



50 000 & 1  
**SEAPs**

## **D3.6. Report on monitoring procedures and tools**

FINAL VERSION

**Author: PNEC, DENKSTATT**  
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Author(s)	Association of Municipalities Polish Network "Energie Cités" (PNEC) DENKSTATT
Co-author(s)	SOGESCA, CRES, EKODOMA, ARM, ECQ, AMET, OURENSE, ALBEA, AMORCE, MT PARTENAIRES
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### CONTACT:

**Email:** [50001seaps@iclei.org](mailto:50001seaps@iclei.org)  
**Website:** [www.50001seaps.eu](http://www.50001seaps.eu)  
**Twitter:** @50001SEAPs



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## 1. Executive summary

Monitoring is a very important part of the SEAP process, yet often underestimated by the municipalities. Usually, they focus most of their efforts on planning and implementing sustainable energy measures, but without checking adequately what are their real, long-term results, how they contribute to the achievement of established climate & energy targets and if some corrective measures are needed. This is because many municipalities don't understand the value and benefits resulting from regular and good-quality monitoring, treating it as just another obligation imposed by the Covenant of Mayors. But, in fact, the benefits are many. Regular monitoring of implemented measures and their impact enables better understanding of local energy situation and its dynamics, promoting achieved results among citizens and local stakeholders, planning corrective measures and SEAP revisions and identifying further needs and opportunities for improvement. To ensure efficient monitoring and that its results will be used in practice, it is necessary to plan monitoring procedures and indicators in advance, making the metering plan part of a SEAP.

50000&1 SEAPs project partners understand all this very well. That is why they made the definition of monitoring procedures and tools an important part of the work on the development of integrated SEAP + EnMS. They supported pilot municipalities in understanding the value of good-quality monitoring and in the development of a metering plan that covers all important elements and considers both quantitative and qualitative parameters. It is worth highlighting that in this case benefits of integrating SEAP with an EnMS are especially visible. SEAP methodology doesn't give municipalities any specific guidelines concerning monitoring of the progress and impacts of implemented measures and making use of the data gathered. CoM signatories are only asked to report on the overall progress of SEAP implementation every 2 years (including some quantitative data on current energy consumption every 4 years). That is where ISO 50001 comes helpful, giving municipalities detailed guidelines on how to conduct energy consumption and energy performance measurements and how to use monitoring data to constantly improve this performance.

The report gives more details on the monitoring procedures promoted by the Covenant of Mayors and ISO 50001 and the benefits of integrating both approaches. It also informs about the monitoring tools developed by the 50000&1 SEAPs consortium and partners' efforts to support pilot municipalities in the establishment of sound metering plans.

## **2. Monitoring and review of achieved results in the framework of CoM and ISO 50001**

Both SEAP guidelines and ISO 50001 highlight the importance of monitoring and review of implemented sustainable energy measures. Adequate monitoring is essential for checking and demonstrating effectiveness of implemented improvements and for planning necessary corrective measures. But there are also some differences between both methodologies. SEAP methodology gives more general guidelines and requirements concerning monitoring and reporting processes. Their purpose is to check if the signatories are making overall progress towards their main target, which is min. 20% reduction of GHG emissions by 2020, and to benchmark the results achieved by different municipalities. In this case the focus is more global, therefore local authorities wanting to use monitoring results in the local context (e.g. for checking real impacts on local energy situation, planning corrective measures or planning further improvements) need to look for another tools. One of them may be ISO 50001, which gives very specific guidelines on the selection of monitoring indicators and definition of monitoring procedures. It also informs how to use monitoring results to ensure continuous improvement of own energy performance.

### **Monitoring and reporting in the framework of the Covenant of Mayors**

Reporting on the progress and results of implemented measures is one of the commitments undertaken by CoM signatories. SEAP guidelines highlight that regular monitoring followed by adequate revisions of the SEAP allows to evaluate whether the local authority is achieving its targets and to adopt corrective measures if necessary. Therefore the document should

contain a brief outline on how the local authority intends to ensure the follow-up of the actions and to monitor their results (but without giving any specific guidelines on this). The signatories are also required to submit an implementation report every second year following the submission of the SEAP. The report should contain qualitative information about the progress of SEAP implementation, including:

- any changes to the overall strategy;
- status of implementation of respective actions and their effects;
- updated figures on the attribution of staff and financial capacities.

At least every fourth year the report should be accompanied by the monitoring emission inventory (MEI), developed in the same way as the initial Baseline Emission Inventory (BEI). The inventory should inform on the current value of energy consumption and GHG emissions on the territory of the municipality, divided per sector and per energy carrier. It should be developed on the basis of as much bottom-up data as possible, but some estimates are also possible. Comparing results of BEI and MEI allows to check if undertaken measures are really influencing local energy situation and energy consumption in different sectors.

