look for help in [*How to develop a Sustainable Energy Action Plan integrated with an Energy Management System based on ISO 50001:2011 - Technical Guidelines*](#).

QUESTIONS THAT OFTEN RISE IN THIS RESPECT AND ANSWERS TO THEM

- Q: WHAT IS AN ENERGY PLANNING PROCESS?
 - In general, energy planning in the context of LAs is a process of developing a long-term policy for a future energy system affecting the LA's operations and in a wider context within its territory.
- Q: IS THERE A DIFFERENCE BETWEEN ENERGY PLANNING PROCESSES IN ENMS AND SEAP?
 - The difference between energy planning in SE(C)AP and EnMS is that under SE(C)AP the LAs do not control but only influence territorial energy planning whereas under EnMS the LA has to plan energy actions / uses / targets / etc. onto its own assets (i.e. controlled by the LA). It is the ISO 50001 methodology that can be used in SECAP energy planning and review because it gives a methodology and structure to be expanded onto territorial energy policies.

3.1. Risk and opportunity assessment

ISO 50001:2018 (SECTION 6.1) DEFINES:

- In the planning process of the EnMS, the municipality must assess both internal and external factors affecting the municipality's ability to achieve the planned results (Chapter 4.1), as well as the legal and other requirements relating to the identified stakeholders (Chapter 4.2). The municipality should identify risks and opportunities to ensure that:
 - Planned EPS results are achieved (including reduction of energy consumption);
 - undesirable effects have been eliminated or reduced;
 - Continuous improvement in energy performance.
- The municipality must plan for action prevention and use of opportunities, integrate and implement these actions in EMU and processes and evaluate their effectiveness.

WHAT DOES IT MEAN IN A PRACTICAL SENSE FOR LAS?

Identifying risks and opportunities at the energy management planning stage is part of the strategic decision-making process (see Figure 6). In this way, the municipality can anticipate possible scenarios and consequences and prevent or minimize unwanted effects before they occur. Similarly, favorable conditions can be identified and promoted that can bring potential benefits and positive results

The EnMS Working Group, with the involvement of other municipal experts (if necessary), can assess potential risks and opportunities and plan actions. For example, there are at least two risks associated with the comfort of the office environment (indoor temperature and air quality, quality of lighting, etc.) - a decrease in productivity due to insufficient work environment comfort and lack of competence / awareness among responsible employees. Thus, it is possible to both improve employee satisfaction (and productivity) and reduce energy consumption by optimizing indoor temperature. The following activities could include, for example, educating employees about thermostat use and efficient space ventilation, checking and / or providing the qualifications of personnel responsible for operating the equipment, the energy efficiency service agreement, etc.

The ISO 50001 standard does not specify a specific method for risk and opportunity assessment. There is a possibility to carry out both qualitative risk assessment, eg based on SWOT analysis, historical data analysis and discussions with stakeholders, as well as quantitative analysis of the most significant risks, eg in terms of cost. It is important that the identified risks and opportunities are consistent with the municipal energy policy.

HOW IS IT DOCUMENTED IN AN ENMS?

The EnMS Handbook should describe the risks and opportunities identified by the municipality as important to its EPS and what will be done to prevent / mitigate the risks and take advantage of the opportunities. It is advisable to establish a procedure that defines in more detail the procedure and responsibilities for conducting this assessment and planning for further action.

SOME IDEAS AND SUGGESTIONS WHERE TO START:

- Evaluate the internal and external conditions that affect the municipality's energy performance (see Chapter 8.1) and the interests of the parties involved (see Chapter 8.2). Take note of the results of an assessment of the current situation to identify existing / potential risks and opportunities.
- The next step in assessing the current situation is the analysis and prioritization of risks and opportunities. In the framework of the EnMS Working Group (involving other experts or external experts if necessary), develop a method that will help to assess the significance of each risk. Describe this procedure in the procedure. This can be done by defining the effects of each risk / opportunity and assessing the likelihood and impact (eg on a 5-point scale). In this way, evaluating the probability and potential impact of each risk (multiplication of two elements) ultimately shows

which of the risks should be prioritized. The higher the score, the more significant and likely the risk factor.

Reflect on each identified risk and / or opportunity to consider actions that will help prevent or reduce the risk. Start with the most important risks / opportunities.

3.2. Legal requirements

ISO 50001 (SECTION 4.2) DEFINES THAT:

- LAs should be able to document the existing legal requirements – and any voluntary agreements – that apply to its own energy aspects, including energy use and efficiency.
- The legal requirements to be respected refer to rules already in force at local, provincial, regional, national and international levels.

WHAT DOES THIS MEAN IN A PRACTICAL SENSE FOR LAs?

There are new legal norms related to energy use, consumption and efficiency which are approved from time to time at the local, national and international levels. For example, these can include energy efficiency standards in public buildings or green procurement requirements for appliances or any other acts applicable for an LA. In respect to EnMS, the LA should define the procedure explaining how it actually gets to know about new/updated legal norms (e.g. how often), estimate their impact on the LA (i.e. what are the requirements and consequences to the LA) and who does what in these regards (i.e. define clear responsibilities).

HOW IS IT DOCUMENTED IN AN ENMS?

In the manual, a brief description of a current practice could be included and a reference to a procedure and/or database (i.e. a registry) of legal documents given. Procedures should describe in more detail clear responsibilities, methodology, access to the registry, etc. However, a registry is a tool (e.g. even a straightforward table in Word, Excel or in any other system) with requirements already set out within the ISO 50001.

SOME IDEAS AND SUGGESTIONS WHERE TO START:

- Find out what are the current practices for how your LA normally addresses new/updated legal requirements.
- Create a registry of relevant normative acts.
- Start defining involved parties, frequency of updates, etc.

QUESTIONS THAT OFTEN RISE IN THIS RESPECT AND ANSWERS TO THEM

- Q: HOW TO IDENTIFY THE RELEVANT LEGAL REQUIREMENTS FOR MY LA?
 - Legal requirements are usually defined within laws, regulations and orders. The LA should set up the scope and boundaries of the EnMS (e.g. the O&M of all public buildings in LA). Relevant legal requirements in this case would include all legal acts about the use of public buildings, including energy use, efficiency levels, energy audits, use of electric equipment, etc.
- Q: WHY IS IT IMPORTANT TO REVIEW THEM AT DEFINED INTERVALS?
 - New and/or updated legal norms in the energy sector are introduced on a fairly regular basis. It is important to remain informed about these norms and how they impact your LA. Therefore, a revision of the legal norms should be foreseen to be done at least 1-2 times per year.

3.3. Energy review

ISO 50001 (SECTION 6.3) DEFINES THAT:

- The LA should have an energy review and sets three main requirements that LAs should follow and address.

WHAT DOES IT MEAN IN A PRACTICAL SENSE FOR LAs?

In an energy review, the LA describes how, how much, where and why the energy in its assets is used and identifies which are the significant users. It is the basis for further analysis. In order to ensure a systematic approach and revision of the energy review, the LA should describe its own methodology for conducting it. The review is usually done annually, while the revision times are in any case freely chosen by the LA according to their own needs and requirements.

HOW IS IT DOCUMENTED IN AN ENMS?

In the manual, a brief description of the main requirements is provided and a reference to procedures is given. Procedures describe in more detail the methodology how the energy review should be conducted. Moreover, spreadsheets with calculations of each energy review should be part of all documentation.

SOME IDEAS AND SUGGESTIONS WHERE TO START:

- Review energy and CO₂ emission calculations, as well as data from the SEAP, EEA or similar (if available), and estimate which data can be used also for the EnMS.
- Gather past and present annual energy data, like heat and electricity consumption data for all the relevant assets.
- Identify the significant users and uses.

QUESTIONS THAT OFTEN RISE IN THIS RESPECT AND ANSWERS TO THEM?

- Q: HOW DETAILED SHOULD THE ENERGY REVIEW BE?
 - The initial energy review should be as detailed as the LA can ensure it. The LA should gather annual data for the last 3-5 years and also start gathering monthly data at least for the previous year, if not longer. It's in the LA's interest that the energy review should cover all of its assets, so that the LA can afterwards more clearly differentiate and define significant users and uses.
- Q: HOW DO YOU IDENTIFY A SIGNIFICANT USE?
 - It is up to each LA to determine criteria for what qualifies as a significant use. It's quite common that LAs define it as those sectors/energy users with substantial energy consumption, e.g. with the highest share in the total energy balance within the LA. But there might be other criteria to choose from, such as if the LA defines it according to those public buildings with the highest EnPIs (like kWh/m² year).

