METHODOLOGY TO DEFINE ENERGY EFFICIENCY CAPACITY BUILDING SCHEMES IN *MUNICIPALITIES*

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ACTION FOR ENERGY EFFICIENCY IN BALTIC CITIES
ACT NOW!
Interreg Baltic Sea Region
EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND
EUSBSR EU STRATEGY FOR THE BALTIC SEA REGION

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List of abbreviations

CBS	Capacity Building Scheme
EE	Energy Efficiency
EnMS	Energy Management System
PPP	Public Private Partnership means in the report any formal collaboration between public authorities and private companies.
RTU	Riga Technical University
SEAP	Sustainable Energy Action Plan
SECAP	Sustainable Energy and Climate Action Plan
SWOT analysis	Strengths, Weaknesses, Opportunities and Threats analysis

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1. Introduction

Act Now! project provides a consistent methodology identifying capacity gaps for SEAP implementation in municipalities. The aim is to have an optimal and tailored **capacity building scheme** uncovering the identified obstacles. The methodology is also applicable for municipalities that would like to update their current SEAPs to SECAPs or even to municipalities that would like to create a new SECAP without having a SEAP.

The customised capacity building methodology is based on 2 main stages (Figure 1):

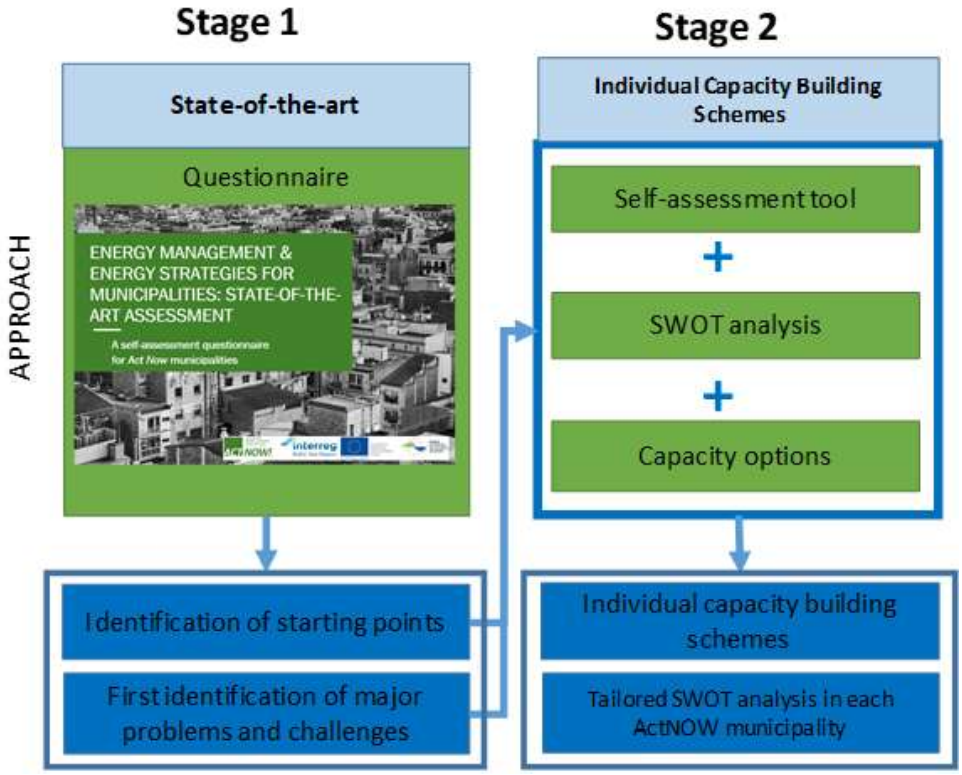


Figure 1: Act Now! customised capacity building methodology.

The starting point towards the proposed approach begins from the strategic local energy planning. Further steps are oriented towards the organisation and process analysis in the administrative environment and approaches needed to rearrange work flows and energy management systems. In this context it should be explored the adoption of technical solutions for energy monitoring and the identification of potential investments in energy efficiency projects as well as the related implementation of knowledge capacity-building schemes.

The main elements characterising each stage are:

- **STAGE 1**: first identification of major problems and challenges in the Energy Management System (EnMS) and Energy Efficiency (EE) within the SEAP, SECAP or municipal energy plans. This task is fulfilled by the use of a specific **questionnaire** as a simple tool for the municipality to evaluate and understand their current situation, to identify areas of strength for building upon, and also to identify areas where improvement may be desirable or even necessary (See chapter 3.1 for further details, and the *Act Now!* learning platform for the actual questionnaire: actnow-baltic.eu/learning/tools);

- **STAGE 2:** identification of specific needs and gaps by implementing a **SWOT** analysis and a **Multi Criteria Approach** in quantitative self-assessment tool**.** These tools aim for identification of the potential key priorities for implementing a Capacity Building Scheme.

Within the assessment methodology, mostly related to the municipal building stock, some attention must be paid also to the building stocks of private-owners and housing associations. This aspect is essential for the overall Energy Management System (EnMS) and Energy Efficiency (EE) strategies at the municipal level (See also the *Act Now!* Guideline "Public Private Partnerships" available at actnow-baltic.eu/learning).

2. Questionnaire

The questionnaire is thought to be filled in by municipal administrative and operational staff in close cooperation with the energy department (energy working groups if existing) and finally approved by the municipal council. Once the questionnaire is completed it should be regularly reviewed. Ultimately, who is involved in actually filling in the questionnaire depends on each municipality's individual structure and capacity.

The questionnaire covers four main areas. It provides the ground for the Capacity Building Scheme (CBS using capacity-building tools and solutions relevant to each respective topic. It is offering a systematic approach to strengthen municipal capacity both on energy efficiency management and on the existing energy management system (EnMS). Table 1 shows the main areas, the specific contents and the major outcomes addressed in the questionnaire.

