

Municipal Energy Management Systems supporting the financing of activities in the field of climate and energy at regional level



Municipal Energy Management Systems

MUNICIPAL ENERGY MANAGEMENT SYSTEM, DEVELOPMENT AND IMPLEMENTATION MANUAL

EnEffect 

Supported by:



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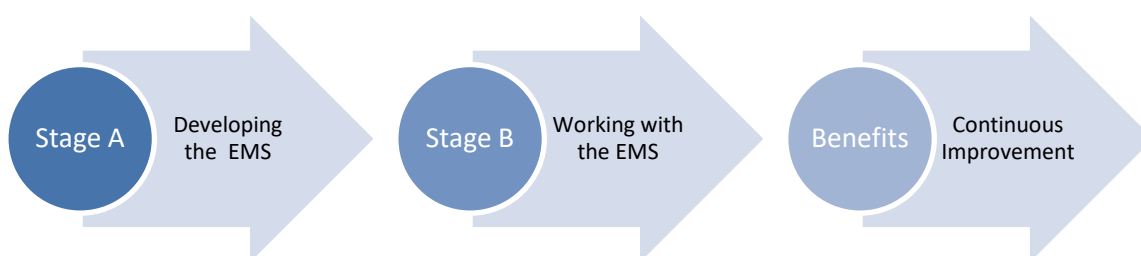
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INTRODUCTION

The implementation of energy management systems (EnMS) in municipalities will strongly support the energy management efforts made by municipalities and will help satisfying all legal and by-law requirements related to energy use. In addition, the commitment of a certain municipality to implement and maintain EnMS is also a demonstration of responsible attitude, providing competitive advantage when trying to attract investment for realizing energy efficiency improvement projects, and for using renewable energy sources.

Theoretically, the realization of EnMS could be divided into two main stages with the final result from implementing the system being continuous improvement of the energy characteristics.



The main steps for developing an EnMS and its implementation in practice are presented in *Appendix 1*.

The aim of the manual hereby is to help the municipalities with the development of the EnMS (Stage A) in accordance with the requirements of the standard EN ISO 50001:2018 and the potential certification of the system by an accredited authority.

The Standard EN ISO 50001:2018 determines the minimal requirements to the EnMS but does not regulate the structure and the format of the documents. The type and the range of the documented information should ensure meeting the applicable requirements of the Standard and should be bound with the activities carried out by the municipality.

According to the standard, the information, based on its type, is stored in two types of documents:

- for *keeping documented information*
- for *maintaining documented information*

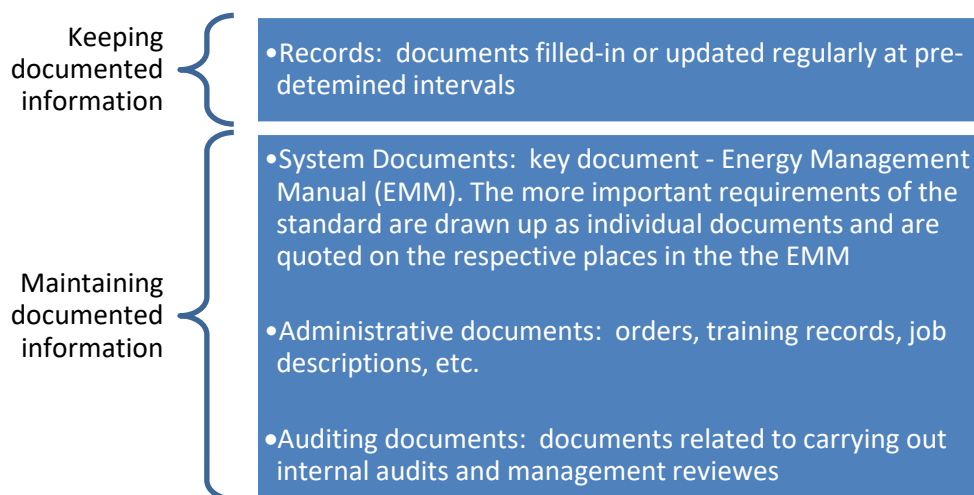
The documents for *keeping documented information*, which, for brevity will further be referred to as “records” shall be filled in and updated in due time at intervals regulated in advance.

The documents for *maintaining documented information* are updated, or new ones are issued, only in case of necessity.

The type and the format, as well as the way individual documents are stored, shall be developed in accordance with the specific requirements and the will of the team which is to be responsible for the EnMS and is supposed to use it most often.

The Manual hereby offers a well working approach, proven in practice, for drawing up documents, which is supposed to alleviate the efforts of the team responsible for working with the EnMS to an utmost degree.

One of the key documents is the Energy Management Manual (EMM). Some of the Standard's more important requirements are drawn up as individual documents and are quoted in the respective sections of the EMM.



In order to ensure clarity and convenience of usage, whenever possible it is recommended to draw up individual documents as tables, presenting the information clearly and concisely, focusing only on the requirements of the standard with no redundant descriptions. It is recommended that the blank signature spaces be signed by the personnel, that the team and the management be kept to the required minimum and that the documents, which shall be filled-in, be structured very carefully and updated continually or as a result of the regular management review.

The manual hereby follows structure, recommended by EMM and incorporates recommendations about all the requirements of the EN ISO 50001:2018, in an order which reflects its contents.

The manual hereby was produced using excerpts from the Manual for Municipality Managers and specialists in MUNICIPAL ENERGY PLANNING by the Energy Efficiency Centre EnEffect.

Before starting work on implementing EnMS the persons in charge must have become acquainted both with the abovementioned manual and with ISO 50001:2018 itself:

http://www.eneffect.bg/images/upload/Temi/mep_guide_bg.pdf

https://www.bds-bg.org/bg/standard/?natstandard_document_id=83289

The source of the clarification texts in the boxes is the Manual for municipality managers and specialists in MUNICIPAL ENERGY PLANNING by the Energy Efficiency Centre EnEffect from 2010.

The set of documents developed shall explicitly mention that the Manual and the other EnMS documents are a municipal property and none of the documents shall be copied, made available or disseminated in any form whatsoever, without a preliminary written consent of the municipal authorities.

After the set of documents has been developed and approved, the team in charge for EnMS is responsible to update it regularly and change it so as to simplify the functioning of the system.

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**APPENDIX 1: BASIC STEPS IN DEVELOPING AND WORKING WITH AN ENERGY MANAGEMENT SYSTEM
ACCORDING TO THE REQUIREMENTS OF ISO 50001:2018**

APPENDIX 2: EXEMPLARY METHODOLOGY FOR RISK AND OPPORTUNITY ASSESSMENT

1. MUNICIPALITY PRESENTATION

A short presentation of the municipality or reference to external documents in which the municipality is presented in detail. In case there is a reference to external documents, these should be duly listed including details about the place where they are kept and the term of their validity.

The general data and information show the state of the municipality: a) location, connections and contacts with the adjacent municipalities and regional centres; b) the environmental conditions and available precious natural resources; c) the local industry – leading branches and activities, and most of all, those, connected to the most significant energy consumption; d) the local agriculture – leading branches and activities, especially those with the most significant energy consumption; e) transport of local (municipal) importance; f) structure and condition of the building stock.

2. NORMATIVE REFERENCES

Normative references are not applicable in EN ISO 50001:2018 *Energy Management Systems. Requirements with application guidance*.

3. TERMS, DEFINITIONS AND ABBREVIATIONS

The terms and definitions used when drawing up the energy management system (EnMS) documentation, are mostly from ISO 50001:2018 *Energy Management Systems. Requirements with application guidance*. The terms used in the set of documents are in accordance with the applicable legislation.

Some of the abbreviations used are as follows:

RES – Renewable Energy Sources

IA – Internal Audit

EE – Energy Efficiency

EnBL – Energy Baseline

SEU – Significant Energy Use

EMM – Energy Management Manual

MEIS – Municipal Energy Information System

PRME – Person responsible for maintaining equipment

EM – Energy manager

EnPI – Energy Performance Indicator

PDCA – Plan, Do, Check, Act

MR – Management Representative

SP – Specific Consumption

EnMS – Energy Management System

IRR – Internal Rate of Return

NPV – Net Present Value

PB – Period of Buyout

4. CONTEXT OF THE ORGANISATION

4.1 Understanding the organization and its context

What is done to determine the scope of the EnMS is analysing the internal factors (circumstances), directly or indirectly affecting the effective energy use. It is recommended that the influence of these factors on the energy consumption / energy production on the territory of the municipality be described in a **separate document**.

- External factors can be, for example:
 - climate
 - legal requirements
 - EU support programs
 - market conditions
- Internal factors can be, for example:
 - building stock
 - technological equipment
 - management
 - staff
 - available budget
 - knowledge and experience
 - equipment management

When determining the context of the organization it is important to take into consideration the municipality's main functions in relation to energy, namely:

- *the municipality as an energy consumer*
- *the municipality as an energy producer and energy supplier*
- *the municipality as an investor in the local energy sector*
- *the municipality as a source of motivation for more effective energy production and energy consumption and for protecting the environment*

4.2 Interested parties' needs and expectations

It is obligatory to identify the interested parties, related to the energy performance and the EnMS of the organization in the process of understanding its context.

It is recommended that the analysis of the interested parties, their impact on the EnMS and their expectations be described in a **separate document** (The interested parties can be grouped by categories, e.g.: regulatory bodies, financial institutions, effect on society, etc.).

Interested parties are, for example:

- Ministries
- Regional authorities
- SEDA
- NAMRB

- NGO's
- Banks and financial institutions
- Suppliers
- Management (the municipal council and the Mayor)
- Officers
- Residents
- Others

The success of each municipal energy policy depends, to a great extent, on the ability of the municipality administration to engage the largest possible number of participants and interested parties in the process of formulating and implementing the energy policy, mobilizing their knowledge and skills.

- Central and local authorities
- Municipality administration
- A wide range of social circles
- End consumers
- Producers of energy

The organization should determine the applicable legislative and other requirements, related to energy efficiency, the use of energy and the energy consumption.