3.4. Energy baseline(s) & performance indicators

ISO 50001 (SECTION 6.5) DEFINES THAT:

- The LA is free to choose its own energy baseline (EnB) based on the energy review and sets three main conditions when the EnB should be revised.
- LAs should regularly define, apply and review EnPIs and compare them to the EnB.

WHAT DOES IT MEAN IN A PRACTICAL SENSE FOR LAs?

Based on the energy review, LA should set the baseline as the reference year against which to measure improvements. EnB should be carefully selected. Rarely will the same baseline be used as for the SE(C)AP. Often a baseline is set for each sector separately, since different improvement measures are introduced with different timings. This means that the LA should select the most recent year which best describes the current situation (e.g. a baseline for public buildings might differ from the baseline needed for public lighting). The reason might be, for example, that the LA has just recently installed new public LED lighting that will influence further energy consumption, but that its buildings are much older.

EnPIs allow LAs to estimate if any improvement has truly been achieved. LAs can introduce a variety of EnPIs for different needs/sectors, like: kWh/m² year for energy use in buildings; kWh/luminary or kWh/h functioning for public lighting; and L/100 km for municipal fleets. It is very important that the LA define EnPIs which it can actually measure and apply. For example, if one of the EnPIs is about climate corrections for public buildings, the LA should be able to estimate, and describe, how the data for outside temperatures are actually recorded.

HOW IS IT DOCUMENTED IN AN ENMS?

The manual briefly describes how the EnB has been selected and which EnPIs will be used. A reference to a related procedure should be given, which might be the same procedure as for the energy review (see previous section), since setting an EnB and EnPIs are outcomes of the energy review.

SOME IDEAS AND SUGGESTIONS WHERE TO START:

- Estimate how the annual energy consumption has changed in the past. Has it increased or decreased substantially?
- Learn the reasons for any noticeable changes. Investigate which measures have been implemented within your selected EnMS boundaries (i.e. has there been any important renovation of public buildings or similar measures undertaken?).

QUESTIONS THAT OFTEN RISE IN THIS RESPECT AND ANSWERS TO THEM?

- Q: HOW TO CHOOSE THE ENERGY BASELINE?
 - In principle, the EnB is usually set according to the most recent year for which the LA has energy data of adequate detail/frequency. We should keep in mind the reason why we choose an EnB: an EnMS is created to ensure continuous improvement and it is necessary to know at what level the LA began. This means that if the LA has recently invested a lot in energy efficiency of public buildings, the EnMS should focus more on what is happening after the renovation. In other words, has the LA already achieved its maximum savings or can it still achieve more, for example with simple/low-cost measures?

- Q: CAN AN ENERGY BASELINE BE DONE FOR DIFFERENT SECTORS?
 - Yes. EnBs can differ (e.g. between public buildings and public lighting). The most important aspect is to be sure that the EnB is defined after any major investment projects so as to not generate positive or negative results diverging from reality.
- Q: WHY IS IT NECESSARY TO SET ENERGY PERFORMANCE INDICATORS?
 - EnPIs allow the LA to objectively estimate if it has achieved any real savings. In case absolute energy consumption increases or decreases, EnPIs will help reveal the reason behind such apparent changes. For example, if the winter has been very warm, energy consumption in buildings should be smaller than normal, and therefore the use of an appropriate EnPI (in this case, a climate-correction to the specific energy consumption) will help determine if energy consumption has really been reduced due to the EnMS, or if it was just due to lower demand brought on by the climate.
- Q: WHICH PERFORMANCE INDICATORS CAN BE THE MOST SUITABLE FOR MY LA?
 - There are a variety of EnPIs widely used, each with their own suitable circumstances for use. For public buildings, the specific energy consumption (kWh/m² year) is most commonly applied. For public lighting, there are different EnPIs, like energy consumption per luminary or per operational time. It is up to LA to select the ones that it is actually currently available and can be measured and applied.

3.5. Objectives, targets and action plans

ISO 50001 (SECTION 6.2) DEFINES THAT:

- The LA should set energy objectives and consistent targets with a known timeframe, taking into account legal requirements and possibilities. In order to achieve its objectives and targets, the LA should have in place a thorough action plan.

WHAT DOES IT MEAN IN A PRACTICAL SENSE FOR LAs?

While SEAPs usually have long-term targets defined, LAs should set short and mid-term objectives and targets for an EnMS. Nonetheless, they should always be in synergy with the SEAP, though more concrete and measurable, for example setting a first year goal for the LA to fix a target to implement the EnMS.

In respect to objectives and targets, the LA should prepare an action plan. According to ISO 50001 requirements, this plan should establish clear responsibilities, actions and deadlines.

HOW IS IT DOCUMENTED IN AN ENMS?

While the manual includes clear objectives and targets, as well as an action plan for the next period, the procedures describe a methodology to define next targets and actions.

SOME IDEAS AND SUGGESTIONS WHERE TO START:

- Look at which targets are actually defined in your SEAP or EEA (if available). Can these also be applied/updated for an EnMS?
- Which conclusions revealed by the energy review and current EnPIs seem relevant? Is it clear from them where to start?
- Define small, but concrete, steps/actions towards putting an EnMS into practice in your LA.

QUESTIONS THAT OFTEN RISE IN THIS RESPECT AND ANSWERS TO THEM?

- Q: HOW TO CHOOSE THE OBJECTIVES AND TARGETS FOR YOUR ENMS?
 - Objectives and targets are clearly interlinked with the energy policy of the LA. In case the LA has a SEAP, EEA or similar document, the objectives and targets often are already defined and may need only small alterations to adapt them to the EnMS context. For an EnMS, the main objective is to ensure a continuous and systematic approach towards efficient energy use. To this end, the LA can define its own targets, how they will be ensured it and at what pace they should be achieved.
- Q: WHY IS THE TARGET SET AGAIN EACH YEAR?
 - Annual targets allow the LA to plan clear actions and assess if they have truly been achieved. In case targets are achieved, subsequent targets are upgraded and set. In case the LA has not accomplished its goals for the year, the reasons should be analysed and corrective actions should be planned. In either case, continuous improvement is ensured.
- Q: WHY CAN'T WE CHOOSE A LONGER TIME PERIOD?
 - Actually, you can choose longer period. ISO 50001 doesn't set the timeframe. However, since a LA budgets its spending annually, it is just more of a planning issue to ensure funding for the EnMS. Usually EnMS measures are low-investment measures, which of course tends to make for easier decisions from the policy-makers.
- Q: HOW TO ESTABLISH THE ENERGY MANAGEMENT ACTION PLAN?
 - The EnMS' action plan can be summarised in a simple table. It is most crucial to describe the action to be taken, who is going to be responsible for implementing/monitoring it and what is the deadline for this action to be accomplished.

- Q: WHAT KIND OF ACTIONS CAN BE PART OF AN ENMS ACTION PLAN?
 - Usually we are inclined to include only energy and structural improvements in the Action Plan. However, the ISO 50001 prescribes a continuous improvement on all the requirements of the System. Therefore, the aspects related to training, communication, O&M, monitoring, measurement and diagnostics shall also be included in the Action Plan.

4. Implementation and operation

4.1. Competence, training and awareness

ISO 50001 (SECTIONS 7.2 AND 7.3) DEFINES THAT:

- Competence, training and awareness are fundamental aspects in order to improve LAs' energy performance. Personnel involved in the EnMS should be adequately and periodically trained on specific energy aspects. Training activities could help the LA to avoid deviations in the LA's energy performance.

WHAT DOES IT MEAN IN A PRACTICAL SENSE FOR LAs?

All the members of the Energy Team should have a certain competence. It is up to LA to set the level of the competence and verify that the respective member actually corresponds. For example, LA can decide that Energy Manager should have higher education. This means that LA should be able to prove with respective documentation (i.e. diploma) that the current Energy Manager and/or new person assign to this role corresponds this criterion.