Main part	Specific content	Major outcomes
1. Municipality profile and context	1.1. General description 1.2. Targets, policies and investments 1.3. Building energy efficiency	• National framework • Energy balance & consumption patterns • Political commitment • Fund allocation • Supportive aspects & obstacles
2. Existing energy management models and future visions in the selected building segment	2.1 Existing energy management models 2.2. Future visions and expectations	• Building stock • Energy management in buildings • Major problems & future challenges • Next steps
3. Stakeholders and major target groups	3.1 Identification of stakeholders 3.2. Identification of major Act Now target groups	• Relevant stakeholders • Stakeholder & citizen involvement • Target groups (TG) identification • TG challenges & first ideas for solutions
4. Municipality competences and resources		• Human res. & organizational structures • Existing knowledge & awareness • Existing capacity building measures • Funding guidance for public sector

Table 1: Structure of the questionnaire

2.1 Application of SWOT analysis for performance improvement

In order to reach significant capacity improvements in municipalities within the context of EnMs and EE, the gap between each municipality's current energy efficiency capacity and the desired capacity or aimed performance has to be analysed, based on two pillars:

1. the review of the organisation's strategic plans and the needs and context assessment;
2. an evaluation of performance gaps.

The **Strengths, Weaknesses, Opportunities and Threats (SWOT)** analysis is a commonly used approach to assess the current and desired performance gaps. After the implementation of a performance and needs assessment, improvement measures must be selected, which in this case are defined as various capacity-building strategies [1].

SWOT analysis is a valuable and structured tool for simple, useful and qualitative analysis of various management procedures, projects and plans [2]. It is a "situation" analysis which allows evaluating the gap between the current and a desired performance or level [1] [3]. As a structured approach the SWOT analysis improves the comparability and transferability of the results and allows to define more specific and measurable objectives [1].

The input data for SWOT analysis include the output from strategic plans, from needs assessment and the state of various collected performance measures. The output will provide significant insight for a successful strategy formulation [4].

SWOT analysis provides a context for performance improvement and essential information for improved decision-making strategies [1]. The output of SWOT analysis will provide significant insight for successful strategy formulation [4].

SWOT analysis is carried out through a less formal „brainstorming" process by individuals, teams, or organisations. A brainstorming session provides both a powerful learning experience to the stakeholders as well as increases their awareness of the potential issues for capacity building [3].

2.2 SWOT analysis application process

The main steps for the SWOT analysis application [1] [3] [5] are as followed and summarised according to Figure 2.

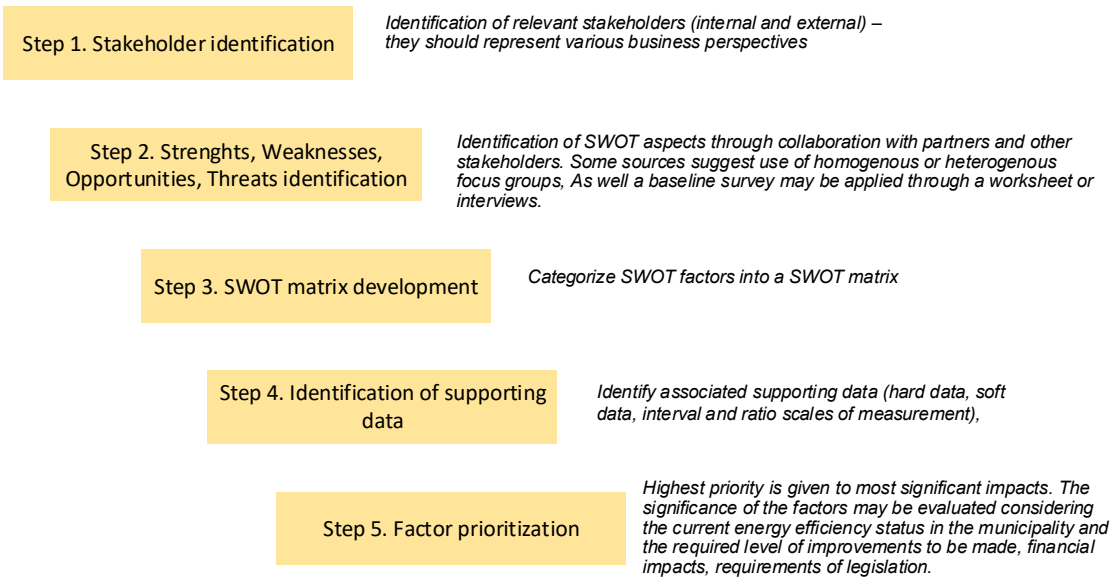


Figure 2: SWOT's steps.

In **Step 1 and Step 2** both situation-related and operational parameters are identified that are substantial for defining an objective for a performance improvement initiative [1] [4].

In **Step 2** factors that are enhancing the desired performance are called Strengths, while those ones inhibiting it are defined as Weaknesses. Strengths and Weaknesses are internal indicators. Strengths characterize a system's own resources and capabilities, e.g. employee knowledge, new technologies, particularly for a municipality they include the areas in which the municipality is more effective and efficient than others or in respect to the level requested by standards. Subsequently, a system's Weaknesses include its lack of capabilities and features. Determination of the Weaknesses for each of the municipalities will lead to resolution of potential future problems regarding their long-term strategies and plan [1] [6].

The analysis also considers external conditions that have impact on the desired performance (external analysis). Other sources also characterise the internal factors as controllable and external ones – as non-controllable factors. External enhancing factors are classified as Opportunities while hindering factors are defined as Threats. Opportunities include external possibilities that a municipality might pursue or exploit for benefit, while Threats could potentially reduce the municipality's performance. For a municipality Threats could be e.g. change in legislation, requirements, lack of energy efficiency specialists in the region [1] [6] [7].

The assessed internal and external factors are summarised in a SWOT matrix in the **Step 3** (Table 2).

The categorization of various SWOT factors can be led by following questions [based on [1]]:

- Does this item represent an asset or liability to the municipality?
- Is this item within municipality's control?

To ease the identification of SWOT factors for **Step 4** a number of leading questions may be applied as summarized in Table 2 [based on [7]].