In order to achieve better legibility, it is recommended to have the applicable legislative and other requirements, which the municipality shall adhere to, registered in a **separate document**

This document shall include:

- The title of the act or law and the requirements, related to the EnMS
- Compliance verification or other requirements
- Person responsible and monitoring schedule
- Description of the measures to be taken for achieving compliance.

The document shall be updated in cases of legislation changes, concerning its entries.

4.3 Scope of the EnMS

What should be considered when determining the scope of the EnMS is:

- The external and internal circumstances as laid out in 4.1
- The needs and expectations of the interested parties as laid out in 4.2.

The scope of the EnMS depends on the extent to which a certain municipality performs its function in the energy sector. The choices made to determine the scope should be based on the specific condition in the respective municipality and in accordance with the political will of the local authorities.

Examples for the scope of the EnMS:

- Version 1: The entire building stock of the municipality and the street lighting system.
- Version 2: The kindergartens and the schools within the municipality boundaries, as well as the street lighting systems.
- Version 3: The kindergartens, the schools, and the sports halls within the municipality boundaries.

The choice of scope shall be justified.

The functions of the municipality in relation to energy:

1. The municipality as an energy consumer

Impact Areas	Possible Actions
<i>Municipal Buildings</i>	• <i>Developing programs for reconstructing the municipal building stock</i> • <i>Energy monitoring of the municipal buildings and developing projects for improving energy efficiency</i> • <i>Implementing measures for improving energy efficiency in the municipal buildings</i> • <i>Energy Management in municipal buildings</i>
<i>Street Lighting</i>	• <i>Energy monitoring of the street lighting in streets, squares, and open-air municipal areas (parks, gardens, and parking lots)</i> • <i>Preventive maintenance of the street lighting systems and facilities</i> • <i>Implementing measures for improving energy efficiency in the municipal buildings</i>
<i>Municipal Transport</i>	• <i>Monitoring the public transport fuel consumption</i> • <i>Preventive maintenance of the public transport vehicles</i> • <i>Renewing the fleet of vehicles</i>

2. The municipality as an energy consumer and an energy supplier

Impact Areas	Possible Actions
<i>Producing electricity and heat and using RES</i>	• <i>Energy maintenance of the systems</i> • <i>Increasing the heat and electricity production efficiency</i> • <i>Implementing systems for combined production of heat and electricity</i> • <i>Determining the potential for using RES</i>
<i>Energy transfer and distribution</i>	• <i>Optimizing the energy distribution systems</i> • <i>Reducing the transfer and distribution loss of energy and improving the systems' energy efficiency</i> • <i>Building facilities for producing energy from RES</i>
<i>Energy consumption</i>	• <i>Introducing energy consumption management</i> • <i>Implementing minimal cost planning</i> • <i>Carrying out an integrated policy in relation to energy production, transfer and distribution</i>

3. The municipality as a regulator

Impact Areas	Possible Actions
Site development plans	- Developing municipal energy strategies as component parts of the strategies for the sustainable development of regions and municipalities - Developing municipal energy programs and action plans
Local construction rules, standards, and practices	- Developing various options for developing energy networks - Impact Assessment and choosing the optimal energy distribution options - Optimizing the functional zoning with view to decreasing the transportation needs (commuting to and from work daily) - Optimizing the transporting communication schemes with a view to decrease the traffic intensity - Carrying out pilot bioclimatic (environmentally friendly) architectural projects within the municipal boundaries
Technical infrastructure	- Establishing energy efficiency as a key criterion for assessing municipal projects - Exploring the opportunities for introducing local construction rules, standards, and practices, regulating the bioclimatic (environmentally friendly) architecture and architectural and construction solutions for high energy performance - Reconstructing the existing technical infrastructure with a view to reduce energy losses and improve energy efficiency - Building a new energy efficiency technical infrastructure

4. The municipality as a motivator

Impact Areas	Possible Actions
Investors and investments	- Disseminating information about the advantages of investing in energy efficiency measures - Disseminating information about the investment and the tax policy of the municipality
End energy consumers	- Disseminating information about the available opportunities for more efficient energy use - Carrying out demonstration projects illustrating the advantages of high energy efficiency as well as practical ways and means of achieving it - Providing consulting services for carrying out energy efficiency improvement projects - Launching educational programs, aiming at gaining practical knowledge and skills for carrying out energy efficiency projects - Introducing moral and material stimuli for improving energy efficiency in the sphere of energy consumption

	• <i>Encouraging the development and use of public transport at the expense of using private cars</i> • <i>Encouraging bioclimatic (Environmentally friendly architecture)</i>
<i>Local Taxation system</i>	• <i>Applying a taxation policy directed at stimulating the end consumers to improve the energy consumption efficiency</i> • <i>Applying a taxation policy aimed at encouraging the investment in energy efficiency improvement measures</i>

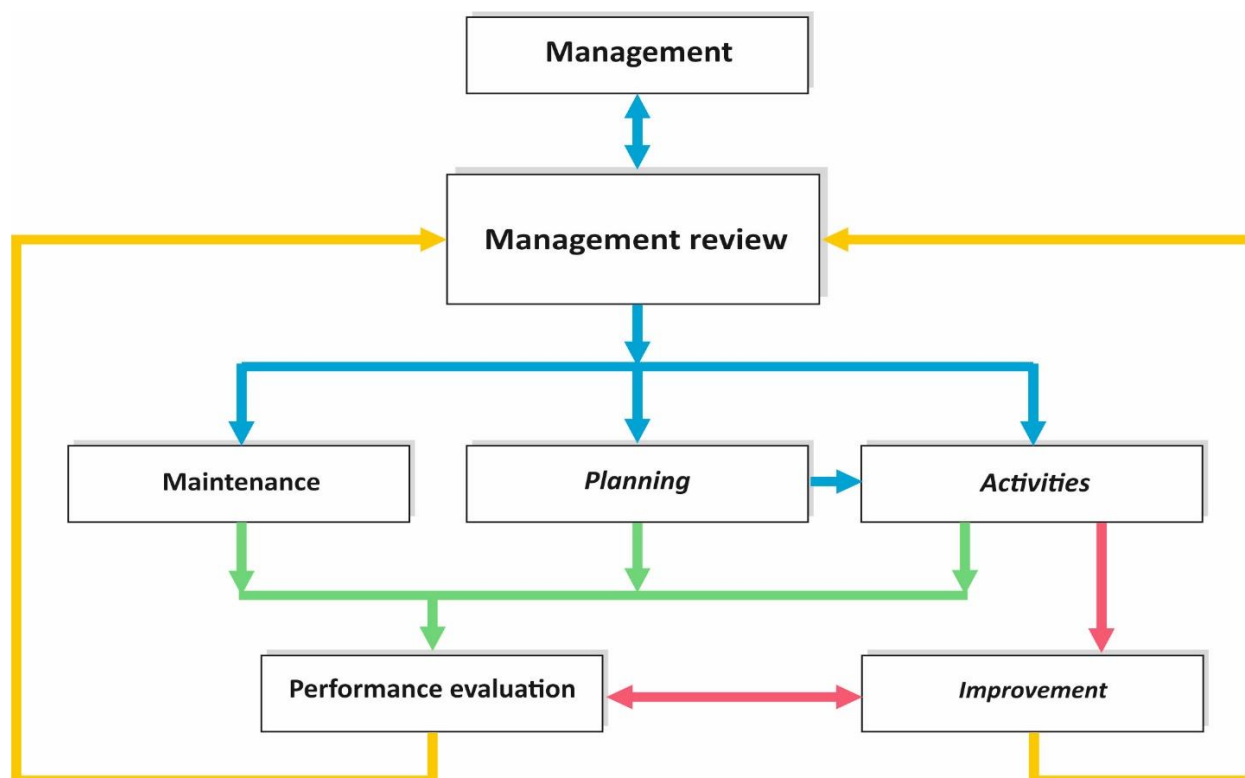
4.4 EnMS

The energy management system, when developed and implemented, shall be in line with ISO 50001:2018 *Energy Management Systems. Requirements with Guidance for Use*.

The municipality shall apply, maintain, and continuously improve the EnMS, including the required processes and their respective interactions.

EnMS should encompass the range laid out in 4.3, including the working environment, human resources, the work with the suppliers of materials and services, as well as the fulfilment of the interested parties' requirements.

An exemplary scheme of the processes in the EnMS the relations between them is shown in the following figure.



Scheme of the processes in the EnMS and the relationship between them

The municipality must constantly strive to improve its energy performance, using objective measurements and acting in accordance with all legal and by-law requirements applicable for the municipality's energy consumption activities.

5. LEADERSHIP

5.1 Leadership and commitment

The municipality authorities, and the Mayor in particular, shall manage the activities aimed at improving the energy performance of the sites and the facilities within the energy management system. The management shall clearly demonstrate its responsibilities concerning the EnMS to the municipality's employees and the other interested parties and shall ensure the visibility of its activities for all employees in the organization. A key role among the requirements imposed on management to demonstrate commitment is to provide the resources needed for continuous maintenance and improvement of the EnMS and the energy performance. In the beginning of the EnMS implementation, the management shall inform all municipality employees about the significance of the energy performance and the energy management. Initially the decision to implement a EnMS could be communicated to all employees of the municipality as well as to other interested parties.

Special attention should be paid to the means of collecting and reporting data about the energy consumption (a suitable tool for collecting and analysing energy consumption data is the specialized software of the Municipality Energy Efficiency Network, EcoEnergy, which is available online).

When developing the EnMS, the main responsibilities of the management should be outlined in the manual, e.g.:

- To guarantee that the scope and the limits of the EnMS, laid out in accordance with 4.3, the energy policy, the energy objectives and targets are up-to-date and in compliance with the local, regional, national and European strategic documents, the legislative framework and the organization's context;
- To support the creation and the optimal functioning of an energy management team;
- To provide the resources required for the effective functioning of the EnMS;
- To guarantee that the EnMS requirements are integrated in the municipality's procedures.

The municipal authorities and the Mayor in particular, bear the full responsibility for the functioning of the EnMS.

5.2 Energy policy

The energy policy shall demonstrate the commitment of the management for the continuous improvement of the energy performance and the EnMS.