The LA should design and implement a training plan for its personnel dedicated to EnMS. The training plan must comply with both the objectives of the EnMS and the training needs of the personnel involved. The LA should establish in a specific procedure the adopted criteria and responsibilities for defining the energy training needs of the employees of the LA, and to ensure the necessary awareness-raising of both internal staff, and external personnel working on behalf of the LA, whose activities can influence aspects related to significant energy uses.

Training topics can range from the energy management of certain equipment, technical facilities and/or processes, to awareness-raising about legal requirements relevant to energy, to the design and monitoring of energy uses, to exploration of behavioural aspects to energy, etc.

For training, a LA can use online courses dedicated to public administration employees, specific courses which issue training credits or even rely on external professionals for a specialized training course.

HOW IS IT DOCUMENTED IN AN ENMS?

In the manual, a brief description of current training practices could be included and references to relevant procedures and/or databases (i.e. a registry⁹). Procedures should describe in more detail how skill-building relates to specific responsibilities, methodologies, access to the registry, etc., and how they align with requirements already set out within the ISO 50001 standard for building up necessary competences.

SOME IDEAS AND SUGGESTIONS WHERE TO START:

- It is recommended to verify the relevant skills of internal staff working on the EnMS, especially for Management Representatives, the Energy Manager and all members of the Energy Team.
- It can help to start by mapping out the strengths and weaknesses of the Team at large in terms of existing knowledge on energy management and related activities, and then using this information as the basis for a first training plan.
- A specific training path should be created which is coherent with the role and capacities of the personnel involved in the EnMS.

⁹ Even a table in a spreadsheet or a simple text document can serve as this registry for EnMS purposes.

QUESTIONS THAT OFTEN RISE IN THIS RESPECT AND ANSWERS TO THEM?

- Q: WHY DOES ISO 50001 BOTHER TALKING ABOUT COMPETENCES, TRAINING AND AWARENESS?
 - In ISO 50001, continuous improvement is a requirement that applies not only to the LA's energy performance, but also refers to the continually-improved ability of internal personnel to properly address energy management. Therefore, the aspect of training serves an important function for a number of reasons:
 - It helps the LA comply with its own Energy Policy and EnMS procedures;
 - It is a responsibility of the personnel and authorities to ensure fulfilment of the requirements of the EnMS;
 - Properly educated personnel can more easily ensure efficient energy use by the LA's assets to facilitate better and continuous energy performance;
 - Impacts on the energy uses of the LA's activities are more effectively analysed and monitored when done by capable personnel.
- Q: WHY IS IT IMPORTANT?
 - By identifying the training needs associated with the operations and control of the LA's significant energy uses, the way forward becomes much clearer, as the LA is able to maintain its own group of competent people who become better-equipped to achieve positive results from the implementation of the EnMS.
- Q: HOW TO FULFIL TRAINING REQUIREMENTS IF WE HAVE LIMITED STAFF CAPACITIES?
 - ISO 50001 standard does not set requirements about the number of annual trainings. So, the quantity is not the issue, but rather the quality and the real needs for the training. This means that the LA sets its own requirements for the training based on its own needs. Employees often attend different workshops and trainings (e.g. about application of new criteria for green procurement, new energy efficiency requirements for public buildings, etc.). Usually such attendance is not recorded anywhere, but in an EnMS, such a registry is often introduced to keep track of progress made in staff competences and other kinds of awareness-raising.

4.2. Communication

ISO 50001 (SECTION 7.4) DEFINES THAT:

- The LA should communicate internally with regard to its own energy performance. Any person working for, or on behalf of the LA should receive appropriate communications and be able to make their own comments or suggestions to improve performance. LAs should include also energy suppliers, energy products' suppliers, and any other relevant person or organizations who can positively or negatively affect the LAs' own energy performance.

WHAT DOES IT MEAN IN A PRACTICAL SENSE FOR LAs?

The energy performance of any organization implementing EnMS should always be communicated at pre-established time intervals. This means that the LA should establish its own methods of communication both internally and externally.

The LA should establish and implement a process by which any person working for, or on behalf of, the LA is informed about the EnMS and its objective, can make comments or suggest improvements to the EnMS. Such a mechanism (e.g. internal meetings, special IT/email support, etc.) can help capture perspectives that might otherwise be missed by those deeply involved in the EnMS, such as testimonies of on-site energy performance, observations related to facilities' interventions, suggestions for improvement or even reports of malfunctions or other problems.

It is up to LA to decide on the level of external communication. External communication concerns two types of modes in the EnMS context:

- External passive communications are a response to requests and queries coming from outside the LA, and can include reports of malfunctioning of technical equipment or facilities, requests for interventions, etc. from interested external parties.
- External active communications are carried out on the LA's own initiative to disseminate about its own energy performance or other aspects of its EnMS development, implementation and monitoring. Sometimes LAs combine this with the SE(C)AP communication activities.

HOW IS IT DOCUMENTED IN AN ENMS?

In the manual, a brief description of current communication practices could be included and references to relevant procedures and/or databases, which should describe in more detail how communication relates to LA responsibilities, methodologies, access to the registry, etc., and how they align with requirements already set out within the ISO 50001 standard for communications.

SOME IDEAS AND SUGGESTIONS WHERE TO START:

The first step should be to identify and analyze how communications within and outside the LA are currently done, trying to assess whether any improvements can, and are allowed, to be made. It may prove useful to map out key components of the system by asking yourself the following questions:

- Which kinds content does the LA typically communicate internally/externally? How, when and to whom?
- Which recipients receive active and passive communications?
- Who sends out active communications and/or responds to passive communications?
- What about the EnMS process do you want to communicate internally/externally? How, when and to whom?

QUESTIONS THAT OFTEN RISE IN THIS RESPECT AND ANSWERS TO THEM?

- Q: WHY DO WE NEED TO COMMUNICATE ABOUT ENMS AND ENERGY ISSUES TO OTHER LA STAFF, OR EVEN TO OUTSIDE STAKEHOLDERS?
 - Other people working for the LA, on its behalf or for key external stakeholders of the LA should be informed about their own effects on the LA's energy performance as they are themselves energy users.
 - Opening up such communication channels with them allows the LA to receive from these people suggestions and observations it might otherwise miss for the purpose of improving the energy performance of the LA.
 - The LA may even decide it's worth communicating (e.g. through its website or other tools) about its own energy performance to citizens and types of stakeholders (e.g. to demonstrate a positive example for them to follow).
- Q: WHICH SPECIALISTS FROM THE LA CAN BE INVOLVED IN THE COMMUNICATION ACTIVITIES?
 - There are many channels which the LA could pursue in communicating about its EnMS activities, including school offices (i.e. which are commonly municipal-held assets), the public relations office, the environmental department, the general secretariat office, the quality and evaluation office, etc.

4.3. Documentation

ISO 50001 (SECTION 7.5) DEFINES THAT:

- The LA should document a set of EnMS documentation and how the LA ensures control of this documentation.

WHAT DOES IT MEAN IN A PRACTICAL SENSE FOR LAs?

The LA should define the format and modality with which it issues and records its own documentation relating to the EnMS, as well as defining the staff responsible for these activities. The issue of internal documentation of the EnMS takes place throughout its preparation, verification and approval phases. As a rule, the preparation of such a document is entrusted to a functionary with the necessary competence, while its verification is assigned to one or more people whose involvement ensures compatibility with every pre-existing organizational aspect and its approval stages are overseen by someone mandated with the authority necessary to make binding its application.

For some documents, such as the Energy Policy, the internal audit or the training plan, only a signature of approval is generally sufficient, and this type of decision is usually given to the Management Representative(s).

HOW IS IT DOCUMENTED IN AN ENMS?

In the manual, a brief description of current documentation practices could be included and references to relevant procedures and/or databases (i.e. a registry) prepared and approved. Procedures should describe in clear detail how documentation relates to specific responsibilities, methodologies, access to the registry, etc., and how they align with requirements already set out within the ISO 50001 standard for documentation.