	Strengths	**Weaknesses**
Internal factors	• What capacities are currently strong? • What are the factors supporting the energy efficiency? • Which are the municipality's advantages over the competition? • ….	• What could be improved? • What should be avoided? • What obstacles hinder energy capacity improvement? • What elements need strengthening? • …
	Opportunities	**Threats**
External factors	• What benefits may occur? • What changes in usual practice and available energy efficiency technology may occur? • What policy changes may occur? • What changes in standardization may occur? • What changes in socio-economic behaviour may occur? • …	• Do the relevant stakeholders show their willingness and interest to support the technology energy efficiency? • What external obstacles can hinder the capacity improvement measures? • Are any potential changes threatening the energy efficiency measure implementation and capacity building? • …

Table 2: Generic SWOT analysis matrix Key questions for SWOT categories

2.3 The SWOT-AHP hybrid method

Step 5 is the latest stage of the SWOT analysis requiring to prioritize the identified factors by a weighting process like the Analytic Hierarchy Process (AHP)

Although the SWOT analysis is a very useful tool, researchers have noted its lack mostly on identifying the SWOT factor groups and not defining groups with most impact on successful strategy implementation, as well as lack of analytical determination of factor importance [4]. Therefore, a hybrid SWOT-AHP (Analytic Hierarchy Process) method was introduced [4], it complements SWOT with additional quantitative information and prioritizes the factors.

Analytic Hierarchy Process (AHP) is a multi-criteria decision-making method intended for complex problem solving [6]. AHP provides a measurement of the relative importance of the identified factors accordingly to stakeholder's point of view [8].

The hybrid SWOT-AHP methodology applies to the municipality's energy efficiency capacity research as follows:

- The questionnaire is used as a base to determine the current situation and draft the potential SWOT analysis matrix. After that the evaluation of the SWOT factors must be performed by the members of an expert focus group (representatives of the municipality).
- Following the identification of the main SWOT factors, the expert focus group members will use their insight to perform the pair-wise comparisons guided and structured through a common evaluation template.
- The data analysis is performed in the provided Excel tool and specific priority indexes are calculated (see example below) for evaluating results.

Thus, in order to provide a more in-depth analytic approach to the municipality's SWOT analysis, the presented methodology includes the implementation of a SWOT-AHP analysis with three main steps [5] [8] (see Figure 3):

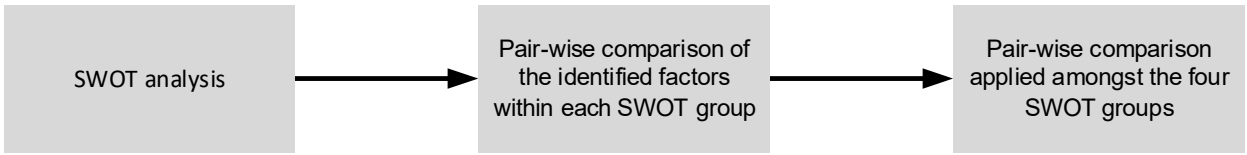


Figure 3: SWOT-AHP analysis

- **Stage 1. Implementation of SWOT analysis including identification of key factors that influence the decision** (typically performed by participants or stakeholders). It is recommended that this identification should focus on up to ten most significant factors within each group.
- **Stage 2. Implementation of a pair-wise comparison of the identified factors within each SWOT group**. The comparison process is led by two main questions – which factor is more important and by how much. A Likert scale (1-9) is applied for the separate pair-wise comparison of all factors (Figure 4). Using the Excel tool implemented in *ActNow!* project (download the excel tool from *actnow-baltic.eu/learning)*, a priority value (sub-factors relative local importance) is computed for each factor using the Eigenvalue method and the highest-ranking factors are further analysed.
- **Stage 3. The pair-wise comparison method is applied among the four SWOT groups.** The four most important factors that were selected for representation of the individual groups (Step 2) are mutually compared.
- A scaling factor is computed for each group of factors, and together with their local priority values, they are used to calculate the overall priority accordingly to the equation:
-

$$Global\ priority\ of\ factors_{ij} = (priority\ value\ of_{ij})(scaling\ factor\ of\ group j)$$

where j=4 (Strengths, Weaknesses, Opportunities, Threats)

The sum of all factors is equal to 1 and each factor's score indicates the relative importance of that factor on decision.

$$Global\ priority\ of\ factors_{ij}=(priority\ value\ of_{ij})(scaling\ factor\ of\ group_j)$$

where *j=4 (Strengths, Weaknesses, Opportunities, Threats)*

The sum of all factors is equal to 1 and each factor's score indicates the relative importance of that factor on decision.

APPLIED METHODOLOGY SUMMARY

Within the current framework the hybrid SWOT-AHP methodology will be applied to the municipality energy efficiency capacity research as follows:

1. The questionnaire implemented within the first part of this group of activities may be used as a base to determine the current situation and draft the potential SWOT analysis matrix. Thereafter the evaluation of the SWOT factors must be performed by the members of expert focus group (representatives of the municipality).
2. Following a successful identification of the main SWOT factors, the expert focus group members will use their insight to perform the pair-wise comparisons guided and structured through a common evaluation template (see example in Figure 4).
3. The data analysis is performed in provides Excel tool and specific priority indexes are calculated (see example below), and results may be evaluated.

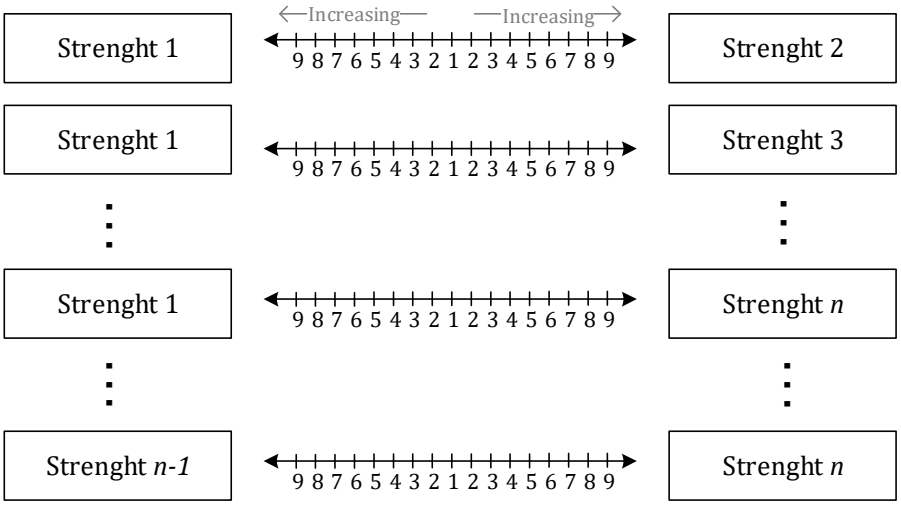


Figure 4:.The structured guidelines for pair-wise comparison of SWOT factors (for Strengths domain).