The energy policy shall be laid out in a **separate document** and shall be confirmed by the municipality authorities and by the Mayor in particular.

The formulations in the energy policy document shall be in line with the aims of the respective organization, e.g.:

- ✓ Providing access to the information and the resources needed for achieving the objectives and the targets of the municipality

- ✓ Compliance with the legislative and other applicable requirements, connected to energy consumption, energy expenditure and energy efficiency
- ✓ Keeping the energy policy up-to-date and in line with the consumption type and the consumption levels, through regular monitoring activities and updating whenever necessary
- ✓ Dissemination and implementation of the energy policy across the municipal hierarchy.

Energy policy must determine the strategic goals of the municipality when managing energy, e.g.:

- ✓ Effective planning and using the available materials, human, energy, and finance resources
- ✓ Improving the energy performance through optimizing the main processes and reducing the energy consumption
- ✓ Carrying out regular trainings aiming at improving the employees' qualification and their motivation for improving energy efficiency
- ✓ Prioritized purchasing of energy efficient products and services
- ✓ Planning and realizing activities and measures, leading to improving the energy indicators. The high-level management, and the Mayor in particular, shall declare their personal participation and responsibility for execution of the energy policy in the document.

The top management and in particular the Mayor of the municipality must declare in the document their personal participation and responsibility for the implementation of the energy policy.

Energy policy can be developed before or after the initial Energy review. In the first case the energy policy shall be reviewed, in order to guarantee its compliance with the nature and the scale of the energy consumption in the municipality.

The municipality energy policy should be presented to all municipality employees and to all interested parties by carrying out trainings, seminars and other events, as well as the on municipality's web page.

5.3 Organisation roles, responsibilities and authorities

The management should allocate the responsibilities and the authorities for the development and the functioning of the EnMS among the members of an **energy management team**.

The energy management team shall consist of, at least:

- Management Representative (MR)
- Energy Manager (EM)
- a person/people in charge of equipment maintenance and data collection.

The responsibilities and the authorities of the Team as well as those of other municipality officials involved in the use of energy, are determined through:

- orders
- job descriptions
- procedures or instructions included in the EnMS.

It is possible to draw individual job descriptions or to add requirements, rights, and responsibilities to the existing job descriptions.

There is a practice in some municipalities to build specialized energy units (working groups), which support the municipal authorities in developing and implementing the energy policy. They usually monitor and control the energy supply and the fuel and energy consumption. The personnel of these working groups can vary from a single specialist to complex structures of municipal specialists (in the big municipalities). These teams may be independent units of the municipal administration or units comprised of specialists, working in various departments of the administration, e.g. technical, financial, or investment departments. If need be, external specialists may be invited to join the team.

It is recommended that the personnel of the specialized energy units undergo specialized training in energy planning and management, meant to introduce them to the energy efficiency issues, to the problems of the development, the financing and the management of municipal energy management projects, as well as to the difficulties of the energy efficiency among the inhabitants and the enterprises within the boundaries of the respective municipality. Support for such trainings could be obtained from the national energy efficiency agencies, from NGO's, as well as through international programs.

Management Representative (MR)

The Management Representative shall:

- ❖ manage and ensure the implementation of the EnMS, as well as its maintenance and improvement
- ❖ establish and manage the carrying out of energy audits and the verification of appropriate energy performance indicators
- ❖ control and verify all documents beyond the remit of the Person responsible for EnMS
- ❖ organize training courses in EnMS and its functioning
- ❖ provide monitoring, measuring, analysis and assessment of the energy performance and the EnMS
- ❖ participate in the developing and implementation of energy goals and energy management action plans
- ❖ facilitate the regular control, the carrying out and the evaluation of the functioning of the EnMS.

The list of means used by the Management Representative can guarantee that both the exertion and the effectiveness of the EnMS control could include, for example:

- ✓ scheduling the regular meetings of the teams
- ✓ reviewing the results of the internal audits and the correction activities
- ✓ reviewing the border deviations of the energy performance (REP)
- ✓ using management tools, such as business indicators and energy data tendencies.

Energy Manager (EM)

The person responsible for the energy management system (or the Energy Manager) shall:

- communicate efficiently at all levels of the organization
- understand the concepts for using and consuming energy
- exert operative control on the functioning of the system and organize its implementation in all EnMS impact spheres
- master basic analytical skills for understanding energy performance
- be directly involved in the improvement of energy performance.

The municipal Energy Manager is usually a municipality officer with technical education, who is responsible for carrying out the municipal energy policy, monitors the condition of the municipality consumers, the amount of fuels and energy they consume, initiates and prepares projects related to efficient energy use and finds new financial opportunities, etc.

An explanatory model job description of the Municipal Energy Manager, which might be used as a foundation for drawing the job descriptions of the MR and the EM is given in the box below.

An explanatory model job description of the municipal Energy Manager:

Role

The Energy Manager leads and manages the overall process of energy production, distribution, and consumption on behalf of and on the entire territory of the municipality.

The energy manger shall ensure the sustainable execution and the successful implementation of the process of municipal energy planning in practice.

Position in the Municipal Administration

The Energy Manager shall be given a superior position in the administration hierarchy, comparable to that of a Vice-Mayor or of the Chief Architect – and to report directly to the Mayor or the responsible Vice-Mayor.

The Energy Manager shall be appointed with a long-term contract, independent of the duration of the municipal authority's term of service.

Functions

The Energy Manager, supported by the Mayor, shall ensure and mobilize the political support needed for the consistent and sustainable development of the processes of the municipal energy planning and the energy management.

The Energy Manager shall initiate, develop, organize, realize, and co-ordinate the Municipal energy program, and report the results to the municipal authorities. Regular reports must be presented at least twice a year, e.g. before and after the heating season. Besides, the Energy Manager must also provide reports at any other time, upon request from the municipal authorities or in cases of emergency.

Tasks

The Energy Manager shall: a) initiate, manage and maintain the municipal information system for the energy consumption on the municipality area; b) support the municipality authorities in the process of the municipal energy planning; c) organize and supervise the process of carrying out the

municipal energy program; d) identify the need of external technical assistance; e) organize and monitor the process of awarding public procurement projects for consultancy services / project designs for improving energy efficiency and construction monitoring; projects for improving energy efficiency in buildings, in transport, industry, tourist and commercial sites, in the services sphere and in agriculture, as related to energy production and consumption: using renewable energy sources etc.; f) evaluate the contribution of the external consultants and their impact on the process of municipal energy planning; g) mobilize funding for the development and implementation of the municipal energy program; h) mobilize public support for the implementation of the municipal energy program; i) be responsible for activities related to reducing carbon emissions; j) ensure the participation of the municipality in European and international programs and projects for efficient use of energy and water and for protecting the environment; k) ensure the dissemination of good practices, results of successfully implemented municipal energy programs, demonstration projects, etc.

Qualification

It is recommended that the Energy Manager is an economist, mechanical engineer, electrical engineer, plumbing engineer, civil engineer, or architect. Management experience and computer literacy are required. The use of English is an advantage.

Professional Experience

The Energy Manager shall have a) at least five years' experience in the management of energy and financial projects; in the sector of consulting services, in design and construction supervision; b) good professional reputation.

Experience in municipal activities and the implementation of environmental protection projects is an additional advantage.

Main activities

The Energy Manager coordinates the daily work of all departments in the municipality (e.g. the Public Amenities Department, the Legal Department, etc.) and all municipal employees involved in the implementation of the municipal energy program; negotiates, mobilizes, organizes and coordinates the external working group appointed to do the daily work under the Municipal Energy Plan; reports to the municipal administration the new or the course of implementation of the current Municipal Energy Plan and takes all necessary corrective actions; manages the relationships with the media, the private companies and the general public on all aspects of energy efficiency, as well as in connection with municipal initiatives such as "Energy Days", "Days without cars" etc.

6. PLANNING

6.1 Actions to address risks and opportunities

Risk is the probability of an occurrence of an event, which will have a negative effect on the energy consumption of the municipality and the achievement of its goals.

The opportunity is unused potential for improving the energy performance and reducing the energy consumption.

Through actions for controlling risks and opportunities, the municipality shall foresee the potential scenarios, so that the consequences of the undesired events can be identified before they occur and the improvement potential can be utilized effectively.

Within the EnMS, the risks and the opportunities are identified and actions for their controlling are assessed and planned.

The basis for identifying risks and opportunities is the context of the organization.

The assessment is carried out using risk and opportunities assessment methodology. A sample assessment methodology is presented in Appendix 2.

It is recommended that all actions related to identification, assessment planning and selecting responsible persons, setting deadlines, as well as the assessment of the effectiveness of the project activities, shall be taken by an expert panel, appointed by the Management Representative. Records verifying the work of the panel shall be drawn.

Planning

The sequence of actions related to planning the control of risks and opportunities is as follows:

1. **Identifying.** The risks and the opportunities which might directly or indirectly affect the energy performance are identified based on the organizational context, the needs, and the expectations of the interested parties (points 4.1 and 4.2).
2. **Analysis and assessment.** It is performed for each risk and each opportunity separately, in accordance with a preliminarily established methodology, laid out in a **separate document** (cf. Appendix 2).
3. **Planning the necessary actions.** The possible measures for managing the risks and opportunities are identified using the analysis drawn in accordance with the methodology in point 2.
4. **Determining the controlling activities:**
 - a. **Activities.** A determining factor for the choice of means of exerting impact on the risk or the opportunity should be the cost of exerting impact and the efforts for implementing. It should not exceed the benefits from reducing the risk or mastering opportunities. Among the indicators used to that end are Period of Buyout (PB), Internal Rate of Return (IRR) and Net Present Value (NPV)
 - b. **Person responsible and deadline.** A person responsible and a deadline for finalizing shall be assigned for each action. The deadlines could be a certain date, before conducting the internal audit, indefinite (permanent), etc.

The identified risks and improvement opportunities (name and estimation), the planned activities for exerting impact, the people responsible and the deadlines, shall be registered in a **separate document**.