SOME IDEAS AND SUGGESTIONS WHERE TO START:

- It is recommended to first investigate current documentation practice and flow in the LA and then define/update and use it in all EnMS documents.
- Internal roles and responsibilities on document modification, management and diffusion should be clearly defined, including the creation of a central “List of Documents” registry.
- Whenever any EnMS documents are updated and/or revised, such changes should also be reflected in the registry “List of Documents”.

QUESTIONS THAT OFTEN RISE IN THIS RESPECT AND ANSWERS TO THEM?

- Q: WHY DO WE NEED EVEN MORE PAPERWORK?
 - EnMS documentation (i.e. procedures, manual, policy, etc.) defines and clarifies the functionality of an EnMS in terms of assigned responsibility and operation. Through its documentation, the LA is able demonstrate the adequacy of its own EnMS with respect to its internal structure and the energy management objectives of its assets, as well as of its own technical and human resources. By documenting such things in a suitable manner, it ensures clarity for all staff. Moreover, when new employee starts working in the LA, there is all necessary documentation already available.
- Q: HOW WE CAN MINIMIZE THE RESOURCES NEEDED FOR DOCUMENTATION?
 - Using a digital version of the manual and other documentation can reduce the need for actual paper, but it also makes it less time-consuming to update them.
 - Establishing streamlined procedures, for example by integrating EnMS procedures/manual with other management systems already in place, can make documentation more efficient.

4.4. Operational control

ISO 50001 (SECTION 8.1) DEFINES THAT:

- LAs should identify and plan those O&M activities which are related to significant energy uses and that are consistent with the energy policy, objectives, targets and action plans.
- Operating and maintaining facilities, processes, systems and equipment could help the organization to avoid energy performance deviations or even deterioration.
- Checking the efficiency of boilers, air-conditioners, lamps and RES power/thermal plants are typical operational control activities.

WHAT DOES IT MEAN IN A PRACTICAL SENSE FOR LAs?

Operational control is the most technical part of an EnMS. To comply with the criterion of continuously improving energy performance, it is necessary to have expert personnel able to:

- verify the correct functioning of structures and systems (e.g. the efficiency of boilers);
- establish criteria for the analysis and management of events that generate or may generate deviations in energy performance; and
- ensure proper maintenance of structures and systems with significant energy use.

In order to comply with EnMS requirements of operational control, the LA either should involve its own O&M personnel in these activities or use competent external personnel. Usually O&M is based on the existing practice and several important aspects like deviations, non-conformities are introduced. Operational control also extends to all suppliers of energy goods and services that work for, or on behalf of, the LA.

HOW IS IT DOCUMENTED IN AN ENMS?

In the manual, a brief description of current O&M practices could be included and references to relevant procedures, action plan and/or monitoring plan is given. Procedures should describe in clear detail how documentation relates to specific responsibilities, methodologies, access to the monitoring plan, etc., and how they align with requirements already set out within the ISO 50001 standard for O&M.

SOME IDEAS AND SUGGESTIONS WHERE TO START:

- Identify the current O&M practice in each sector of the EnMS (i.e. how the energy matters are organised in public buildings, public lighting network etc.).
- Start with the first sector and describe who and how often will ensure data readings, how the operational control will be ensured (e.g. what is the level of deviation, how to report on non-conformities etc.).
- Continue defining operational control for other sectors included in the EnMS.

QUESTIONS THAT OFTEN RISE IN THIS RESPECT AND ANSWERS TO THEM?

- Q: HOW DOES ENMS DIFFER FROM THE BUILDING MANAGEMENT THAT WE ARE DOING CURRENTLY?
 - Operational control in the EnMS context refers to the ordinary and extraordinary maintenance of technical facilities and structures, as well as to the specific energy yields of the equipment. This requirement also extends to purchases of energy goods and services, as well as to the management of related emergency events.
- Q: WHAT IS A DEVIATION AND HOW SHOULD I SET THE MOST APPROPRIATE LEVEL OF IT FOR MY LA?
 - The degree of “deviation of energy performance” must be established according to appropriate and shared criteria. These criteria must take into account the LA’s consumption and energy, but also external factors affecting deviations. Adequate EnPIs taking into account energy consumption and dynamic factors can support a correct analysis of deviations in energy performance.
- Q: WHY DO WE HAVE TO INVESTIGATE REDUCTIONS/INCREASE IN ENERGY CONSUMPTION?

- ISO 50001 requires not only a rational use of energy focused on continuous improvement, but also that the organization is able to demonstrate that it possesses an effective method to achieve and verify this goal. A reduction or increase in consumption could be generated by several factors beyond actual energy savings (e.g. unexpected demand from abnormal seasonal changes or unforeseen over-/under-use of energy). ISO 50001 requires that these factors be analysed, clearly identified and suitably managed when demonstrating any energy performance improvement of the LA.
- Q: HOW TO CARRY OUT THE ENMS ON A DAY-TO-DAY BASIS?
 - All monitoring and measurement activities should be done frequently. The analysis of changes in energy performance is a fundamental means of avoiding situations in which, despite the EnMS being implemented, energy performance improvement is not achieved for reasons related to technical facilities' problems, user management, etc.
 - The LA's energy management should become part of the daily routine for the delegated staff. Performance monitoring should therefore be properly timed and revised at pre-set intervals.

4.5. Design & procurement

ISO 50001 (SECTIONS 8.2 AND 8.3) DEFINES THAT:

- The LA's energy performance improvement should be considered in any operational control, as well as in the design of new, modified and/or renovated facilities, equipment, systems and processes which can have a significant impact on energy performance.
- The results of the LA's energy performance should be adequately verified by using appropriate EnPIs and be suitably incorporated in design and procurement activities of the relevant project(s).
- When procuring energy services, products and equipment that have, or can have impact on significant energy use, the LA should inform its suppliers that procurement is partly evaluated on the basis of energy performance.
- Criteria for assessing energy consumption and efficiency should be established respecting legal requirements that the LA must follow.
- Energy purchase specifications should be defined and documented even in public tenders made by the LA concerning its energy services and/or activities.

WHAT DOES IT MEAN IN A PRACTICAL SENSE FOR LAs?

Although in LAs it is usually left to external experts, design is an important aspect in an EnMS. In an LA, design can be constituted by building interventions (e.g. improving building envelopes, replacing fixtures, etc.) and by technical facility interventions (e.g. seasonal heating/cooling, public or interior lighting, etc.).

From an EnMS perspective, to design properly, the LA should:

- Ensure the inclusion of opportunities for improvement in the various phases of design and in public tender documents.
- Establish any need to introduce procedures for the operational management of facilities and equipment.
- Evaluate the possibility of obtaining incentives related to the improvement of energy performance.

Considering the operational lifetime in the ISO 50001 context means evaluating the value of energy performance and business benefits against total costs over that lifetime. However, it does not necessarily require a full life-cycle analysis or management.

Procurement therefore should be viewed as an opportunity to improve energy performance through the use of more efficient products and services by the LA. It is also an opportunity for the LA to work closely with the relevant supply chains and positively influence their energy behaviour and footprint.

In addition, the procedures for purchasing energy goods and services for LAs are often regulated by national and European rules strictly linked to the energy performance of goods and services purchased directly or through public tenders.

HOW IS IT DOCUMENTED IN AN ENMS?

In the manual, a brief description of current practices could be included and references to relevant procedures is given. Procedures should describe in clear detail how design and procurement relates to specific responsibilities, methodologies, access to the documentation, etc., and how they align with requirements already set out within the ISO 50001 standard for O&M.

SOME IDEAS AND SUGGESTIONS WHERE TO START:

- For procurement identify those services and products/equipment that influence energy performance in the assets.
- Investigate what is current procurement practice and talk to procurement officer in your LA how to introduce energy efficiency criteria during the next procurements.
- Describe it in the manual and procedure.
- Do the same also for design planning: identify how in the design phasing energy efficiency matters will be addressed.

QUESTIONS THAT OFTEN RISE IN THIS RESPECT AND ANSWERS TO THEM?