2.4 Example for implementation of SWOT-AHP analysis

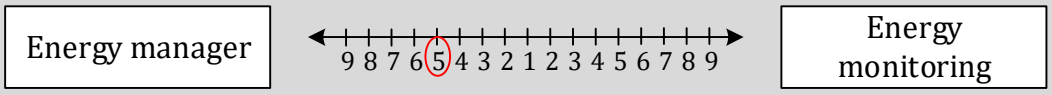
For a case of municipality energy efficiency capacity building the SWOT-AHP analysis should follow these steps:

STEP 1. A questionnaire regarding energy efficiency aspects at the municipality is performed and an expert focus group meeting is organized. The experts may be municipality representatives of various departments, e.g., energy manager, top-management officers, executive staff, and/or outsource experts. Experts are introduced with the questionnaire outcomes, as well they base their assessments on their professional (energy manager) or

STEP 2. At the focus group meeting each of experts may submit ideas for all four types of SWOT factors, but only up to top 10 most significant factors as decided by expert group discussion are added into the SWOT matrix.

STEP 3. After the development of SWOT matrix, a pair-wise comparison of the identified factors within each sub-group is performed using the structure presented in Figure 1. For a case of two strengths as "Energy manager is very active and competent *(Energy manager)*" and "Energy monitoring devices have been installed *(Energy monitoring)*" the comparison shall answer to the question: **Which of these have higher impact on municipality's energy efficiency capacity and by how much?**

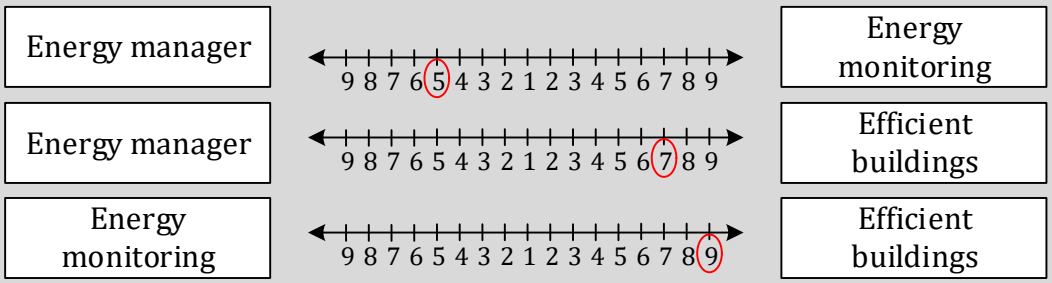
For this example, let us say, that *Energy manager* has more significant impact, as he is the one that can use the *Energy monitoring data* to analyse the actual energy efficiency situation. The evaluation scale would be as follows:



Energy manager has higher impact and the approximate amount of that impact is 5.

If the experts would value both Strengths as equal, the evaluation is 1. If any Strength has much greater importance than the other, the evaluation should be 9 on the side of that Strength. This comparison is then repeated for each factor pair within Strengths. And the same is done within other sub-categories (i.e., Threats, Weaknesses, Opportunities).

STEP 4. When all pair-wise comparisons are available the Comparison matrix is developed (it may be developed on paper or input directly in the Excel tool). Let us add a third Strength factor to the previous example – municipality has many new buildings that have been build accordingly to energy efficiency standards *(Efficient buildings)*. The pair-wise comparisons of three strengths are as follows:



The evaluation for each pair-wise comparison may be devised from average of each participants evaluation scores, or devised by group discussion.

Then, a three by three matrix may be filled, taking into account that:

- If the evaluation stands on the left side of the middle-point, the actual value is put in matrix,
- If the evaluation stands on the right side of the middle-point, then reciprocal value is put in matrix

	Energy manager	*Energy monitoring*	*Efficient buildings*
Energy manager	1	5	1/7
Energy monitoring		1	1/9
Efficient buildings			1
Efficient buildings	7	9	1

STEP 4 (continued). The lower part of matrix is filled with reciprocals to the upper values (this is done automatically within the excel tool).

	Energy manager	*Energy monitoring*	*Efficient buildings*
Energy manager	1	5	1/7
Energy monitoring	1/5	1	1/9
Efficient buildings	7	9	1

Similar evaluation is done for the overall groups Strengths versus Weaknesses versus Opportunities versus Threats, based on the overall insight form the SWOT analysis and accounting for municipality's strategy, policy and priorities (fill in Step2 in Excel tool). If all major factors are equal, then table in Excel tool may be left as pre-filled.

STEP 5. After that, the developed matrix for each group of SWOT sub-factors is input into the Excel tool (if it was not developed directly in the tool) where the priority values are calculated for each factor using the Eigenvalue method. From each group the highest ranking factor is selected for further comparison in-between the groups. The example of Excel tool output: The output from the Excel tool allows to clearly identify the highest ranking sub-factors within each group, and also provides comparison in-between the groups.

	Priority value (Sub-factor local importance)	**Strenght** group scaling factor	Sub-factor global priority
S1	0.36	0.25	0.09
S2	0.17		0.04
S3	0.38		0.10
S4	0.04		0.01
S5	0.05		0.01

The municipality or/and the expert focus group should analyse this output data, to understand which should be the main focal points for further capacity building initiatives.

3. Capacity self-assessment tool

Figure 1 shows the framework for the Excel-based **quantitative self-assessment tool** which has been developed within the project *Act Now!* project. It is an easy and systematic tool for municipalities to prioritize actions and improvements. The proposed capacity self-assessment methodology consists of five strategic phases of capacity development [9]:

- Assessment of the present capacity ->Where we are now?
- Definition of the desired state/ future vision ->What do we want to achieve?
- Comparison of the present situation and future desired state, identification of capacity gaps, planning strategies and actions to fill these gaps and achieve desired goals ->How do we get there?
- Implementation of capacity building measures ->What actions do we take?
- Monitoring and evaluation to feedback experiences into the planning phase ->How do we stay

Based on the five steps described above, a schematic representation of the methodology for capacity self-assessment is given in **Fehler! Verweisquelle konnte nicht gefunden werden.**.