### Monitoring and reporting in the framework of ISO 50001

ISO 50001 gives more detailed guidelines on monitoring procedures and tools than the CoM methodology. One of its main objectives is to help organisations (including local authorities) to develop a sound metering plan to measure energy performance and improvements, entailing cost reductions, improved competitiveness and GHG emission reduction. The idea is that no improvement measure or action can be proposed, described and accepted if no adequate data can be provided for evaluation. Monitoring should be set up for all relevant elements, including overall energy policy, specific objectives and targets, foreseen measures, adopted energy performance indicators (EnPIs), legal obligations and other requirements to which the organisation (municipality) subscribes.

All relevant aspects (monitoring procedures, tools, EnPIs, assigned resources, persons responsible, etc.) should be described in a document called a "metering plan". The plan should foresee monitoring of both parameters describing energy consumption and parameters affecting energy consumption, such as e.g. external temperature. Both types of parameters shall be clearly defined and established. The energy consumption shall be assessed taking into consideration:

- relationship between the consumption and different parameters affecting it;
- relationship between expected and actual consumption.

The results of this assessment are to be used to investigate the effectiveness of the whole energy saving programme and of its respective actions. All data, figures and comparisons used for the assessment should be recorded and kept.

It is vital for Public Authorities wishing to implement ISO 50001 to have a clear grasp of which measurements are actually possible and reliable for monitoring, of the available meters and metering systems, and whether these metering systems are appropriate for the metering needs of the planned activities and objectives.

It is also important to ensure proper definition and documentation of tasks and responsibilities related to data collection, elaboration, analysis and reporting.

### Integrated approach to monitoring and reporting

One of the key benefits of integrating SEAP with an EnMS following ISO 50001 is the significant improvement of monitoring procedures that exceed beyond CoM requirements and give municipalities detailed and reliable information on their energy performance. While SEAP methodology focuses rather on monitoring progress and overall impact of implemented measures, ISO 50001 concentrates on more detailed aspects, such as monitoring of energy consumption and energy uses related to different municipality's operations and following various energy performance indicators. Only integrating both approaches will give the municipality complete picture of its energy situation.

Although scope of a SEAP is wider than a scope of the traditional EnMS, it is recommended that the municipalities use ISO 50001 monitoring guidelines to monitor and evaluate both their own energy performance and the performance of the private sectors.

### 3. 50000&1 SEAPs monitoring tools

In order to support the partners and pilot municipalities in ensuring adequate and efficient monitoring of their SEAPs and EnMSs, DENSKTATT developed a set of monitoring tools which were collected in 2 excel files:

- SEAP + EnMS development monitoring programme
- SEAP implementation monitoring programme

The 1st tool focuses on the process of SEAP + EnMS development, while the 2nd one on the process of actions implementation. Both of them can be further expanded and adapted to the local needs.

#### SEAP + EnMS development monitoring programme

This instrument is intended to help towns/cities/regions to evaluate, themselves, their steps in the development of SEAP and EnMS and to develop further plans to achieve their goals regarding energy efficiency and CO<sub>2</sub> emission reduction. It includes three sheets:

- SEAP monitoring sheet,
- EnMS monitoring sheet
- "Overview" sheet

SEAP and EnMS monitoring sheets are to be filled in during the process of the audit and according with classifications established, while the "Overview" sheet is completed automatically on the basis of the data collected in the 1st two sheets.