- Q: WHERE CAN WE FIND THE RELEVANT CRITERIA FOR DESIGN?
 - Determining the structural and energetic knowledge of your LA's assets, together with the identification of its significant energy uses, is a valid starting point for creating strong opportunities for energy improvement in the LA.
 - Performing an energy diagnosis according to the law on its technical facilities represents an important, in-depth step in order to define adequate criteria for design aspects.
- Q: WHERE CAN WE FIND THE CRITERIA FOR THE PROCUREMENT OF ENERGY SERVICES, GOODS AND PRODUCTS?
 - EU regulations on green public procurement (GPP), and the national regulation on GPP in your country are a very useful first tool for your LA to understand how to select energy goods and services in compliance with the requirements of an EnMS. The concept of GPP extends to a large number of categories of energy goods and services, and establishes clear and technically-precise assessment criteria for energy performance. Therefore, GPP-compliance essentially also ensures compliance with the requirements of your ISO 50001 EnMS.

5. Checking

5.1. Monitoring, measurement and analysis

ISO 50001 (SECTIONS 9.1 AND 6.6) DEFINES THAT:

- The LA should have in place a monitoring system that ensures regular monitoring, measurement and analysis of the energy performance among the LA's assets. The LA should have a clear measurement plan and should ensure accurate data, as well as be able to address substantial deviations in performance.

WHAT DOES IT MEAN IN A PRACTICAL SENSE FOR LAs?

LAs should have a suitable monitoring system in place. Moreover, they should be able to properly measure the energy use (e.g. meters should be calibrated). LAs should also be able to analyse the energy use and their respective EnPIs. The LAs involved in Compete4SECAP use an online [energy monitoring platform](#) for specifically designed for municipalities. However, they are also free to use their own simpler or more complex spreadsheets if they prefer. Monitoring itself is based on the EnPIs defined during the energy planning phase (see chapter 3).

HOW IS IT DOCUMENTED IN AN ENMS?

The manual briefly describes monitoring, measurement and analysis practices in the LA according to ISO 50001 requirements. Procedures and a monitoring plan can be part of the documentation. In some cases, LAs issue a specific local order about how the monthly energy data should be recorded and reported.

SOME IDEAS AND SUGGESTIONS WHERE TO START:

- Ensure accuracy of your current energy measurements, meaning that all the measurement equipment has been tested according to legal requirements.
- Investigate how energy monitoring and analysis is and will be ensured. Will you use software tailored for EnMS or will you create your own spreadsheet?

QUESTIONS THAT OFTEN RISE IN THIS RESPECT AND ANSWERS TO THEM

- Q: WHY SHOULDN'T WE FORGET ABOUT THE MONITORING? WHY IS IT IMPORTANT?
 - Monitoring of the energy consumption and its trends is essential to assess if the LA actually is going to achieve its targets. Only through the introduction of a clear monitoring process in the everyday routines of the LA, can substantial results (like improved microclimate, reduced energy consumption, etc.) be accomplished most effectively.
- Q: HOW OFTEN SHOULD THE LA ENSURE ENERGY DATA IS GATHERED AND ANALYSED?
 - Monitoring should be based on monthly energy consumption data. If the LA has only quarterly data, it is difficult to estimate why the energy consumption has actually increased or decreased. Following consumption on a monthly basis, municipal employees (e.g. in buildings) can more easily follow, and correct, their own patterns and behaviour.
- Q: WHAT IS AN ENERGY MONITORING PLATFORM?
 - An energy monitoring platform is an online platform for LAs to record, analyse and benchmark their own energy consumption on a monthly basis. In the Compete4SECAP project, it covers public buildings, public lighting, public transport and the municipal fleet. Different categories of users are created with a scope to provide them access to real data in order to help them be able to take immediate action themselves.

5.2. Internal audit of the EnMS

ISO 50001 (SECTION 9.2) DEFINES THAT:

- LAs should carry out an internal audit and document the frequency of them. The standard also defines three main requirements of the internal audit, as well as the criteria for conducting it.

WHAT DOES IT MEAN IN A PRACTICAL SENSE FOR LAs?

Once a year the LA should conduct an internal audit of the EnMS to assess its conformity and functionality, and to determine if/how it can be improved. Internal audits can be done by any employee of the LA who can ensure objectivity and impartiality. It means that the Energy Manager of the LA would not be the suitable person to perform it, due to her/his responsibilities, but any colleague who is not directly involved in EnMS could fill this role.

HOW IS IT DOCUMENTED IN AN ENMS?

The manual briefly describes the main principles about how an internal audit should be conducted and how the selection of the internal auditor will be performed. A standard template with the agenda of an internal audit should be part of the EnMS documentation. At the end of each internal audit, a protocol should be written.

SOME IDEAS AND SUGGESTIONS WHERE TO START:

- Define how selection of your internal auditor will be done.
- Prepare standard templates according to the ISO 50001.
- Briefly describe the principles and approach in the manual.

QUESTIONS THAT OFTEN RISE IN THIS RESPECT AND ANSWERS TO THEM

- Q: WHO CAN PERFORM THE INTERNAL AUDIT FOR MY LA?
 - Internal audits can be performed by any employee of the LA who is relatively familiar with the ISO 50001 standard (need not have expertise), but can still remain objective/impartial and is not directly involved in the EnMS already. If there is no local competence already within the LA, it can also be subcontracted to an external auditor.
- Q: IN A PRACTICAL SENSE, HOW IS THE INTERNAL AUDIT PERFORMED?
 - Practically, it means that the internal auditor assesses the documentation of the EnMS against the requirements outlined by the ISO 50001. It checks also if the involved parties are respecting the EnMS and if there are any possibilities to improve the overall process.

5.3. Corrective and preventive actions

ISO 50001 (SECTION 10.1) DEFINES THAT:

- LAs should document how nonconformities will be addressed. The standard defines a set of requirements that the LA should tackle while taking corrective and/or preventive actions.

WHAT DOES IT MEAN IN A PRACTICAL SENSE FOR LAs?

Corrective and preventive actions are related to the Operational control (see section 4.4) and other aspects of the EnMS, meaning to everyday routine within the LA. For example, as part of EnMS, the LA defines a certain monthly energy consumption for each public building (usually based on its average consumption of the previous 3 years), and the LA has also set a certain level of deviation for energy consumption (e.g. 10%). In this case, if energy consumption during a month is above or below this acceptable level of deviation, the LA should have in place a clear guidance for how to proceed. Usually in such a case, the building manager would report the reason back to the Energy Manager and take corrective action (if needed). LAs should keep a track of all corrective and preventive actions taken and have a registry of them.

HOW IS IT DOCUMENTED IN AN ENMS?

The manual briefly describes the main principles how nonconformities are addressed, including timeframe. A registry for corrective and preventive actions should be kept.

SOME IDEAS AND SUGGESTIONS WHERE TO START:

- If you have not defined how the Operational control will be ensured (section 4.4), you should start with this step.
- Prepare a registry for corrective and preventive actions according to the ISO 50001.
- Briefly describe the principles and approach in the manual.

QUESTIONS THAT OFTEN RISE IN THIS RESPECT AND ANSWERS TO THEM

- Q: WHY DO WE NEED TO RECORD THE NONCONFORMITIES?
 - If we are not aware of (unrecorded) nonconformities, it is difficult to improve any process. On the other hand, if we are conscious that something is not really working as it should, we can actually take action to change that. An illustrative example is a common situation with renovated public buildings namely that it is common that LAs do not monitor energy consumption after renovations - this often results in missed opportunities for energy savings. Instead, for cases whereby a LA actually does register its nonconformities in a registry, these issues can be addressed and solved.

5.4. Management review

ISO 50001 (SECTIONS 9.3) DEFINES THAT:

- LAs should plan for a management review at adequate intervals according to the needs of the EnMS, the eventual occurrence of energy performance deviations or when needing to verify EnPIs. The standard defines necessary inputs and outputs of the management review.

WHAT DOES IT MEAN IN A PRACTICAL SENSE FOR LAs?

A management review is an annual report which summarises the results and achievements of the EnMS and ensures further continuity of the whole process. It is specifically targeted for top management of the LA. The ISO 50001 clearly defines which issues should be addressed and what is expected out of the management review.

HOW IS IT DOCUMENTED IN AN ENMS?

A short section in the manual can be included to define how often a management review will be conducted and how the approval process is done.

SOME IDEAS AND SUGGESTIONS WHERE TO START:

- Define how often your management reviews will be prepared and what they will include.