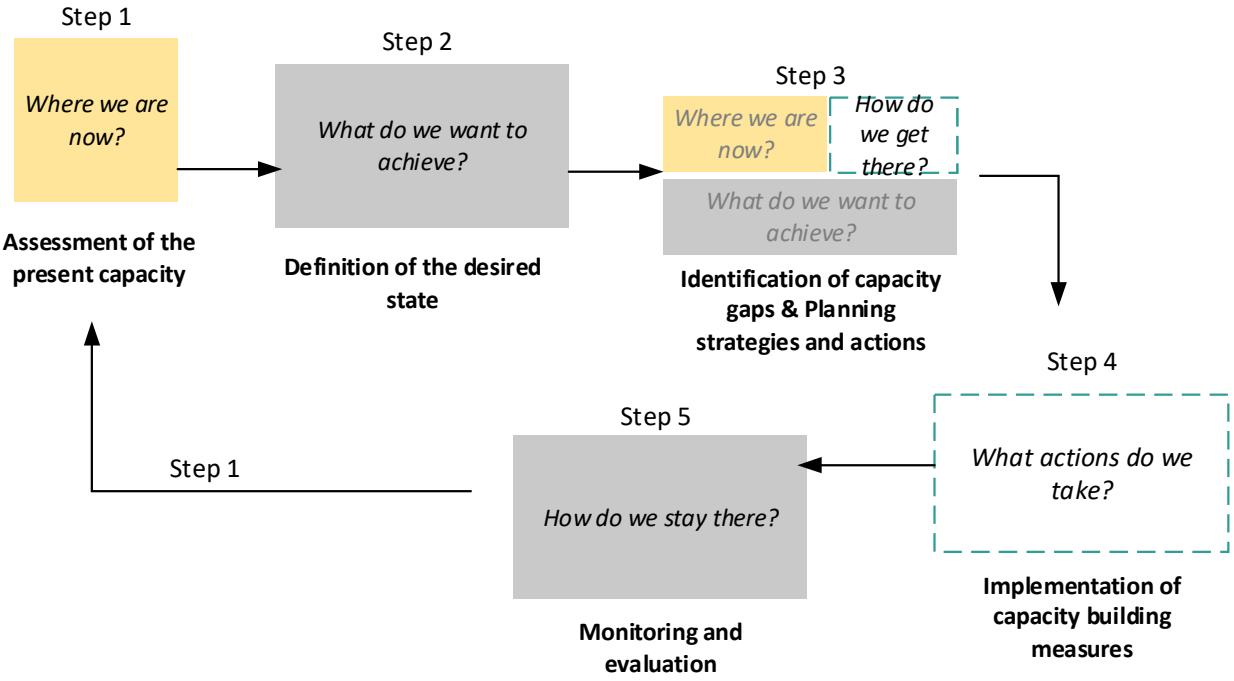


Figure 5:. Five steps of capacity building process through the use of the quantitative self-assessment tool.

Results of the self-assessment are summarized in a table describing the existing and the possible capacity under each evaluation criteria and merging the estimated capacity gap with possible capacity building schemes (Table 3 , adapted from [10])

No.	Capacity evaluation field	Existing capacity	Possible future capacity / Max score	Estimated capacity gap	Possible suggested strategies
1	Example 1	Score: 2 Compliance with evaluation criteria (EC): • EC 1 • EC 2	Score: 6	Score =4 Non-compliance with evaluation criteria (EC): • EC 3 • EC 4 • EC 5 • EC 6	• Strategy 1 • Strategy 2 • Strategy 3
2					
3					
		TOTAL score:			

Criteria for energy management assessment (see Section 2.3.2)

Result score based on points received for each evaluation criteria

Definition of municipality's goals respect different capacity criteria

Non-compliances with the evaluation criteria

Table 3: Capacity assessment matrix for a municipality within the quantitative self-assessment tool

The Excel-based tool "Energy management capacity self-assessment tool" is developed considering requirements for developing effective systems and processes in organizations to improve its energy performance according to the ISO 500001 energy management standard. The tool recognises the role of home-owners and housing association (Figure 6); particularly the "Customer Journey" approach by the

REFURB project [11] was taken into consideration. (See also the *Act Now!* Guideline "Public Private Partnerships", available at actnow-baltic.eu/learning)

3.1 Capacity evaluation criteria

The capacity evaluation criteria are grouped under six macro-dimensions as shown in Figure 6.

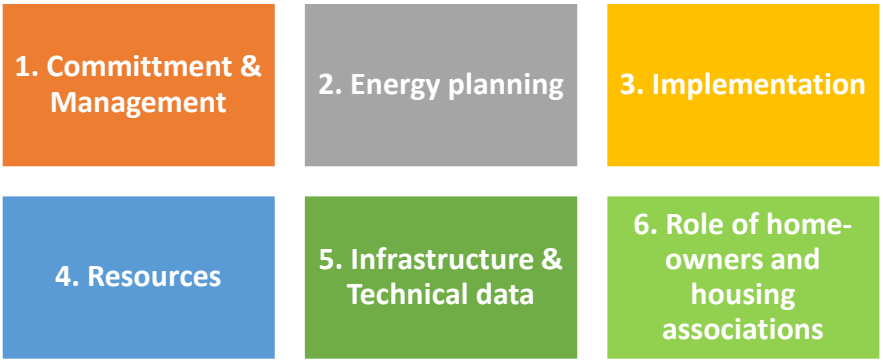


Figure 6: Six macro-dimensions for capacity evaluation implemented in the self-assessment tool

Each macro-dimension contains a number of criteria to evaluate the existing capacity. Capacity evaluation criteria considered under each macro-dimension are given in Table 4.