Verification and re-evaluation

In most cases once a year, before conducting an internal audit and monitoring by the municipality, the EM, on his/her own with support from a competent person, has to analyse the results and the effectiveness of the actions taken. The analysis can also be carried out in shorter terms as a result of a management decision, e.g. in cases of significant structural or organizational changes, changes in legislation, etc. The results must be documented in an appropriate way. The document used for registering the risks and opportunities can be utilized for that purpose.

After the verification and the evaluation under point 5, a new plan for the activities for managing risks and opportunities shall be drawn up, reassessing the registered risks and opportunities, and identifying new ones. Steps 1 to 4 shall be repeated.

Types of risks and opportunities:

- *internal*
- *external*
- *political*
- *technical*
- *financial.*

Internal Risks

The internal risks are usually related to the capacity of the municipal administration. For example, the risks associated with the management of the program are the most typical example of dependence on the management skills of the municipal administration. The choice of technology and equipment may also pose a significant risk to performance if, due to insufficient qualifications, inappropriate or inefficient facilities are selected. The process of searching for and selecting reliable financial institutions contains similar risks. The municipal administration may reveal a number of other internal risks specific to the respective municipality.

External Risks

The risks internal for the municipality may be related to the country specific status of the industry or with the dynamic legislation which might be subjected to changes. What could be considered external risks for a municipality are the prices of energy, fuels and equipment, which may be affected by international market conditions. The program may also be affected by risks associated with some of the municipality's partners on which its implementation relies.

Another external risk is the instability of the banking system, as well as a number of extraordinary force majeure circumstances, some of which are difficult to predict.

Political Risks

The program can also be affected by the political situation in the country and the municipality. National or local elections could cause radical changes in the structure and the political orientation of the authorities. Such a change can in turn lead to reviewing both the priority goals of the program, and the specific activities and projects it encompasses. Even the international political situation can influence the program.

Technical Risks

The prioritized choice of tested technologies, proven in practice, can reduce the technical risks.

The chosen technologies, materials and equipment entail certain level of risk which can be lowered, if tested technologies, proven in practice, are preferred. Using the high-quality materials and products also reduces this technical risk. If preference is given to materials and products with low initial value to obtain significantly lower operating costs, this often carries a significant risk of future losses. Therefore, preference should be given to materials and products with certificates for high quality, which would reduce the technical risks associated with their operation. The selection of contractors for the individual projects of the program, such as designers, builders, or fitters, can also incur significant risks. The key justification of such a choice should be the good recommendations and proven experience.

Financial risks

The most typical financial risk for the energy program's success is the inability to provide the necessary financial means for its completion, in particular the part that is to be provided by the municipal budget. This risk can be managed by the very choice of priorities and the correct planning of the cost of carrying out each separate activity or project.

The choice of financial institution (a bank or a fund) can also entail financial risks. Sometimes, what might be hidden behind particularly favourable credit conditions is the insufficient reliability of the financial institution. Therefore, one of the means of reducing financial risk is giving preference to banks and funds with established reputation and experience in financing energy efficiency projects. Such critical approach is particularly necessary, when choosing an ESCO to endow with both financial and technical responsibilities related to carrying out projects.

The choice of financial instruments to be used for carrying out the municipal energy program could also entail risks. Along with the traditional credits, there are new financial instruments used in practice and their suitability and reliability should be carefully assessed in each individual case. Thus, for example, leasing technologies and equipment could facilitate the municipality, by reducing the volume of direct investment. In some cases, issuing municipal bonds could attract additional funds for the program, etc.

6.2 Objectives, energy targets and action plans for achieving them

Setting objectives and energy targets is a means of putting energy policy into action. This ensures that the municipality has certain criteria and the necessary resources to improve energy performance.

The objectives and the energy targets should be:

- in alliance with the energy policy
- compliant with the energy performance as determined in the energy review
- specific, applicable and, if possible, measurable.

When the energy review determines zones with significant energy use (SEU), these should be taken into consideration when determining the specific aims.

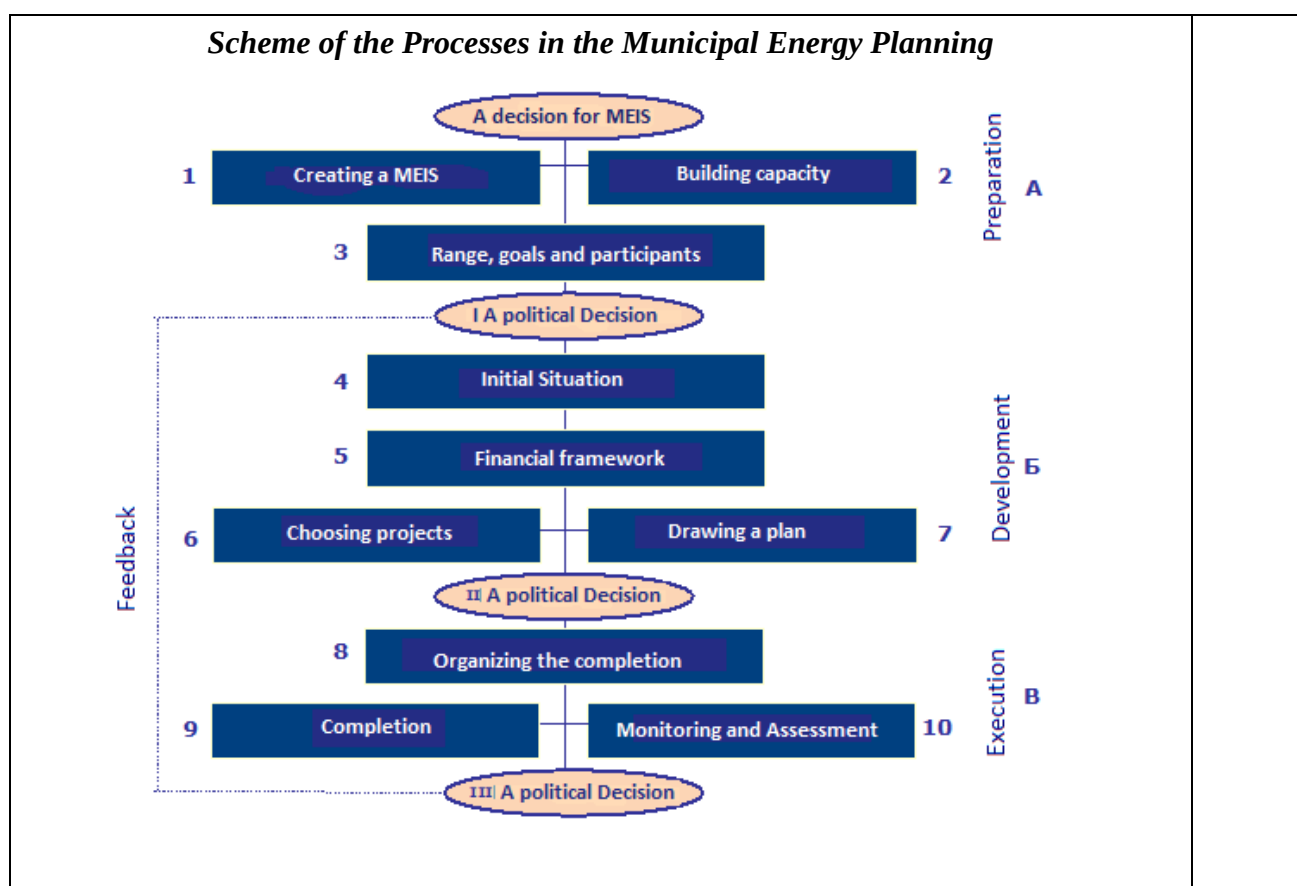
The municipality must draw up a plan how to achieve its general and specific energy goals.

An action plan should be prepared for each of the goals. The goals and the action plans are to be drawn as **separate documents** (ideally filling in a form prepared in advance) and they should include for example:

- The name of the goal set for achieving
- A description of the activity/the measure
- A responsible person and a deadline
- Resources necessary for achieving the goals
- Stages of completion, including:
 - A responsible person
 - A deadline
 - The expected result.
- Means of assessing results
- A person responsible and a deadline for assessing results.

Note: The deadline for assessing results could be a certain date or a period after carrying out the activity/measure.

The document is to be coordinated with the interested officials and confirmed by the Management.



The involved personnel shall be acquainted with the energy goals and the action plans.

The aim and the completion deadline shall be controlled by the MEIS. In case of failing to meet the completion deadline at a certain stage of the plan and whenever necessary, the goal and the plan are to be updated by issuing a new document.

The assessment of the degree of implementation of the set objectives and the results of their implementation is made mandatory before conducting internal audits and reviews by the management (see points 9.2 and 9.3 of this manual). The evaluation can be made earlier at the discretion of the management. The results must be properly documented.

The formulation of the objectives of the municipal energy program is usually based on: (a) the national energy and environmental policy; (b) municipal strategies and policies in this area; (c) the specific conditions and requirements in the respective municipality.

Approaches to setting goals:

- *political approach*
- *technical or economic approach*
- *integrated approach.*

Possible goals:

- *reduction of energy costs*
- *improving the quality of services*
- *reduction of energy prices*
- *reduction of greenhouse gas emissions*
- *integration of several goals*

6.3 Energy review

The energy review is to be developed in accordance with the requirements of the standard and should be drawn as a **separate document**. The document should also include the specified energy performance indexes and the energy baselines (Cf. 6.4 and 6.5).

The methods and the criteria for drawing an energy review are:

- Analysis of the main consumers and the energy they use
- Assessment of the availability and the veracity of the energy consumption data
- Assessment of the delivery method and the reliability of the main energy sources
- Analysis of the current energy performance of the facilities/sites and an annual balance of the energy consumption
- Identifying zones with significant energy use (SEU)
- Monthly analysis of the energy consumption and its dependence on the range of EnMS, e.g.:
 - monthly average temperature (for buildings)
 - monthly average duration of the dark hours in a day (for the street lighting)
 - number of passenger rides (for the municipal public transport).
- Determining the priority measures for improving energy performance and for calculating the indicators (PB, IRR and NPV) for each measure (see the box below)
- Calculating the expected energy consumption after implementing the measures.