QUESTIONS THAT OFTEN RISE IN THIS RESPECT AND ANSWERS TO THEM

- Q: WHY IS A MANAGEMENT REVIEW NEEDED?
 - A management review (and related meetings for revision and approval) is an important phase in the whole process to summarise and inform top management of the LA what has been achieved (or not) during the previous year. It allows them to agree upon further steps towards continuous efficient energy use (e.g. expand the existing boundaries of the EnMS) and plan necessary budgets (if needed).
- Q: HOW DO I PRESENT THE REVIEW TO THE MANAGEMENT?
 - A standardised template can be made. The ISO 50001 standard already defines the main topics to include in the annual review, though more can be added. The Energy Manager will be probably the most appropriate person to draft the review, which afterwards will be discussed in the Energy group. The final version will then be presented to the top management (preferably to the Council of the LA).

6. Continuous improvement

ISO 50001:2018 (SECTION 10.2) DEFINES:

- The municipality continuously improves the suitability, relevance and effectiveness of the EnMS. The municipality demonstrates continuous improvement in energy performance.

WHAT DOES IT MEAN IN A PRACTICAL SENSE FOR LAS?

The term "continuous" in the standard sense describes the process that the municipality constantly repeats and that results in improved municipal energy performance. The type, scale and scope of the measures to achieve improvements is determined by the municipality itself, depending on the circumstances and opportunities. Energy performance improvements can be demonstrated in several ways, such as:

- Reduction of energy consumption in the scope and range of the EPS (normalized);
- Progress towards the objectives set and the management of significant areas of energy consumption.

HOW IS IT DOCUMENTED IN AN EnMS?

This information is included in the annual Management Report.

SOME IDEAS AND SUGGESTIONS WHERE TO START:

- Do not be afraid of the term "continuous improvement". The ISO standard allows for interruption periods.
- The main thing is that the municipality has to demonstrate gradual improvements over time.
- Follow the ISO standard plan to demonstrate results:
 - Identify the scope and boundaries of your EnMS
 - Make an initial assessment of energy consumption
 - Develop baselines and energy performance indicators (indicators)
 - Assess risks and interests of stakeholders
 - Set goals and develop an action plan

Monitor and review according to results.

7. EnMS certification

THE ISO 50003 DEFINES¹⁰ THAT, GENERALLY SPEAKING:

- Certification is “the provision by an independent body of written assurance (a certificate) that the product, service or system in question meets specific requirements”.

WHAT DOES IT MEAN IN A PRACTICAL SENSE FOR LAs?

Certification in this context refers to an official recognition by an accredited external certification body that the EnMS of the LA conforms as needed to the ISO 50001 standard. “Accredited” bodies are those which have been independently recognized by ISO as valid for certifying any kind of institution, including LAs, in this case for ISO 50001.

HOW IS IT DOCUMENTED IN AN ENMS?

A reference to a certification of the EnMS can be included in the manual as one of the tasks in the action plan and/or in Energy Policy. Otherwise there is no specific chapter dedicated in the manual.

SOME IDEAS AND SUGGESTIONS WHERE TO START:

- Find accredited bodies in your country that can certify the EnMS of your LA.
- Contact them and ask for price quotation.
- Take a decision how to proceed.

QUESTIONS THAT OFTEN RISE IN THIS RESPECT AND ANSWERS TO THEM

- Q: WHY SHOULD MY LA CERTIFY ITS ENMS?
 - Official certification gives the LA and its stakeholders formal recognition that its EnMS has been set up according to a recognised international standard. Furthermore, this kind of a step tends to help guarantee that the LA actually devotes itself towards a long-term commitment to maintain and improve the EnMS over the years. Additionally, it is worth mentioning that there already exist various mechanisms which have an official ISO 50001 certification as a pre-requisite (e.g. bonuses on white certificates, etc.), which itself may serve as an incentive to follow through on this important step.
- Q: WE HAVE IMPLEMENTED AN UNCERTIFIED ENMS, BUT DO WE NEED REALLY TO CERTIFY IT?
 - Any entity, including your LA, can only rightfully claim to have an ISO 50001 EnMS in place only when it has been fully, officially certified by an accredited certification body. Until such certification is in place, your LA only has an unverified EnMS, which while perhaps technically functional, is still officially uncertified. Although full certification is not strictly compulsory, C4S nonetheless highly recommends it, because it helps ensure the quality of the EnMS’ implementation, as well as international recognition of your achievements (e.g. for the mechanisms mentioned above).
- Q: WHAT IS THE DIFFERENCE BETWEEN INDUSTRY AND LAs IN TERMS OF ENMS CERTIFICATION?
 - In the industrial sector, ISO 50001 certification covers either a single factory or facility in depth, or several sites of a single entity (e.g. several supermarkets of the same chain) to be managed equally. In fact, for many industries, it may even be a legal or contractual requirement to have a certified ISO 50001 EnMS in place.

¹⁰ <https://www.iso.org/certification.html>

- For LAs, C4S intends to set up a PDCA process on a limited array of a LA's assets (i.e. on its significant energy uses) that can potentially be expanded in the future to cover progressively more and more of the LAs' assets. Some countries may have a legal requirement for LAs to have an EnMS set up (e.g. Latvia, Croatia), but as mentioned above, at least there are certain mechanisms in place which do require a certified ISO 50001 EnMS as a prerequisite, and so LAs are recommended to follow this path to ensure such compliance.

7.1. Certification bodies

Regulation n. 765/2008 is the European basis for all accredited activities. Certification bodies must be accredited by the appropriate National Accreditation Body according to ISO 50003. According to ISO itself, accreditation is the *"formal recognition by an independent body, generally known as an accreditation body, that a certification body operates according to international standards"*.

Among the commonly-known certification bodies, Bureau Veritas and LRQA (Lloyd Register Quality Assurance) are represented in all eight target countries of the C4S project, while certain others cover several countries (e.g. Dekra, TUV, DNV, SGS, etc.).

Some of the certification bodies play multiple roles. For example, France's AFNOR is a standardisation body, but also does certifications and acts as a consultancy – such multiple roles unfortunately can lead to confusion or seem misleading. In any case, your LA should be able to freely choose whichever certification body it prefers (as long as it's accredited for ISO 50001).

7.2. Certification process

The following steps are necessary for the certification process:

PUBLIC BID

The LA should issue a public bid according to normal procurement procedures in the country in order to contract a certification body. It may be worth noting the following points valid for the C4S project (and perhaps others):

- C4S will raise certifiers' awareness as to what LA certification means and requires (which is an important step, since many of these certification bodies are more used to traditional clients in industry).
- A framework agreement shall be set up by C4S to ease the process between certifiers and LAs.
- Appropriate bid documents will be drafted for all eight C4S countries.
- Each national partner in the C4S consortium should help define the audit scope as per certification costs calculations (i.e. ISO 50003) as explained in the next section 6.3.
- An allowance of up to EUR 1500 per LA shall be paid by project partners to facilitate LAs in C4S.

PREPARATION

In order to be certified, an EnMS should already be up and running for at least a few months. An internal audit is mandatory before certification, which (as explained before in section 5.2) can be conducted even by an independent LA employee (not involved otherwise in the EnMS) or other external stakeholders. Within C4S, options for this can also include another LA participating in C4S or the appropriate national project partner.

PRE-AUDIT

Although not mandatory, a pre-audit by certifier is highly recommended to be done after the internal audit, but just before the certifier conducts its external audit. Such a step allows the certification body to start the work, verify the scope and boundaries, and raise ahead of time any potential non-conformities so that they can be dealt with before the full audit is underway.

AUDIT

The main audits comprise two phases:

- A stage 1 audit of documentary requirements, where the certification body verifies the way the EnMS covers each requirement, and
- A stage 2 audit inspecting the application of the EnMS in practice – generally this is done for one third (randomly-selected) of all the venues of significant energy use defined by your LA's scope and boundaries.

After analysis, the certification body points out key observations and highlights any blocking non-conformities which still need to be adequately addressed prior to certification being confirmed.

CERTIFICATION

After any identified blockages have been lifted by the certifier, the ISO 50001 certificate itself is delivered to the LA and names the significant energy uses certified as being covered by the EnMS.