Macro-dimension		Micro-dimension		Evaluation criteria
1	Commitment and Management	1.1	Management Commitment	• A written energy policy for the identified building focus areas in the Municipality • Energy Policy approved by the top management (e.g. Mayor, city council, PPP) • Energy Policy communicated to all municipality employees • Energy policy communicated to external stakeholders (e.g. business-sector) • Energy Policy communicated to public • Energy Policy includes regular revision and update (if applicable)
		1.2	Energy Strategy & Action Plan	• Existing written Strategy document • Contains a commitment with quantitative improvement targets and timeline • Contains an Action Plan for implementation • Strategy and Action Plan approved by the top management • Strategy and Action Plan shared with private sector partners • Recently written, updated or reviewed / revised • Valid for at least 3 coming years/ revised • Valid for at least 3 coming years
		1.3	Management & Stakeholders	• Energy management system in place • Energy management system is certified • Local working group (supported/agreed by the management) • Appointed management representative/organization responsible for energy • Regular working group meetings

Macro-dimension		Micro-dimension		Evaluation criteria
				• Regular information exchange between working group and top management • Directly involved (municipality) employees identified • Directly involved (municipality) employees instructed • Indirectly involved (municipality) employees identified • Indirectly involved (municipality) employees instructed • Directly involved relevant stakeholders identified • Directly involved relevant stakeholders instructed • Indirectly involved relevant stakeholders identified • Indirectly involved relevant stakeholders instructed
2	Energy planning	2.1	Regulatory Compliance	• Review completed to determine legal (and other) requirements applicable to the the municipality (i.e. policy, strategy and action plan) • Relevant regulation communicated to responsible employees • Regular review/ revision of regulations • The municipality is compliant with regulations or there is a clear plan for compliance
		2.2	Monitoring and Analysing Energy Use	• Past and present energy use and consumption evaluated with appropriate energy performance indicators • Energy consumption monitored on a regular basis • Energy consumption analyzed against major energy performance indicators • Regular review/ revision of energy use and consumption • Energy performance communicated to top management on a regular basis • Documented energy consumption baseline in place with regular revision • Energy consumption monitored against the baseline • Areas of significant energy use identified based on energy analysis • Possibilities to improve energy consumption identified • Possibilities to improve energy consumption prioritized • CO2 emissions calculated • Future energy use and CO2 emissions estimated
		2.3	Target Setting	• Documented energy saving targets • Targets consistent with Energy Policy/ Strategy • Targets based on energy performance analysis • Financial, operational and business conditions, technological options and views of interested stakeholders considered

Macro-dimension		Micro-dimension		Evaluation criteria
				• Targets are reviewed and revised (if applicable) on a regular basis • Documented Action Plan consistent with targets • The Action Plan includes regular revision and updates
3	Implementation	3.1	Communication	• Energy Policy, targets and energy performance regularly communicated internally to all employees • A process is established by which any employee can make comments and/ or suggest improvements • Energy Policy, targets and energy performance are regularly communicated externally
		3.2	Documentation	• Core elements of the energy management system are documented in paper, electronic or other medium • Procedure for control of documents is established, implemented and maintained • Energy management system documentation is maintained
		3.3	Operational Control	• Operations and maintenance activities related to significant energy uses identified • Criteria for effective operation and maintenance of significant energy uses established and set • Facilities, processes, systems and equipment operated and maintained in accordance with operational criteria • Operational controls communicated personnel and eventually shared with local stakeholder • Nonconformities or potential nonconformities registered, evaluated and corrective/preventive actions taken
		3.4	Design	• Energy performance improvement opportunities considered in the design of new, modified and renovated facilities, equipment, systems and processes that have significant impact on municipality's energy performance • Results of the energy performance evaluation incorporated (where appropriate) into the specification, design and procurement activities of relevant projects
		3.5	Procurement of energy services, products, equipment and energy	• Energy consumers that have, or can have, an impact on significant energy use identified and documented • Criteria for assessing energy use, consumption and efficiency over the planned or expected operating lifetime established • Procurement of energy services partly evaluated on the basis of energy performance • Procurement of products and equipment and partly evaluated on the basis of energy performance

Macro-dimension		Micro-dimension		Evaluation criteria
				• Procurement of fuel and energy partly evaluated on the basis of energy performance
		3.6	Checking and Management Review	• Internal audits conducted at planned intervals • Energy management system is reviewed by the top management and city council at planned intervals
4	Resources	4.1	Competence, training and awareness	• Local working group members/ key personnel have appropriate education and competences to implement energy management and the improvement action plan activities • Clear job descriptions for key personnel including the management team • Employees at all levels are aware of the energy management system • Training needs are identified associated with the control of energy use and the operation of energy management system • Municipality provides trainings or take other actions to improve competence of its employees related to energy use also in connection with relevant stakeholders • Wider awareness raising initiatives held regularly (e.g. for local community)
		4.2	Financial resources and Energy Financial Commitment	• The Energy Strategy and Action Plan are taken into account when planning yearly (municipality) budgets • Certain amount of yearly budget is dedicated to climate and energy related projects • Certain amount of annual budget is dedicated to energy saving measures in buildings • Municipality searches for funding of energy efficiency measures through project proposal applications • Successful experience with third party financing
		4.3	Human resources and inter-relationships	• Personnel assigned for climate/ energy projects • Energy managers position in place • Cross-department communication established • Access to information ensured
5	Infrastructure and technical data	5.1	Energy production infrastructure	• Technical data about heat supply is available • Technical data about electricity supply is available • Biomass fuel quality is being measured • Bioenergy potential at municipal level is assessed and/or reported on a GIS-system platform
		5.2	Buildings (in the focus area)	• Installed electric energy meters in each building • Smart meters with remote data collection installed in each building • Existing electric energy metering system at system's level

Macro-dimension		Micro-dimension		Evaluation criteria
				• Existing electric energy metering system at appliance level • Individual heat energy meters in each building • Complete monitoring and measurement systems connected to cloud/ software for real-time data visualization • Remote control of energy systems (electricity and/ or heat) • Valid building energy performance certificates in place
		5.3	Other Public Sectors	• Energy audit/ inventory done for public lighting within the past 3 years • Technical data available for public lighting • Technical and energy consumption data available for municipal vehicle fleet • Technical and energy consumption data available for public transportation
6		6.1	Municipality and home-owner segment synergy	• Are goals and baseline established for the home-owner segment? • Is a value propositions developed for the selected segments? • Is a "Customer journey" process (or smilar approaches) in place within the Municipality (including communication, implementation, follow-up)? • Is there an independent single-point-of contact person to support home-owners decisions? • Has a home-owner segment working group been established? • Is the implementation progressing and results monitored and reported? • Have the stakeholders along the "customer journey" been trained to understand roles & responsibilities?
		6.2	"Customer Journey" in-depth analysis	• Have sufficient communication-means to support the decisionvmaking process been implemented? • Are the implemented activities enough to secure a high process quality across stakeholders? • Are the implemented means enough to secure and motivate further energy retrofit iterations with same home-owners? • Is a "Business Model Generation" tool being used to secure a fully functioning value proposition? • Is the implementation progressing and results monitored?