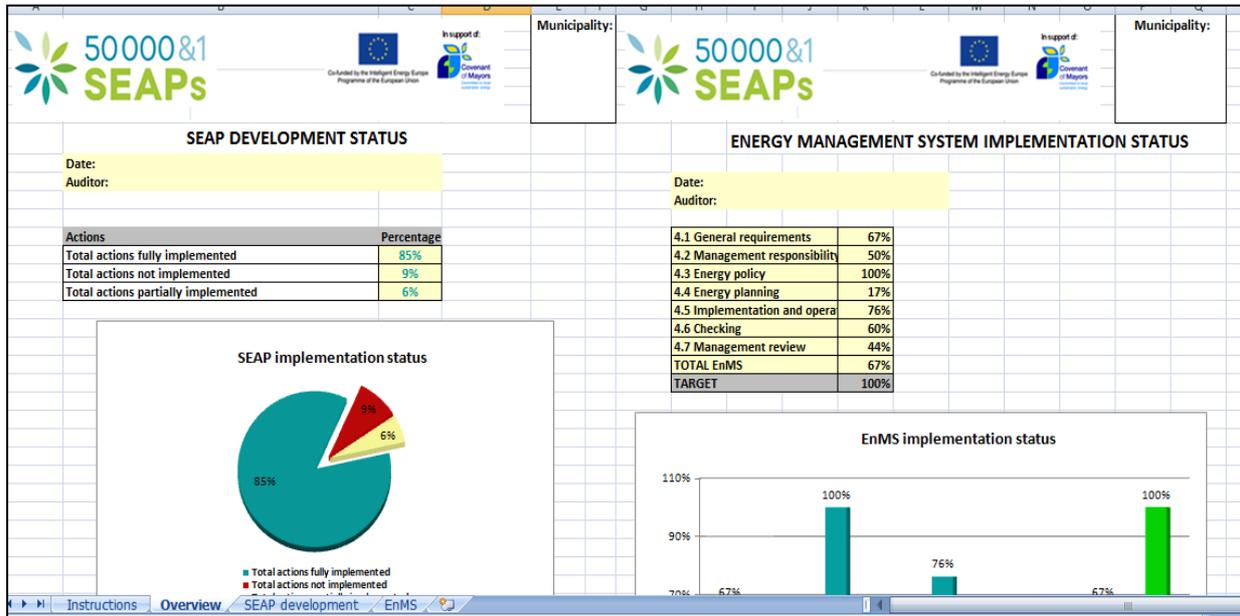
**SEAP monitoring sheet** aims at the monitoring of the progress of the plan's development and verification if it complies with the CoM requirements. It includes a check list helping the municipality to develop a good quality SEAP and informs how close it is to achieving this target.

  		<b>SEAP MONITORING TOOL</b> Municipality.....	
Date: Auditor:			
Nr Crt	REQUIREMENTS	EVALUATION	COMMENTS
1	There is a political commitment regarding Covenant of Mayors (Local Council) approval for adhesion?	No	
2	There is a specifically commitment to reduce CO2 emissions with 20% till 2020?	No	
3	There is signed the adhesion to CoM?	No	
4	The Adhesion is uploaded on CoM site?	Partial	
5	There is a decision regarding implementation team, including team leader and responsibilities of the team?	Yes	
6	Have the members of the team the proper skills and competency to develop a SEAP?	Yes	
7	If a consultant is needed for the project implementation was it decided and the contract signed	Partial	<i>Example: Consultant was chosen but the contract is not signed yet</i>
8	There is a Forum organized to involve all interested parties and collect their ideas?	Yes	
9	The local situation was evaluated by CO2 baseline emission inventory -BEI (energy and greenhouse gas emissions) prior to SEAP development?	Yes	
10	Is BEI included in the SEAP?	Yes	

**EnMS monitoring sheet** aims at the monitoring of the progress of the EnMSs development and verification if it complies with the ISO 50001 requirements. It includes a check list helping the municipality to develop a good quality EnMS and informs how close it is to achieving this target. There is also plenty of space for comments and findings that could improve the work on the system.

  		<b>ENERGY MANAGEMENT SYSTEM IMPLEMENTATION MONITORING TOOL</b> Municipality.....	
Date: Auditor:			
<b>ISO 50001 - Evaluation</b>			
<b>Requirements for an energy management system</b>			
Each question is provided with a point-based value, whereby the points have the following meanings:			
0 Nothing exist			
1 Very few records, responsibilities and/or documents exists, no results existing, no processes described			
2 Most of the requirements are fulfill, most of processes described, responsibilities are defined			
3 All requirements are fulfill (some improvement opportunities could exist)			
<b>4.1 General requirements</b>			
Chapter	Standards requirements	Evaluation	Findings
4.1 General requirements	The organization shall: a) establish, document, implement, maintain and improve an EnMS; b) define and document the scope and boundaries of its EnMS;	2	
<b>Total result</b>		2	67%
<b>4.2 Management responsibility</b>			
Chapter	Standards requirements	Evaluation	Findings
4.2.1 Top management	Commitments top management: a) establishing, implementing and maintaining an energy policy; b) appointing a management representative and approving the formation of an energy management team; c) providing the resources needed for the EnMS; d) identifying the scope and boundaries to be addressed by the EnMS; e) communicating the importance of energy management; f) ensuring that energy objectives and targets are established; g) ensuring that EnPIs are appropriate to the organization; h) considering energy performance in long-term planning; i) ensuring that results are measured and reported at determined intervals; j) conducting management reviews.	2	
<a href="#">Instructions</a> / <a href="#">Overview</a> / <a href="#">SEAP development</a> / <a href="#">EnMS</a>			

The "Overview" sheet is completed automatically and shows the current status and results of the work on SEAP and EnMS development.