Possible criteria types

In compliance with the goals of the municipal energy program, the municipal administration can adopt different criteria sets to be used for prioritizing the actions and the projects in the program.

Financial criteria

This group of criteria can be used to determine the weight of certain actions and projects against the financial goal of the programme, such as: reducing the budgetary energy cost. The possible sample financial criteria can be certain values of the key economic indicators, which can easily and accurately be measured, such as: net present values (NPV); Return of Investment (RoI); Internal Rate of Return (IRR).

Other possible criteria may be:

- *the volume of necessary investments*
- *the possibility of budget financing (or co-financing)*
- *the availability of accessible sources for grant funding.*

Social criteria

It is through the social criteria that the that social climate in which the programme will be carried out is assessed.

This group of criteria is usually connected to certain social goals of the municipal programmes for sustainable development and the municipal energy programs in particular. In most cases these are goals, related to the comfort provided for the inhabitants in the buildings, including the buildings used for social purposes, e.g. kindergartens, schools, nursing homes for the elderly or for disadvantaged children (orphans or children with intellectual disabilities), etc. This criteria type can be set with certain measurable values.

The social criteria provide the opportunity to assess the overall social climate in which the energy programme will be carried out. This climate is determined by: the condition of the existing legislation framework; the condition of the institutional and human resources; the available tools for promoting energy efficiency; the sociopsychological attitudes in the local community; the tolerance of the community for the measures laid out by the programme.

Environmental criteria

The environmental criteria correspond to the environmental goals of the municipal energy programme. These should be determined in a way which allows them to be easily and accurately identified and measured. Such criteria can be:

- *reducing the CO₂ emissions*
- *reducing the harmful gasses and dust emissions*
- *reducing the share of built-up areas in towns and villages by rooftop landscaping etc.*

Technical (energy) criteria

The assessment of the facilities and technologies used for achieving certain goals is performed through technical criteria. These are usually subjected to measuring and are related to the level of technical risks. Energy criteria could also be added to this type.

Some examples of technical (energy) criteria are:

- *the degree of reliability of the chosen technology*
- *minimal technical risk during the project implementation*

- *minimal technical risk for achieving energy savings calculated in advance*
- *energy consumption of the available (accessible) energy sources*
- *minimum relative energy consumption after the project completion (maximum energy savings)*
- *minimum management and maintenance costs.*

Criteria related to the energy efficiency measures

The nature of certain measures and actions for improving energy efficiency could be a significant criterion for choosing the priority actions and projects within the programme. Some of the most commonly implemented measures are technical, organizational, and regulatory stimuli. Based on the programme's goals the municipal administration could prefer certain groups of measures to others.

The SEU are identified based on the following criteria:

1. An action, a facility or a site with energy consumption exceeding a certain percent of the overall energy consumption of the municipality or a of a group of sites
2. A site, a facility, a process or a system within the EnMS with significant potential for improving the energy performance
3. A site, a unit, a facility, a process, or a system within the EnMS for which there are or are expected certain discrepancies with the legislative requirements or the expectations of the interested parties.

The following qualify as SEU:

- Sites, facilities, or units which are to be decommissioned within the next 12 months
- Sites, facilities, or units which have been subjected to significant changes, and for which the available information in the following 6-month period is expected to be insufficient for an objective assessment of energy performance.

Objectives and action plans in accordance with point 6.2 of this guide shall be drawn up from the identified measures for energy performance improvement.

Energy reviews are performed in case of: major changes in the initial state; changes in the energy used; changes in the fuel base and the energy conversion method. The update of the energy review is carried out after sufficient statistics on consumption have been accumulated after the changes (between 6 and 12 months).

6.4 Energy performance indicators

The energy performance indicators (EnPI) are determined using the results of the energy review. They characterize the energy use, which can be verified measured and assessed based on, e.g., a specific cost (kWh/m²/year, kWh/m²/month).

The permissible significant deviations in the energy characteristics are also determined. A suitable EnPI shall be determined for each SEU identified. A certain measure for ensuring the necessary circumstances shall be laid out for all the identified SEU, where it is impossible to verify, measure or assess the energy consumption.

The permissible significant deviations in the energy characteristics are also determined

The specific energy efficiency goals must be characterized with the values if the chosen EPI. The EPI must provide the organization with the tools necessary for monitoring and assessing the

accomplishment of these goals. The EnPI must, as far as possible, include significant energy consumption.

The identified EnPIs shall be documented in the **energy review**.

The energy performance indicators and the permissible considerable deviations shall be reviewed and corrected when updating the energy review, as well as when the energy performance indicators no longer reflect the energy consumption correctly.

6.5 Energy baseline

A specific energy baseline shall be determined for each EnPI. The energy baselines are determined using the results of the energy review. What should be determined is a baseline and a basis period, reflecting the operation cycles, the regulatory requirements and the variables affecting the energy consumption and the energy efficiency. In most cases the cycle of the baseline is related to the annual cycle of the climate factors.

The determined baselines for the chosen base period of the municipality shall be documented in the **energy review**.

The corrections in the energy baselines are made when updating the energy review, as well as when the energy performance indicators no longer reflect the energy use correctly.

The energy baselines can also be updated when reviewing the Manual and when performing internal audits of the system.

6.6 Planning for collection of energy data

The energy review identifies the main energy sources as well as the considerable energy uses. It also determines the energy performance indicators (EnPI), the energy baselines and the corrections of the energy baselines.

In order to use the EnPI effectively, the following should be determined:

- the period of operational control of energy consumption
- the period and time of the energy consumption assessment (usually they are related to the time of conducting an internal and a management review)
- the variables needed in order to control the energy consumption, the sources and the frequency of collecting data about them
- the people responsible for collecting data.

The team responsible for collecting data is appointed by an order issued by the management, whenever necessary.

The person responsible for the EnMS organizes and manages the collection of data.

An appropriate tool for collecting and analysing data on energy consumption is the specialized software of the Municipal Network for Energy Efficiency, EcoEnergy. The data collection plan shall be documented in the **energy review**.

7. SUPPORT

7.1 Resources

The management plans, controls and provides the resources necessary for the implementation and the functioning of the EnMS, by:

- Integrating the actions within the EnMS in the organisation's processes
- Providing the conditions for engaging the staff for achieving the EnMS goals
- Providing resources for monitoring and measurements
- Supporting the employees' initiatives for efficient use of energy.

Only well-trained staff shall be assigned to perform the actions related to energy management, including the internal audits of the system.

7.2 Competence

Human resource management includes training, qualification, motivation, providing information to employees and recruitment of competent new staff. The selection and appointment of competent staff is carried out by the management. The new staff is introduced to EnMS by the EnMS manager. Any staff training related to EnMS shall be documented in training minutes. The requirements for staff competence, level of education and practical experience are in accordance with the organizational structure of the municipality and are defined in their job descriptions.

All documents related to the competence and proving its compliance with the specified requirements, as well as those from participation in various forms of training, are kept in the files of the officials.

Mandatory briefings and trainings on safe and healthy working conditions and on fire and emergency safety, which are organized in accordance with the requirements of the regulations in force in Bulgaria.

The training and the improvement of qualification related to EnMS are carried out during the implementation of the system and regularly afterwards, according to the changes in technologies, facilities and energy supply. Training is also administered in case of change in the requirements of the specific workplace; in case of changes in the regulatory requirements; when making changes in the documents of EnMS, etc.

The training can be internal or external (conducted by external organizations). The internal training includes general acquaintance with the policy of the municipality in the field of energy efficiency; training for proper implementation of the specific activities at the respective jobs; training for the work of EnMS. The trainings are documented in the EnMS.

The trainer acquaints the staff with the basic principles of EnMS, the objectives and management policy, the documents used in the system, the contribution of each person involved to the effective operation of EnMS, and the consequences of non-compliance with these requirements.

The key tasks of the training are:

- Reduction and elimination of actions and events that would lead to a reduction in the energy efficiency
- Professional training and adaptation of new staff
- Realizing the importance of achieving and maintaining compliance with the management policy as well as with the requirements of EnMS
- Determining the actual or potentially significant impacts on energy performance

- Realizing the benefits for the municipality from increasing the energy efficiency, based on improved performance of staff
- Realizing each one's responsibilities and tasks related to achieving compliance with the energy management policy
- Determining the possible consequences of the deviations from the defined work processes.

In case additional training is necessary, or the staff needs qualification improvement, or in case there have been notifications for meetings, courses, seminars, etc., the management confirms the participation of its employees, after having considered their professional needs.

Evaluation of the benefits of the conducted training courses is performed during the management reviews or through exam results documents, certificates, and examination records.

The main responsibility for the implementation of the human resources management process is borne by the management through personnel selection, competence testing, training, evaluation and motivation of employees and workers, and through adequate remuneration.

When issuing a document from an external training organization, a copy of the document shall be added for safekeeping to the official's file.

For more information see *Step 2: Capacity Building* of the MUNICIPAL ENERGY PLANNING: Manual for Municipal Managers and Specialists.

7.3 Awareness

The management of the municipality takes specific actions in order to ensure employees are aware of the energy policy implementation and the achievement of the goals and programmes for increasing the energy efficiency. The importance of the contribution of each employee for increasing the effectiveness of EnMS and the consequences of non-compliance with the requirements of laws and regulations are explained through pre-scheduled internal trainings.

7.4 Communication

The internal communication between the management and the employees / workers is carried out within the working process through organizing and conducting regular operational meetings at different levels, through various means of communication, etc.

The person responsible for EnMS controls the operation of the system and in case a necessity arises, decides which information shall be coordinated with the EM or with the management and which official it has to be given to.

The form of the information exchange shall be determined by the person responsible for the EnMS depending on its type.

The department/directorate managers shall inform all workers/employees about the incoming requirements, amendments and additions related to the implementation of the activities affecting the work of EnMS.

All workers/employees are obliged to inform their immediate supervisor about any discrepancies with the EnMS operation requirements. For this purpose and at their request, they shall receive a blank discrepancy identification form. After completing it, they shall hand it over to their direct supervisor, who shall hand it over to the EM.