Table 4: Selected criteria for existing capacity evaluation

Evaluation of the existing capacity based on the set of criteria under the six macro-dimensions is performed using an Excel-based tool as presented in Figure 7. You can download the *Act Now!* Capacity Self-Assessment Tool from actnow-baltic.eu/learning.

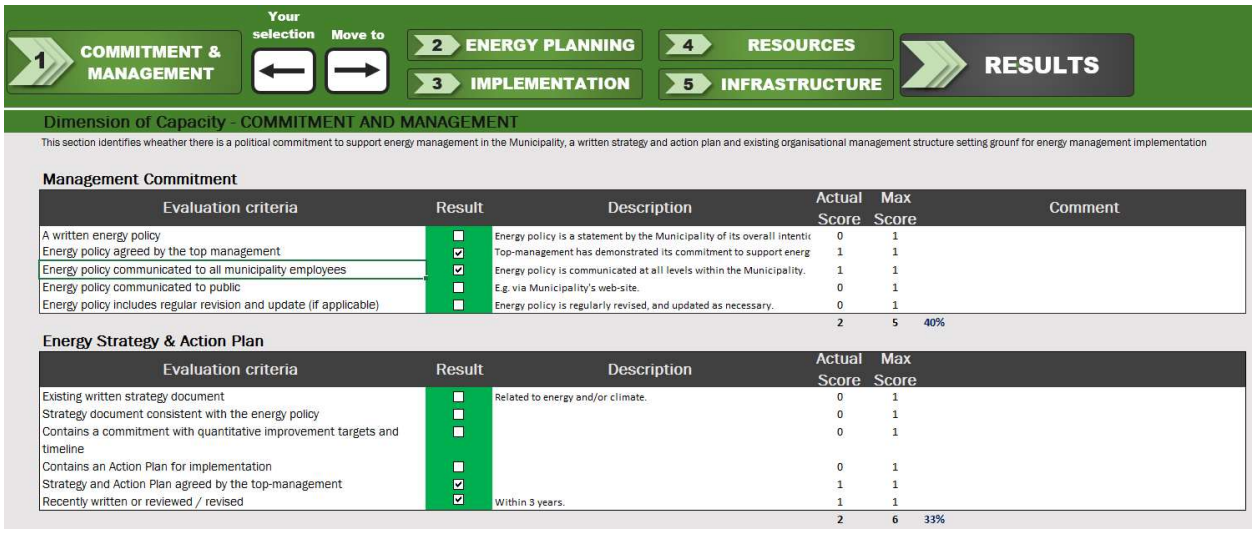


Figure 7: E*xample of the excel-based tool for self-assessment of energy management capacity.*

In the Excel tool under each of the five macro-dimensions a set of criteria for capacity assessment is given. The criteria are grouped under several micro-dimensions. The municipality assesses its capacity based on the given criteria. If the municipality fulfils the criteria, tick the box ☒, if not, leave the box empty ☐. For each positive answer, the municipality receives one point. The total actual score is the sum of positive answers. The total maximum score is the sum of evaluation criteria under the respective

Macro-dimension	Evaluation criteria	Result	Score	Max Score
1.Commitment & Management	2.1.1. A written energy policy	☒ = 1 point	Score = SUM of ☒ answers = 1 point	Max score = SUM of evaluation criteria = 5 points
	2.1.2. Energy policy agreed by the top management	☐ = 0 point		
	2.1.3. Energy policy communicated to public	☐ = 0 point		
	2.1.4. …	…		
	2.1.5. …	…		

Table 5: Example of answers of the Excel-based tool for self-assessment of energy management capacity.

3.2 Results and interpretation from the Excel-based self-assessment tool

Results are presented from each micro-dimension as shown in Figure 7 using a radar chart.

Dimension of Capacity - COMMITMENT AND MANAGEMENT	Actual score	Max Score	%
Management Commitment	4	5	80%
Energy Strategy & Action Plan	4	6	67%
Management & Stakeholders	9	13	69%

Dimension of Capacity - ENERGY PLANNING	Actual score	Max Score	%
Regulatory Compliance	3	4	75%
Monitoring and Analysing Energy Use	3	13	23%
Target Setting	3	7	43%

Dimension of Capacity - IMPLEMENTATION	Actual score	Max Score	%
Communication	1	3	33%
Documentation	3	3	100%
Operational control	2	6	33%
Design	0	2	0%
Procurement of energy services, products, equipment and energy	2	5	40%
Checking and Management Review	0	2	0%

Figure 8: Example of visual representation of self-assessment for "Commitment & Management.

The user can explore capacity building suggestions based on answers delivered for each evaluation criteria. The tool automatically links "No" answers (the box is empty ☐) with suggestions for improvements. An Example is given below.

The user has left empty the box respective evaluation of existing energy policy in the municipality:

Management Commitment

Evaluation criteria	Result
A written energy policy	☐

In the "Results" section by clicking "Explore suggestions for improvements" the user will be brought to the section "Recommended capacity building" (see Figure 8):

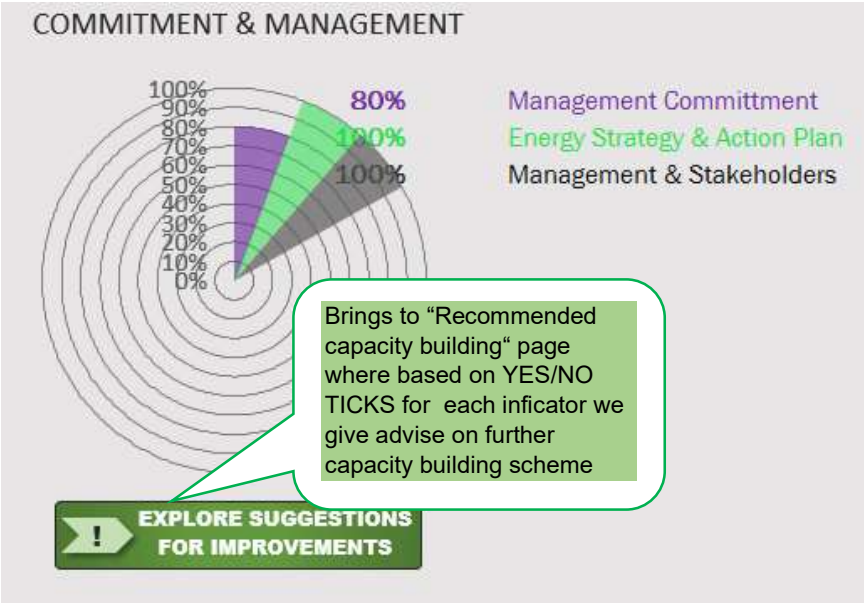


Figure 9: Final result's visualization

The final results presented can be considered as "normalized" results on a scale 0-1 (or 0-100%) supposing at this stage equal weight of each criteria (e.g. Management Commitment, Energy Strategy and Action plan, Management and Stakeholders, etc.).