## SEAP implementation monitoring programme

SEAP implementation monitoring programme focuses on the next step of the process, i.e. implementation of planned sustainable energy measures. It has been developed on the basis of the CoM requirements and recommendations concerning monitoring, evaluation and reporting of SEAP implementation. It helps to follow progress and impacts of different measures included in the action plan. The excel file includes three sheets:

- monitoring schedule
- monitoring sheet
- implementation & monitoring action plan

The 1st sheet is meant to establish and follow monitoring meetings schedule. In each monitoring year at least four meetings focusing on SEAP follow-up should be conducted and the observations from the meetings should be included in the table.

It is recommended that the meetings are organised with a quarterly frequency. If a planned meeting cannot be done for various reasons, it should be rescheduled. If a monitoring

quarterly session was not performed at all, a notice should be imported into the observation section, mentioning the reasons / causes that led to this aspect.

The person responsible must ensure that the monitoring process works as planned, and that monitoring meetings are attended by at least 75% of the SEAP team members. After the end of each session, the status review should be mentioned in the I&M Action Plan, importing the SEAP performance score given by the monitoring sheet.

  						Yearly SEAP monitoring meeting schedules	
SEAP Monitoring Program					LOGO	MUNICIPALITY of.....	
Version_data	Approved by:			Aprobat DL *****			
Revised by:	Meeting schedule			Observation			
Monitoring year	Q I	Q II	Q III	Q IV			
2016	I	II	12-9-2016	13-12-2016			
2017	15-1-2017	15-5-2017	12-9-2017	12-12-2017			
2018							
2019							
2020							

The 2nd sheet is meant to monitor the progress of implementation of respective measures. For each measure planned in the SEAP following information are provided: name, description, period of implementation, person/department responsible, monitoring indicators, implementation score (0-24%, 25-49%, 50-74%, 75-99% and 100%) and observations.

  						IMPLEMENTATION AND MONITORING TOOL					
SEAP - city of .....							LOGO	MUNICIPALITY O			
Version_data		Approved by:									
Revised by:											
Score card gradings:											
0%	The action was implemented in a proportion between 0-24%										
25%	The action was implemented in a proportion between 25-49%										
50%	The action was implemented in a proportion between 50-74%										
75%	The action was implemented in a proportion between 75-99%										
100%	Then action is finished 100 % implemented										
Nr.	Measure / Action	Description of measure	Period of implementation	Responsible	Monitoring indicators	Implementation score card (%)			Observations		
						0	25	50	75	100	
1	Example: Distribution of a best practice manual regarding environment and energy efficiency in public institutions.	Elaborating of best practice manual with relevant messages regarding environmental protection Printing of 5000 pieces and	2013-2014	Executive Director - Patrimony Department	-1 manual project ( draft) and Local Consilium Decision for the budget - Acquisition proces for best practice manual execution - Proces of best practice manual execution	25					

The 3rd sheet is devoted to the implementation & monitoring action plan. All new/reviewed actions agreed during the monitoring meetings are recorded here and carefully followed to be completed.

  				
<b>ACTION PLAN</b>				
<b>Actions agreed during the monitoring meetings</b> <small>(all actions set up by the SEAP team will be recorded and carefully followed to be completed, in order to avoid any problems in the SEAP implementation. Action which might be upscaled in the organisation will be done by the SEAP process owner)</small>				
				<b>Data:</b>
Nr. Crt	Subject/Topic	Action	Responsible	Deadline
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				

## 4. 50000&1 SEAPs monitoring support

Project partners supported pilot municipalities in planning their monitoring activities not only by developing dedicated monitoring tools (presented in the previous chapter) but also by organising dedicating trainings, providing on-the-job consultations and actively participating in the development of sound metering plans considering all relevant aspects and parameters. By the end of the project the metering plans were completed and approved in most of the pilot municipalities. In most cases they were part of a SEAP - only few partners/municipalities decided to develop them as separate documents.