The main and most important information regarding the maintenance and improvement of the energy performance and the EnMS is discussed during the internal audits of the system and the management reviews, and the decisions taken are reflected in the auditing minutes.

The interested parties are informed about the energy policy through the municipality internet page.

The external communication processes cover the municipality's relationships with the external interested parties through:

- Determining and establishing relationships with the interested parties
- Exchanging information with suppliers about the fact that the procurement process is evaluated partly by the energy efficiency indicators (green public procurement)
- Establishing relations with the state authorities
- Maintaining up-to-date information for the legal requirements.

The external information exchange about the energy policy, the EnMS and the efficiency of the EnMS outside the statutory obligations of the municipality is performed after a decision issued by the management.

In case there is a signal from an interested party, related to a negative impact on energy performance, the signal shall be handed in to the EM, who shall review it and determine the necessity of taking appropriate measures. If need be, an expert panel shall be summoned or external consultants shall be employed. The interested parties shall be informed about the results of the measures taken.

More information about the external information exchange, see *Step 9: Program Completion* of the MUNICIPAL ENERGY PLANNING: Manual for Municipal Managers and Specialists.

http://www.eneffect.bg/images/upload/Temi/mep_guide_bg.pdf

7.5 Documented information

The documented information (the EnMS documentation) is information about the identified characteristics of the sites and the data about the functioning of the EnMS, from which it could be directly or indirectly inferred that the system works effectively. The documents contain the achieved results or present proof of actions taken (such as filled-in values, events, records, etc.).

The EnMS documents are focused on:

- the EnMS scope
- the organizational structure
- energy management policy
- analysis of the energy distribution and usage
- planning data collection
- monitoring, measuring, analysis and assessment
- identified discrepancies actions taken for correcting them.

The EnMS documentation shall outline the responsibilities, the competences, and the relationships of the personnel, which manages, performs, and controls the activities related to energy management. It also contains descriptions related to the EnMS, with, when necessary, referring to instructions, laws and regulations, standards, etc.

A detailed description of the volume and the structure of the documented information, developed in accordance with the requirement of the standards is formulated in a **separate document** and contains the following elements:

7.5.1 General provisions

Documents in the energy management system are developed by the energy management team. The type and the format of the documented information ensure the fulfilment of the applicable requirements of ISO 50001:2018. They are related to the actions carried out by the municipality within the determined EnMS range.

The system for energy management must include documents about:

-  MAINTAINING DOCUMENTED INFORMATION
-  SAFEKEEPING DOCUMENTED INFORMATION.

The volume and the structure of the documented information depend on the size of the municipality, the range of the EnMS and the staff competence.

The type and the format of the separate documents shall be developed in accordance with the specific requirements and the requests by the team, which is to be responsible for the EnMS and to use them most often.

7.5.2 Creating and updating

It should be taken into account when drawing up the documentation which documents will be corrected only when needed, which will be amended or updated regularly, and which are not subjected to correctios but replaced with newly drawn-up ones.

The recommended structure of the documentation is:

- As separate documents shall be prepared:
 - ✎ All documents, which shall be amended or updated regularly at pre-determined periods.
 - ✎ Documents, related to administrative activities, such as ordinances, training records and job descriptions
 - ✎ Documents, related to conducting internal audits and management reviews
- It is recommended that the following are also drawn up as separate documents:
 - ✎ The key documents with comparatively longer text, which can be used relatively independently and are updated only when necessary
- The rest of the information is delivered as a consolidated document, named Energy Management Manual (EMM). The names of separately drawn documents are mentioned in the respective sections in the EMM.

The EnMS documents are to be developed in a way allowing the clear and accurate identification of separate documents (name and index), as well as its affiliation to EnMS. Also, it should be clearly indicated that all documents related to the EnMS are property of the municipality and their distribution outside its boundaries is only possible after receiving an explicit approval by the management.

It should also be determined which documents must bear the name of the author and which should be subjected to approval of suitability and adequacy and by whom.

A Control system shall be developed for the documents, which are to be changed and updated. To that end, every such document shall have a *Version number* and an *Amendment number*. The version numbers shall start from #01, while the amendment numbers shall start from #00.

Amendments only are made for some less significant corrections. When an overall review and updating is carried out and the changes are significant and/or changes in the number of pages are required, the version number of the document shall be changed, the amendment takes number 00, while the changes made are included in a different version.

The documents, which are not subjected to corrections and new ones are to be developed to replace them, should have a reference number and issuing date.

7.5.3 Control of documented information

7.5.3.1 Dissemination, access, recovery, and usage

The information, which, according to the management decision, shall be brought to the attention of the operational staff (such as energy policy, general and specific energy goals, Non-compliance Records, and correcting activities), should be printed out and displayed on the information board in the municipal sites or handed in directly to the interested persons.

The updated information, concerning other interested parties (such as the energy policy), shall be displayed on the municipality's internet site.

In case of changing the documents in the system, the EM shall inform the interested parties orally or in writing by providing a copy of the changed document.

For access to external documents, such as national and international standards, directives, laws, regulations, etc., related to the processes connected to the energy use in the municipality, the EM uses the web pages of the respective institutions, the State Gazette and the legal informational system.

The external documents, such as quality certificates, energy audits, energy certificates, declarations of conformity for the purchased products, energy class certificates, tests, analyses etc., shall be managed in accordance with established organization in the municipalities, and when necessary, are to be used by the personnel involved in the EnMS.

External documents, such as technical documents (manuals, instructions, guidelines, technical specifications, guarantees, etc.) are kept by the officials responsible for the respective technical means and, if necessary, are to be used by the staff engaged in EnMS.

7.5.3.2 Safekeeping and protection

The medium (paper, electronic or other) as well as the safekeeping method shall be duly indicated for each document. It is obligatory for the signed documents to be stored on paper.

A parent folder shall be created on the server or in the computer of the EM (e.g. „ISO_50001“) with subfolders with relevant names for distributing documents.

The paper documents shall be kept in folders with relevant names and distribution method.

The distributions of documents in folders and subfolders shall be duly described. The access to the documents shall also be regulated (which are to be filled in, corrected, or for reading only). If need be, an authorized person shall be appointed, with rights to allow access to the documentation. The access to the EnMS documents, to external organizations or persons, can be granted only after permission in writing from the Management Representative.

Officials must be obliged to fill in the documents legibly, with all the required data and details: identification, names, dates, signatures, current version number, page numbering and the total number of pages, etc.

The workers and employees are obliged to fill in the forms without altering the established form.

The workers and employees who draw up, keep and maintain the documents, shall ensure that they are easy to find and given to all persons with granted access to documents, and shall ensure the appropriate conditions for protecting them.

7.5.3.3 *Managing amendments*

The EnMS documentation is subjected to alterations due to the following reasons:

- internal – results of the conducted internal audits, proposals for improvements in the system, new facilities or processes, changes in the structure, etc.
- external – recommendations from audits conducted by a second or third party or changes in ISO 50001: 2018, laws, regulations, etc.

Suggestions for amending a document from the system could be made by any official, by drawing up a written proposal, where all arguments for making the suggested amendments are laid out in detail. The EMM shall stipulate the procedure and the deadlines for reviewing and coordinating, and in case of approval, the procedure and the deadline for making amendments.

It is obligatory to record all alterations in the documents (updates, new versions, amendments) in a **separate document** (register). This register shall contain for example:

- the document amended and a description of the amendment
- submission date and date of amendments' entering into force
- the old and the new versions and the amendments
- person with whom the amendment was coordinated with.

It is also necessary to stipulate the method and the period for keeping the obsolete (old) documents.

The documents which are not subjected to corrections and shall be replaced with newly produced ones, should also be registered in a **separate document** (Register). It shall contain information about:

- the document, which is created, by mentioning whether it replaces another document
- date of creation
- the person who has registered the creation.

Documents related to conducting internal audits and management reviews do not need to be registered.

Documents that are not in a free format must be developed as forms and stored in a separate subfolder.

8. OPERATION

8.1 Operational planning and control

The operational management includes the planned activities, connected to the significant energy consumption management and the achieving of the set goals, as well as those related to purchasing facilities and services, related to the adopted energy policy.

<i>Impact spheres</i>	<i>Possible actions</i>
<i>Municipal buildings</i>	<i>Developing programmes for renovation of the municipal building stock</i>
	<i>Energy audit of municipal buildings and developing energy efficiency projects</i>
	<i>Implementing energy saving measures in the municipal buildings</i>
	<i>Managing the energy in municipal buildings</i>
<i>Street lighting</i>	<i>Energy audits of the public street lighting in the streets, squares, and open public areas (parks, gardens, garages)</i>
	<i>Preventive maintenance of street lighting systems and equipment</i>
	<i>Implementing measures for improving energy efficiency</i>

a. Controlling planned activities

It is recommended to create a **separate document** (a Register) for controlling the planned activities. When a necessity arises for completion of a certain activity within the EnMS, related to a certain completion deadline, it is registered in the respective document, by entering:

- the completion deadline
- the document containing the activity record
- the reference number of the activity in the document
- the person responsible for carrying out the activity.

Until or after the expiration of the term for implementing the activity, and after carrying out the monitoring required the person responsible for the activity shall record:

- the monitoring date
- the monitoring results and the actions taken.

b. Control of the indicators and the energy performance

The criteria for determining the areas with significant energy use and the significant deviations of the EnPI are defined in the energy review. The EnMS team is familiar with the results of the energy review, such as:

- the identified main energy sources

- the current energy performance of the sites and facilities
- the structure of energy consumption
- the identified areas of significant energy consumption
- the defined energy performance indicators (EnPI)
- significant deviations of EnPI
- baseline and baseline period
- operating cycles of energy consumption.

In order to exert control over the energy consumption processes and the documentation maintenance, the EnMS team shall use the respective tool (e.g. the specialized software of the Municipal Energy Efficiency Network EcoEnergy).

The person responsible for the EnMS or the person authorized by him/her shall make the necessary records for assessing the energy consumption in electronic form. The information needed is provided by a team, appointed through an order by the Mayor.