7.3. Certification costs

The costs for certifying an EnMS can often, but not always, depend on a variety of factors, for example: the complexity of the EnMS, significant energy uses and personnel involved – which can affect the time needing to be dedicated to the audit – or even to contextual variables like local wages, travel expenses, etc. typical within the country for auditors. In other cases, it seems flat-rates are more typical for some countries.

Regardless of the manner used, based on past experience from C4S partners, overall certification fees tend to range from around 2500 to 12000 EUR. Below you can find more information about approximate audit costs for your LA, whether flat-rates or calculations are more appropriate for giving you an estimation to use in your own preparation and planning for EnMS.

OBSERVED AUDIT PRICES

In some cases, C4S partners have observed that certain certification bodies seem to use a relatively uniform approach for public bids from LAs. This means that in certain countries (e.g. Latvia) certification costs are not strictly bound to factors like energy consumption levels or number of buildings/employees. In several cases, Latvian certification bodies, for example, have asked for the same price for certifying the EnMS of an LA just managing a single building as for another LA's EnMS covering 100 buildings, its public lighting network and public transport.

Therefore, we strongly suggest that LAs first of all select the boundaries of their EnMS based on their own needs and desires to manage energy uses, rather than just try to align them only to minimise possible certification expenses. Once a LA has set up its EnMS scope and boundaries properly, afterwards is the appropriate moment to investigate and obtain price quotes directly from certification bodies.

In any case, it should be emphasised that past experience from C4S partners shows that certified LAs tend to benefit from a payback time of less than one year for recouping the certification costs. This means that your LA will soon enough be able to take full advantage of all the benefits a certified EnMS can offer, no matter the costs for its audit.

In future updates to this document, we intend to refer to more recent experiences from C4S itself to provide a better approximation to facilitate other LAs in planning and budgeting for a certified EnMS.

DETERMINING THE NECESSARY PERSON-DAYS

For those LAs wishing to more specifically estimate their EnMS audit costs, the ISO 50003 standard defines the time allowance depending on the complexity of your EnMS' scope and boundaries (i.e. the annual energy consumption, the number of energy sources and the number of significant energy uses). A weighted formula allows one to calculate this complexity for your EnMS.

Table 1: EnMS complexity for weighted calculations

	Weight applied to the factor	Range	Factor
Annual energy consumption	30%	≤ 200 TJ ¹¹	1.0
		200 to 2000 TJ	1.2
		2000 to 10000 TJ	1.4
		≥ 10000 TJ	1.6
Number of energy sources	30%	≤ 2	1.0
		3	1.2
		≥ 4	1.4
Number of significant energy uses	40%	≤ 5	1.0
		6 to 10	1.2
		11 to 15	1.3
		≥ 16	1.4

Essentially, you can calculate for yourself the EnMS complexity, C , appropriately weighting each of the three factors above, F , and bringing them all together into a straightforward formula:

$$C = (0,3 \times F_{\text{energy consumption}}) + (0,3 \times F_{\text{energy sources}}) + (0,4 \times F_{\text{significant energy uses}})$$

¹¹ 1 terrajoule (TJ) = 277 777.78 kWh or 277.78 MWh

The EnMS complexity is considered to be *Low* if the complexity value is less than 1,15, *Medium* if between 1,15 and 1,35 and *High* if greater than 1,35. The number of days is then determined according to the number of persons directly involved in the EnMS (usually in LAs it will be ten or less) and its complexity as established from the above table and formula, as well as use of information such as can be found in the following graph.

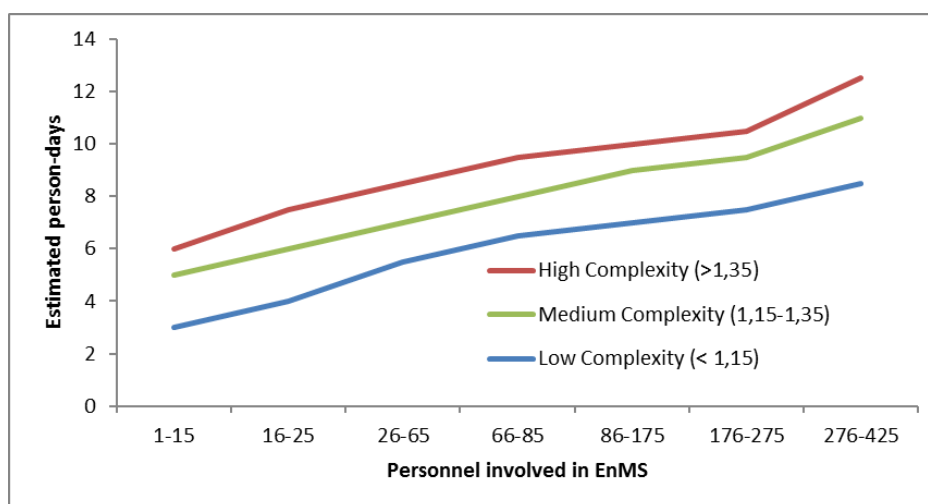


Figure 5. Estimation of the EnMS complexity based on the personnel involved in EnMS.¹²

Example:

A certain LA has an energy consumption of 100 TJ (27.8 GWh), 2 sources (electricity and gas/heat) and has selected 8 significant energy uses. There are 10 persons involved effectively in EnMS. Its EnMS complexity value, C , will be:

$$C = (0.3 \times 1) + (0.3 \times 1) + (0.4 \times 1.2) = 0.3 + 0.3 + 0.48 = 1.08$$

Since the 1,15 value for C is considered *Low*, the number of required person-days should be around 3 days for the audit, though if you wish to include a buffer, then you could consider that it should be covered in 4 or even 5 days.

Annual energy consumption among LA assets rarely exceed 200 TJ, and usually there will be only two or three energy sources to consider. The typical difference among LAs' calculations tends to arise in their number of significant energy uses. Even if the number of significant energy uses is above 16, the resulting EnMS complexity factor C would be 1,16, which itself is only barely (by just 0,01) above what is considered *Low*. This would mean instead around 5 days needed for certification.

¹² This graph is based on data found in ISO 50003, specifically its "Table A.3 Initial certification minimum audit duration (man-days)". It is also worth noting that the information portrayed by our graph is essentially valid as a basis for LAs, or other types of organisations, which are starting out on their EnMS process. For LAs or others already undergoing the monitoring or re-certification phases of their EnMS, different numbers than shown here should be applied. For more details, you are referred to read directly at the original source, ISO 50003. See for more: <https://www.iso.org/standard/60089.html>

TIPS ABOUT ENMS AUDITS

As you can observe from the above sections, certification bodies are not all consistent for determining the cost of an audit. Some seem to use flat-rates, and others calculate their price-quotes on several variables. Nonetheless, C4S partners have come across the following tips from a few certification bodies, which may help you proceed:

- You only need to truly consider the operational EnMS personnel officially, actively involved in EnMS activities. This means that you may otherwise overestimate the personnel you report for your audit calculations.
- It may help you to avoid a high first-certification price if you initially include in your EnMS boundaries and scope only those assets where you already know that an EnMS implementation is most needed. Additional assets can be included gradually later on, for example during monitoring and/or re-certification phases.
- Similarly, it can be useful to limit (at least the first time) what you include in your EnMS scope and boundaries as your LA's most significant energy sources. For example, you could restrict your initial EnMS' set of energy sources to just include electricity and natural gas, or diesel, as appropriate – this way you would avoid including relatively-minor fuels which only serve non-significant uses of energy (e.g. municipal fleet vehicle fuelled by gasoline, liquid gas or methane).

Finally, as was already mentioned, LAs should first of all select the scope and boundaries of their EnMS which is based on their own needs and desires to manage energy uses. If you feel only certain significant energy uses are urgent, then limiting your (initial) EnMS to them may be more efficient for your time and budget. However, if you still feel that many energy uses truly are significant and urgent to address, then by all means you should consider including them into your EnMS anyway. In either case, chances are that if your EnMS successfully tackles all the issues which are most pressing to your LA, the cost of having an effective, certified EnMS will soon enough indeed be seen as a very wise investment.