Following 5000&1 SEAPs guidelines, project partners made sure that all metering plans include both parameters describing energy consumption and parameters affecting energy consumption. The table below shows most typical parameters used in local plans developed within the projects:

Most typical parameters describing energy consumption	Most typical parameters affecting energy consumption
<ul style="list-style-type: none"> <li>• Electricity consumption - total and per sector (kWh, MWh, kWh/m<sup>2</sup>, MWh/m<sup>2</sup>)</li> <li>• Heat consumption - total and per sector (kWh, MWh, kWh/m<sup>2</sup>, MWh/m<sup>2</sup>, temperature corrected)</li> <li>• Heating fuels consumption - total and per sector (kWh, MWh, kWh/m<sup>2</sup>, MWh/m<sup>2</sup>, temperature corrected)</li> <li>• Vehicle fuels consumption - total and per sector (kWh, MWh, kWh/passengerkm, MWh/passengerkm)</li> <li>• GHG emissions due to energy consumption - total and per sector (tCO<sub>2</sub>e)</li> <li>• internal open source software implementation</li> </ul>	<ul style="list-style-type: none"> <li>• Weather conditions</li> <li>• Building characteristics</li> <li>• Building maintenance and operations</li> <li>• System operations</li> <li>• Use of devices and appliances</li> <li>• Types of lights used in street lighting</li> <li>• Hours of use</li> <li>• Maintenance of street lighting</li> <li>• Municipal fleet characteristics</li> <li>• Number of passengers and distances covered</li> <li>• Private fleet characteristics</li> <li>• Driving routes</li> <li>• Driving practices</li> <li>• Behavioural aspects</li> </ul>

The partners also supported pilot municipalities in defining **monitoring procedures** that will be used to ensure adequate follow-up of the actions implemented and their results. The most typical steps of the process included:

- Establishment of the EnMS team;
- Sharing roles, responsibilities and competences related to monitoring and reporting;
- Definition of monitoring indicators;
- Definition of monitoring guidelines, working methods and procedures;
- Setting up of a monitoring system;
- Implementation and maintenance of the monitoring system.

In many cases, due to the lack of smart metering devices, monitoring of energy consumption will be based on regular (monthly) checking of energy invoices and energy meters. In some cases it was suggested to conduct more frequent monitoring for the most important/most energy consuming buildings (e.g. on a daily or weekly basis). Also regular (e.g. quarterly) reviews were suggested with relevant reports prepared for the top management. Once a year the monitoring plan should be controlled and reviewed.

Except for following changes in energy consumption, the metering plans envisage monitoring the progress of SEAP and EnMS implementation based on pre-defined indicators.

Regarding the **monitoring tools**, except for the common 50000&1 SEAPs "SEAP + EnMS development monitoring programme" and "SEAP implementation monitoring programme", the partners were working also with other monitoring tables, with the modules specifically designed for the local purposes and adapted to the local conditions. In most cases they were also Excel based, only the French partner reported working, among others, with the SCADA system. Often, the Excel files were accompanied with Word-file instructions and procedures on how to collect, insert and analyse the data.

The project partners also helped to ensure that the metering plans developed and adopted by the pilot municipalities meet both CoM and ISO 50001 requirements.

## 5. Benefits from good-quality monitoring

Paying adequate attention to the definition and implementation of sound monitoring procedures, tools and indicators pays off. Regular and efficient monitoring enables:

- checking the progress of implemented measures;
- checking the effectiveness of implemented measures and their real impact on municipality's energy performance;
- planning corrective actions and necessary revisions of a SEAP;
- demonstrating achieved results to the local politicians, local stakeholders and the citizens;
- improving reliability of local authorities;
- building detailed knowledge of local energy situation and local needs and - basing on that - planning further energy saving measures.

## 6. Attachments

- **ATTACHMENT 1:** SEAP + EnMS development monitoring programme
- **ATTACHMENT 2:** SEAP implementation monitoring programme

## CONSORTIUM:

SOGESCA (Coordinator) - [www.sogesca.it](http://www.sogesca.it)

CRES - [www.cres.gr](http://www.cres.gr)

PNEC - [www.pnec.org.pl](http://www.pnec.org.pl)

EKODOMA - [www.ekodoma.lv](http://www.ekodoma.lv)

ARM - [www.arm-bg.net](http://www.arm-bg.net)

ECQ - [www.ecq-bg.com](http://www.ecq-bg.com)

AMET - [www.amet.ro](http://www.amet.ro)

DENKSTATT - [www.denkstatt.ro](http://www.denkstatt.ro)

DEPUTACION OURENSE - [www.depourense.es](http://www.depourense.es)

ALBEA - [www.albea-transenergy.com](http://www.albea-transenergy.com)

AMORCE - [www.amorce.asso.fr](http://www.amorce.asso.fr)

MT PARTENAIRES INGÉNIERIE - [www.mt-partenaires.com](http://www.mt-partenaires.com)

ICLEI Europe - [www.iclei-europe.org](http://www.iclei-europe.org)