The person responsible for the EnMS shall review the results and prepare proposals and recommendations for improving energy efficiency of the activities, related to the cases of significant energy consumption. The relevant actions are laid out in point 10.1. Discrepancies and corrections of the EMM.

The EM shall present, upon request, the results of the EnPIs monitoring to the management for analysing and conducting an internal audit and management review.

c. Facilities and Systems Exploitation

The facilities and systems exploitation is carried out in accordance with the technical exploitation guidance.

The prevention and repair of the sites and facilities are most often carried out with the resources of the municipality. The activities should be clearly regulated, and it is recommended that they are in line with the existing practices in the municipality.

Prevention and maintenance may be outsourced to companies approved in advance by the management. It is recommended that information on approved companies be contained in a **separate document** which shall be updated as necessary.

d. Information exchange

The EnMS team shall provide information about the operational management of the staff working for, or the on behalf of the municipality, through direct meetings, e-mails, via phone, etc. To that end, the EM is to acquaint the respective suppliers and subcontractors with these requirements, and in case of signing contracts, where applicable, a requirement is laid out as a point in the contract, that the work on the task must be carried out in compliance with the energy performance.

8.2 Design

When commissioning a design, designers should have the obligation to optimize the design in a way that leads to optimal energy costs.

The results of the energy performance assessment shall be included, where possible, in the design and the purchasing specification of the project concerned. The results of the design activity are recorded in the design and reporting documentation. When awarding a design, the organization should be well

acquainted with the European Commission's criteria for Green Public Procurement and, where possible, make the most of them https://ec.europa.eu/environment/gpp/eu_gpp_criteria_en.htm

8.3 Procurement

Suppliers shall be informed orally or in writing, as applicable, that the purchasing process is partly assessed on the basis of energy performance.

Priority is given to the application of procedures for green public procurement (for more information, visit https://ec.europa.eu/environment/gpp/eu_gpp_criteria_en.htm).

9. PERFORMANCE EVALUATION

9.1 Monitoring, measurement, analysis and evaluation of the energy performance and the EnMS

9.1.1 General provisions

The monitoring, measurement, analysis, and evaluation of energy performance are carried out on the basis of collected data. Collecting that data is to be carried out in accordance with the energy review. The activities for collecting and processing the necessary information are carried out by a team appointed with an order issued by the Mayor.

The energy management team keeps the necessary records for measuring and estimating the energy consumption in electronic form and provides the information for analysis of the review by the management.

The document includes:

- updated data on energy production and consumption
- calculation of current EnPIs
- control of the significant deviations of EnPIs.

9.1.2 Compliance with legal and other requirements

The applicable regulatory and other requirements related to energy use, energy consumption and energy efficiency, which the municipality complies with, are registered in a **separate document**. This document includes:

- document name
- the latest amendments in the document
- a description of the document requirements, concerning the EnMS
- conformity verification or other requirements
- supervision deadline
- person responsible
- description of the measures to be taken for achieving compliance.

The access to the applicable legal and other requirements is carried out through legal information systems, through the State Gazette, and through the websites of the respective institutions. The adequacy of the cited legislative documents is controlled by the authorized municipality officials (the

legal department), as this responsibility is specified in the job description of the respective expert. The document is updated in case of significant changes, related to a change in the requirements or the deadline for verification.

The deadlines for the conformity verification shall be documented in the inspections register. EM independently or jointly with a competent person assesses the compliance with the legal and other requirements and, if necessary, takes the previously prescribed measures.

9.2 Internal audit

Internal audits are conducted by qualified auditors in accordance with a pre-defined program. The program is drawn by the EM and approved by the MR. The results of previous audits shall be taken into account in preparing the program.

The auditors carrying out internal audits should be qualified auditors trained in accordance with the Standards and to possess the respective certificate, to be acquainted with the actions and the processes they audit, to have appropriate qualification and at least two years of experience in this field.

9.2.1 Responsibilities of the energy management team:

- the preparation of the annual audit programme
- organization of planned and unscheduled audits
- presentation of management review reports
- control over the undertaking and implementing of corrections and corrective actions, eliminating discrepancies and the reasons for discrepancies, notes and recommendations from the audits.

9.2.2 Auditors' responsibilities

- compliance with the necessary requirements for conducting internal audits

a. development of an Internal Audit Plan:

- communicating and explaining the requirements for conducting the audit
- recording the results of observations
- performing the audit according to the plan.

e. Drawing up an “Internal Audit Report”, outlining the results of the audit and presenting it to EM:

- verification of the corrections and corrective actions taken in relation to the identified discrepancies, notes, recommendations, and conclusion of the adequate corrective actions
- keeping and storing the documents provided by the audited unit
- keeping the professional secrecy regarding information they have been acquainted with because of the audit.

9.2.3 Preparation of the internal audits

At least five days before the scheduled date for the internal audit, the auditor shall prepare an internal audit plan and coordinate it with the energy management team and with the head of the audited entity.

9.2.4 Conducting internal audits

Each internal audit shall be launched with a meeting at which the auditing team manager informs the audit subjects about the purpose, the duration and the criteria when assessing the auditing activities.

The documents are checked during the audit. The conditions for carrying out the activities in the municipality and the answers of the audited shall be recorded in order to collect and register evidence.

The findings fall into three main categories:

- non-compliance (non-compliance with a requirement)
- note (problem that may lead to non-compliance)
- recommendation (improvement opportunity).

The discrepancies and the notes shall be eliminated by registering them in a non-conformity record where the following shall be listed:

- description of the discrepancy
- reason for the discrepancy
- the proposal for corrective action / correction
- deadline for implementation
- deadline for evaluation of the results.

The notes are recorded in the internal audit report, while the subsequent actions of the respective note are not recorded. The existence of non-conformity record is noted in the internal audit report.

Discrepancies notes and areas for improvement are discussed with the auditees at the time of their detection. The discrepancies found during the audit are checked and assessed thoroughly and precisely in order to assess their significance before a non-conformity record is completed. After the completion of the audit, a final meeting is held with the auditees. The findings and conclusions of the auditors shall be communicated during this meeting.

9.2.5 Reporting the results of the audit

Within five working days, the auditor prepares the internal audit report. An integral part of the report is the non-conformity record together with records for the specific audit (if any). The auditor hands over the audit report to the EM, which stores it and informs the management and the interested officials about the conclusions in it.

9.2.6 Conducting correcting activities for eliminating the identified discrepancies

The person in charge of the audited unit is thoroughly acquainted with the discrepancies and identifies corrections and / or corrective actions with deadlines and those responsible for their implementation. The person in charge of the audited unit has the obligation to control their successful and effective implementation.

9.2.7 Verification of the corrective actions taken

The auditor, after notifying the responsible person of the audited unit, checks the actions taken to eliminate the identified discrepancies. The auditor shall record the results of this verification in the relevant non-conformity record, closing the corrective action and completing a new report in the event of ineffective corrective actions. The existence of a new record is noted in the old record. The auditor

may provide verification and closure of the non-compliance to the Mayor or to the Management Representative.

9.2.8 Analysis

The results of internal audits are analysed during the management review. The effectiveness of the corrective actions taken is reflected in the management review report and in the non-conformity records (if applicable).

9.3 Management review

9.3.1 General requirements

The management review is to be carried out at least once a year. The MR sets the date and appoints the participants in the review. The frequency of the evaluation depends on the needs for evaluation and the processes analyses. In cases when the need for shortening the period for conducting a management review is identified, this could be done with an order issued by the MR. The document check shall be described in a Record.

9.3.2 Management review prerequisites

The entry data for the review includes:

- follow-up from previous management reviews
- energy policy review
- review of the energy performance and the respective EnPIs
- review and analyses of the risks and opportunities
- results of the assessment of compliance with legal requirements and other requirements that the municipality has accepted to comply with
- degree of achievement of the general and specific energy goals
- the result of the conducted audits of the EnMS
- analysis of the identified discrepancies, the state of the preventive and corrective actions
- planned energy performance for the forthcoming period
- recommendations for improvement.

9.3.3 Outcomes from the management review

The output of the review includes solutions and planned tasks related to:

- changes in the energy policy
- changes in energy performance
- changes in EnPIs
- identifying and prioritizing opportunities for improving energy efficiency
- changes in the general and specific goals and other elements of EnMS in accordance with the commitment of the municipality for continuous improvement of the efficiency of EnMS
- the need for resources and changes in their allocation.

Decisions and planned tasks are not announced through the approved means of communication in order to ensure their implementation by bringing them to the attention of the officials.

Decisions from the meetings of the management have the force of an order, and the control over their implementation is performed by the energy management team.

10. IMPROVEMENT

10.1 Nonconformity and corrective action

Discrepancies related to the energy management, due to the non-compliance with the requirements for the sustainable energy development could be found during:

- initial inspection or during the use of energy services / resources provided by a supplier
- regular operational control
- operation of machinery and equipment
- negative feedback from stakeholders
- audits carried out by controlling bodies.

Discrepancies in the operation of the facilities may occur as a result of:

- non-compliance with the work, maintenance, and prevention instructions
- wrong installation or entry in exploitation after repair or maintenance
- damage to an appliance or a facility unit, etc.
- non-compliance with the legislative and other regulations
- non-compliance with the rules described in the EnMS.

The management official who has identified the non-compliance, shall issue a signal immediately, by filling in a Non-compliance Record. To this end, there should be a **form** prepared in advance. The filled-in Non-compliance Record shall be presented to the EM personally or through the official's direct manager. The Non-compliance Record can also be drawn up by the EM.

The findings of officials and controlling bodies related to EnMS shall be provided to the ESMS. The person responsible for EnMS assesses the findings and, if necessary, fills in a non-compliance record, referring to the relevant document.

The EM, on his/her own or with the support of an expert, shall reject or confirm the existence of discrepancies and decides whether it is necessary to take corrective actions. If such an action is necessary the problem is to be analysed, measures to eliminate the non-compliance in a way that excludes or minimizes the possibility of its recurrence are discussed and proposed. If necessary, management participates in deciding on actions to eliminate the problem.