8. Short stories about certified LAs

The following examples have been included here as illustrative of the story of specific LAs from all across Europe. They serve to portray where each of them they started and how they proceeded on the ISO 50001 EnMS path, all the way up until certification. All the cases below come from experiences where C4S partners were directly involved in facilitating the LAs (largely through the 50000&1 SEAPs project mentioned previously):

1. **Daugavpils, Latvia:** case study prepared by Ekodoma, C4S coordinator and 50000&1 SEAPs partner (in English)
http://archive.cleanenergyministerial.org/Portals/2/pdfs/Daugavpils_Latvia.pdf
2. **Montecchio Maggiore, Italy:** case study prepared by SOGESCA, C4S partner and 50000&1 SEAPs coordinator (in English)
http://archive.cleanenergyministerial.org/Portals/2/pdfs/Montecchio_Italy.pdf
3. **Sovizzo, Italy:** case study prepared by SOGESCA (in English)
http://cleanenergyministerial.org/sites/default/files/2018-05/CEM_EM_CaseStudy_Sovizzo_Italy.pdf
4. **Saint-Raphaël and Tours (Plus), France:** story about ISO 50001 in 2 cities, quoting MT Partenaires Ingénierie, C4S and 50000&1 SEAPs partner, and AMORCE, 50000&1 SEAPs partner (in French)
<https://www.afnor.org/actualites/collectivites-locales-essayiez-liso-50001/>
5. **Muretain Agglo, France:** article about ISO 50001 and EnMS in this city, prepared by MT Partenaires Ingénierie and AMORCE (in French)
<http://www.amorce.asso.fr/fr/espace-adherents/newsletters-amorce/newsletter-amorce-du-27-avril/>

Appendix

The new Standard ISO 50001:2018 in a nutshell

Until 2018, the certification of Energy Management Systems in organizations (including LAs) was carried out according to the International Standard ISO 50001:2011. These guidelines are also based on the original 2011 edition. In August 2018 the ISO 50001 standard was updated. During the three-year transition period until 2021, ISO 50001:2011 certificates are still valid, but it should be noted that certification of new Energy Management Systems since August 2018 is in accordance with EN ISO 50001:2018, which replaces EN ISO 50001:2011:2017.

Main changes have been made in the 2018 edition are presented and explained in this chapter.

QUESTIONS THAT OFTEN RISE IN THIS RESPECT AND ANSWERS TO THEM

- DOES CERTIFICATE CHANGES AFTER THE NEW STANDARD VERSIONS IN THE EXISTING ENERGY MANAGEMENT SYSTEM?
 - The updated ISO standard does not require very large changes. Rather, it helps to understand the context, roles and solutions for effective implementation and maintenance of an Energy Management Systems. If the municipality already has a certified Energy Management Systems according to ISO 50001:2011, the EnMS can be considered as 80% compliant with the new standard.
- WHAT ARE THE MOST IMPORTANT CHANGES IN THE 2018 STANDARD VERSION COMPARED TO ISO 50001: 2011?
 - Terms and definitions have been updated in the 2018 version, as well as a number of definitions of energy efficiency. It also emphasizes the role of the organization's top management, clarifies the methodology for demonstrating continuous improvement in energy performance, and simplifies the integration of ISO 50001 into other management systems (ISO 9001, ISO 14001, ISO 45001).

In order to illustrate the changes in the revised version more clearly, we have created a table showing the element of the Standard, a brief explanation of the changes made, as well as a reference to the relevant section of the ISO standard in the 2011 and 2018 versions. Standard's elements are grouped according to the stages of planning, implementation and monitoring and testing. The ISO standard updated version requirements that were not included in the previous version are shown in a different color. A more detailed description of these can be found in the following sections.

1. PLANNING			
Standard elements	A brief explanation of the changes	ISO 50001: 2011	ISO 50001: 2018
Context	A new addition that requires an analysis of the context (context) of the municipality, including internal and external circumstances that may affect the implementation of the EnMS, and the adaptation of EnMS to them (if necessary).	-	4.1
Interested parties	A new addition to the analysis of municipal stakeholders (employees, customers, service providers, suppliers, etc.). Involvement of stakeholders that may affect the municipality's energy performance that may be affected. Includes stakeholder identification and consideration of needs / aspirations when planning an EnMS.	-	4.2

Standard elements	A brief explanation of the changes	ISO 50001: 2011	ISO 50001: 2018
Scope and boundaries	Addition: In defining the scope and boundaries of a municipal EnMS, internal and external influencing circumstances (4.1) and the interests of the parties involved (4.2) must be taken into account. The field of activity and boundaries are defined according to the possibilities of the municipality to control energy efficiency and energy consumption, including all forms of energy.	4.1	4.3
Management responsibility	Emphasis was placed on the "leadership role" of the municipal leadership to demonstrate its commitment to continually improving municipal energy efficiency and EnMS efficiency. Enhanced management responsibilities to ensure strategic implementation of EMU and achievement of planned results.	4.2.1	5.1
Political Energetica	No significant changes have taken place.	4.3	5.2
Roles and responsibilities	No significant changes have taken place.	4.2.2	5.3
Risks and opportunities	A new requirement to assess internal and external risks and opportunities that may affect the achievement of EnMS planned outcomes and energy performance. The assessment of risks and opportunities must be made taking into account the framework or context (4.1) of the activity of the municipality, the interests of the parties involved (4.2) and the procedures and processes in the municipality that affect energy performance. The standard does not specify a specific method for the assessment of risks and opportunities, but requires that this assessment be taken into account when formulating the municipal energy policy.	-	6.1
Action Plan	No significant changes have taken place.	4.4.6	6.2
Energy review	More precisely, the requirements for energy assessment (energy review) are explained.	4.4.3	6.3
Energy performance indicators (EnPIs)	The point is that energy performance indicators should be able to demonstrate the improvement of energy performance in the municipality.	4.4.5	6.4
Baseline(s)	No significant changes have taken place.	4.4.4	6.5
Energy consumption data	The municipality must establish and implement a data collection plan that specifies what kind of data is needed and how it will be obtained, who is responsible for data collection and at what interval. Data analysis includes important areas of energy consumption, operational and static factors, data defined in action plans.	4.6.1	6.6

2. IMPLEMENTATION

EnMS elements	A brief explanation of the changes	ISO 50001: 2011	ISO 50001: 2018
Resources	No significant changes have taken place.	4.2.1	7.1
Competences	No significant changes have taken place.	4.5.2	7.2
Awareness	No significant changes have taken place.	4.5.2	7.3
Communication	It is clarified that the local authority should establish an internal and external communication procedure that specifies the purpose and target groups, types, frequency, responsible persons of the communication to ensure that the information is reliable and relevant to the EnMS.	4.5.3	7.4
Documentation	No significant changes have taken place.	4.5.4	7.5
Planning and Control	The need for establishing, implementing and using performance management criteria for significant areas of energy consumption is further clarified. In addition, there is a requirement for control of planned changes and outsourcing processes in areas of significant energy consumption.	4.5.5	8.1
Design	No significant changes have taken place.	4.5.6	8.2
Purchases	No significant changes have taken place	4.5.7	8.3

3. MONITORING AND VERIFICATION

EnMS elements	A brief explanation of the changes	ISO 50001: 2011	ISO 50001: 2018
Monitoring, Measurement and Analysis	The procedure is further clarified to ensure achievement of energy performance indicators and EPA objectives. The assessment is based on the energy performance criteria developed by the EPS planning process, the baseline and the data acquisition plan. The municipality must clearly define what will be monitored and measured, how it will be done and how often.	4.6.1	9.1
Compliance with legislative and other requirements	No significant changes have taken place.	4.4.2	4.2, 9.1.2
Internal Audit	No significant changes have taken place.	4.6.3	9.2
Management Review	The management report is supplemented with all updated standard parts: framework of action (context), interests of stakeholders, risks and opportunities, monitoring and measurement results, etc.	4.7	9.3
Preventive and corrective	No significant changes have taken place.	4.6.4	10.1

EnMS elements	A brief explanation of the changes	ISO 50001: 2011	ISO 50001: 2018
actions			
Continuous improvements	A new addition to clarify how a municipality can demonstrate a continuous improvement in energy performance. The scale, scope and timing of events to ensure continuous improvement in energy performance are determined by the municipality itself, in accordance with the framework (context), economic, etc. considerations.	-	10.2