The measures taken may include:

- actions to eliminate the detected discrepancies – correction
- additional training of officials for proper performance of their duties
- introduction of changes in the infrastructure
- revision of the energy performance
- examination of the knowledge of the respective qualification group

- checking the availability of the necessary technical documentation: instructions for maintenance and prevention, operating instructions, etc.
- preventive inspection of the facilities.

A responsible person, a term for devising and implementation of the corrective action and a term for evaluation of its implementation are determined. It is recommended that this information is filled in the Non-Compliance Record form. A copy of the Non-Compliance Record shall be presented to the person responsible for developing and implementing the corrective action.

The received and analysed discrepancy is registered.

EM, individually or jointly with a competent person, evaluates the effectiveness of the corrective actions taken, and the results are documented. To this end, an appropriate form for recording non-conformities and corrective actions must be drawn up. When the management conducts reviews and internal audits, they shall make an overall assessment of the non-conformities, the corrective actions taken, and the results.

In case a discrepancy is identified by internal audit, the actions taken shall be in accordance with point 9.2.6. When a certifying authority finds a discrepancy, the actions taken shall be in accordance with the procedures of the auditing organization.

10.2 Continuous improvement

The improvement of EnMS is achieved through the implementation of the energy policy and the implementation of the objectives set in EnMS. Energy performance indicators should be constantly monitored and improved, and the management should be committed to allocating the necessary human and financial resources.

Improvements in energy performance can be demonstrated in several ways, such as:

- Reduction of energy consumption in the scope of EnMS, by comparing past and present energy use, as if necessary, past energy consumption is normalized
- Progress towards the set goals and management of green energy sources.

Continuous improvement should be demonstrated and documented in conducting internal audits and management reviews.

BASIC STEPS IN DEVELOPING AND WORKING WITH AN ENERGY MANAGEMENT SYSTEM ACCORDING TO THE REQUIREMENTS OF ISO 50001:2018

STAGE A: EnMS DEVELOPMENT

1. Management decision

A political decision of the management, which guarantees the necessary resources for the implementation of the system. At this stage it should be determined whether an external consultant will be used, or the organization owns sufficient resources for the development and implementation of the EnMS.

2. Choosing a leading expert from the organization or an external consultant

If the organization is to develop the system with its own resources, a leading expert should be selected who is to coordinate the development and compliance with the set deadlines. In case the organization considers that it does not have the necessary experience to develop and implement EnMS with its own resources, a suitable consultant should be selected with experience not only in management systems, but also in the field of energy efficiency.

3. Official launch of the development and the implementation of an EnMS

The decision for implementation of EnMS must be secured by an order for selection of an EnMS management team and an order for preparation, implementation and operating an EnMS. (points 5.1, 5.3 of the Manual).

4. Training of the team on the requirements of the standard and drawing up a plan for implementation of the system

It shall be performed by the leading expert responsible for the implementation of the system or the selected consultant. The training of the team should be documented with a Training Record.

5. Developing the documentation structure

The EnMS management team shall develop in advance the documentation structure, based on a preliminarily drawn plan, secured with deadlines for preparation, implementation, and certification (point 7.5 of the Manual).

6. Establishing the energy policy of the organization and determining the scope of the EnMS

The energy policy is developed by the energy management team and approved by the management of the organization, in particular the Mayor of the municipality (item 5.2 of the Manual). The scope of the EnMS is defined, and should be updated if necessary, after developing the Energy Review (see step 7).

7. Developing the documentation

The following are developed using the predefined structure of the documents (step 4):

7.1. Energy Review

Collecting information for the energy consumption and the behaviour of the sites, determining the energy performance indicators, the energy baseline and the significant energy consumption (points 6.3, 6.4, 6.5 of the Manual)

7.2. Documents and procedures according to the standard requirements

Including: Organizational context (point 4.1 of the Manual); The expectations of the interested parties (point 4.2 of the Manual); Legislative and other requirements related to the energy efficiency (point 4.2 of the Manual); A list of approved suppliers (point 8.3 of the Manual); Methodology for assessing the risks and opportunities and actions for managing them (point 6.1 of the Manual).

8. Determining the general and specific goals as well as the action plans

They are determined on the basis of the documents developed in step 7, considering the available resources for their implementation, and action plans are drawn-up.

9. Training the employees

The training should be attended by both the energy management team and all the employees of the organization, involved in the use of energy. A record is drawn up with the names of all those present at the training (point 7.2 of the Manual).

10. Final approval of the EnMS

The EnMS team, together with the leading expert / the consultant, shall perform an internal inspection of the system documentation for discrepancies and omissions and shall approve the final structure of the system.

STAGE B: OPERATING THE EnMS

11. Monitoring, measurement, analysis and evaluation of energy performance

The EnMS functions in accordance with the requirements and the structure of the developed documentation (points 9.1 and 10.1 of the Manual). The aim is to accumulate enough data to ensure the improvement of the energy characteristics of the municipality. In most cases, and with well-developed documentation, actions related to energy consumption control need carrying out once a month.

12. Internal audit

It is prepared by an independent consultant or an employee of the organization who is not directly related to the EnMS. It is performed once a year or whenever necessary.

13. Management review

It is prepared after conducting an internal audit.

CERTIFICATION (upon decision of the Management)

It is performed by an accredited organization.

Supervisory audits are performed once a year by an accredited organization in order to retain the certificate.

EXPLEMENTARY METHODOLOGY FOR RISKS AND OPPORTUNITIES ASSESSMENT**1. METHODOLOGY FOR RISK ASSESSMENT**

For risk assessment the following two criteria are applied:

- Risk probability “p”
- Consequences of it occurring “c”

Each of the identified risks is assessed based on the two criteria.

For each of the criterion there are estimates assigned in ascending order - with scores from 1 to 5, 5 giving the highest value.

The estimates are defined as described below.

Risk probability

	Probability	Description
5	Very high	It can happen more than once monthly
4	High	It can happen once a month
3	Medium	It can happen once in approximately six months
2	Low	It can happen once per year
1	Very low	Not likely to happen

Consequences of the risk occurring

	Consequence	Description
5	Huge	The occurrence of the risk will lead to a critical deterioration of the energy characteristics of the site, production processes or manufactured products. There can be a large overspending of funds for energy and fuels, as well as for the implementation of corrective actions. This can lead to significant discrepancies with national and / or European legislation requiring partial or total suspension of work processes.
4	Big	The occurrence of the risk will lead to deterioration of the energy performance of the site, leading to overspending of financial resources for energy and fuels, as well as to the implementation of corrective actions in the production process. It may lead to non-compliance with national and / or European legislation, requiring a short-term suspension of work processes.
3	Moderate	As risk will lead to a noticeable but not significant deterioration in the energy performance of the site, leading to moderate overuse of energy and fuel and financial resources for the implementation of corrective actions. It can lead to discrepancies with the national and / or European legislation requiring the investment of a moderate financial resource for their elimination without noticeable termination of the work processes.

2	Small	The occurrence of the risk will have small consequences on the energy performance of the site and will not affect compliance with national and / or European legislation. It may require insignificant costs for adjustments in production activities without interruption of work processes.
1	Insignificant	The occurrence of the risk has a negligible impact on the energy performance or activity and insignificant adjustment costs. Does not require costs for adjustments in production activities.

To determine the overall assessment “**ar**” of each risk, the criteria scores and the following table are used:

		Consequence (c)				
		1	2	3	4	5
Probability (p)	5	7	10	12	14	15
	4	5	8	11	13	14
	3	3	6	9	11	12
	2	2	4	6	9	11
	1	1	2	5	8	10

The risk assessment is marked down such as: “**p,c-ar**” (e.g.: 2,3-6).

For risks whose final estimate is equal to or greater than 7 there should be foreseen activities for mastering them. The activities are registered in a **separate document** (register).

2. METHODOLOGY FOR OPPORTUNITIES ASSESSMENT

To assess the opportunities the following two criteria are applied:

- Probability of mastering the opportunity “**p**”
- Benefits of mastering the opportunity “**b**”

Each of the identified opportunities is assessed based on the two criteria.

For each of the criterion there are estimates assigned in ascending order - with scores from 1 to 5, 5 giving the highest value.

The estimates are defined as described below.

Probability of mastering the opportunity

	Probability	Description
1	Very low	Under 25% probability
2	Low	Between 25% and 50% probability
3	Medium	Between 50% and 75% probability
4	High	Between 75% and 90% probability
5	Very high	Above 90% probability

Benefits of mastering the opportunity

	Benefits	Description
1	Insignificant	Mastering the opportunity has a negligible impact on the energy performance or activity and insignificant benefits for the organization.
2	Small	Mastering the opportunity will contribute to minimal improvements in energy performance, which cannot be traced through existing energy monitoring and assessment practices. It can have a positive effect on the organization of work processes.
3	Moderate	Mastering the opportunity will lead to a noticeable (measurable), but not significant, improvement in energy performance, leading to a moderate reduction in energy and fuel costs and financial resources for corrective action. It will have a positive effect on the organization of work processes.
4	Big	Mastering the opportunity will lead to a significant improvement of the energy performance (reduction of final energy consumption by over 3%) of the site, leading to a significant reduction of financial resources for energy and fuels. The organization of work processes will be significantly improved. The quality of the produced products will improve.
5	Huge	Mastering the opportunity will lead to a significant improvement of the energy performance (over 5% reduction of final energy consumption) of the site, leading to a significant reduction of financial resources for energy and fuels. A new, more modern technology will be introduced in the production, which will significantly improve the organization of the work processes. The quality of the produced products will be significantly improved.

To determine the overall assessment “**ao**” of each opportunity, the criteria scores and the following table are used:

		Benefit (b)				
		5	4	3	2	1
Probability (p)	1	10	8	5	2	1
	2	11	9	6	4	2
	3	12	11	9	6	3
	4	14	13	11	8	5
	5	15	14	12	10	7

The opportunity assessment is marked down such as: „**p,b-ao**“ (e.g.: 2,3-6).

For opportunities, whose score is equal to or greater than 7, there should be planned activities for mastering them. The activities are registered in a **separate document** (register).



Municipal Energy Management Systems

Municipal Energy Management Systems supporting the financing of activities in the field of climate and energy at regional level

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