The tool allows two types of final scoring: one includes the home-owners and housing associations (right side of **Fehler! Verweisquelle konnte nicht gefunden werden.**), the other does not include it. Subsequently municipalities with a focus on home-owners and housing associations can establish the potential gaps and thus properly address their capacity building schemes accordingly.

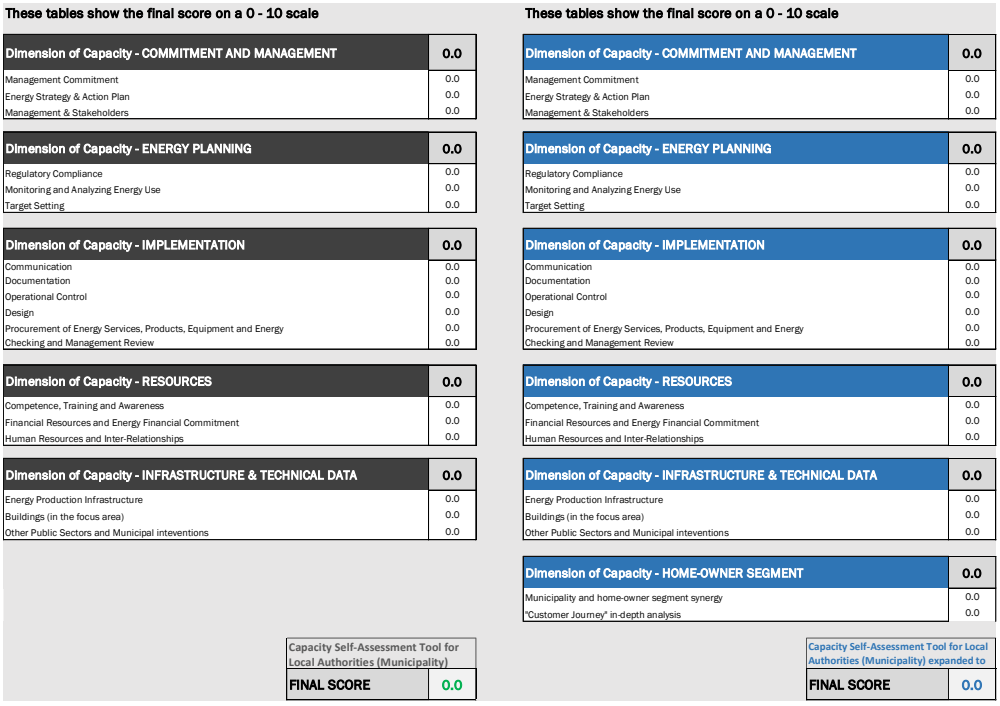


Figure 10: Final scores result's visualization including private sector.

The implemented Excel tool is also reporting automatically potential Capacity Building Schemes for the identified gaps from the self-assessment tool. For an in-depth understanding of the tool please look the example in the learning material section of *Act Now!* project (see www.actnow-baltic.eu).

3.3 Strategies for capacity improvement

Overall, there are many types of common capacity building activities described in the literature. Of these, peer-to-peer working methods are widely used for capacity building among municipalities. The EU projects *CASCADE* [12], *Conurbant* [13], *COVENANT CAPACITY* [14], *eReNet* [15], *LEAP* [16], *50000&1 SEAPS* [17] confirm that methods encouraging the learning from each other is an effective strategy to share and compare experiences, successes, lessons learned and extend knowledge exchange among participating parties. Considering experiences from previous EU-funded projects, we focus on three methods enabling learning from each other described in [18].

Peer-to-peer working

Peer-to-peer working is a knowledge sharing approach based on the formation of supportive working groups. Within these working groups participants provide mutual review and back-up of the work or methods being assessed. Peer-to-peer working can be considered as collaboration between two or more participants.

Mentoring

Mentoring is a partnership between two participants, the "mentor" and the "mentee". During the process, the mentee has the opportunity to collaborate with a more experienced partner to improve capacity and enhance knowledge. The mentor has greater expertise than the mentee in regards to the topic that the mentoring is covering.

Work shadowing

Work shadowing (observing) involves a direct relationship between a "learning" participant and "experienced" participant with the learner spending a period directly observing or engaging with the expert's specific work tasks – these could be thematic tasks, partnership tasks or more technical tasks related to implementation.

The Comparison of the three methods for learning from each other is given in Table 4. These three methods are primarily applicable for local authority employees at different levels of energy management planning and implementation (these are the local energy efficiency working groups in *ActNow!* project partner municipalities). However, proposed methods can extend the initial working group to involve stakeholders, community groups, politicians, …

Besides the three methods aimed to accelerate mutual learning among municipalities, there are other strategies to be considered when developing capacity building schemes in *ActNow!* municipalities. These strategies are best for increasing capacity on specific topics and involve third-party expertise. The list includes but is not limited to:

- Training courses (one-off intensive training courses, modular training courses)
- Technical expertise / advice
- Facilitated workshops or exercise

The methodology itself does not say in front which capacity building strategy is the best but rather suggest potential capacity building strategies. Final decision of capacity building strategy should taken by local working groups in municipalities with assistance of national expert partners considering capacity building needs, resource implications and access to capacity builders and associated resources and tools.

Capacity building method	Description	Applications	Important for effective implementation	Resource implications
Peer-to-peer working	Peer-to-peer processes are based on establishing groups or networks where all participants can benefit from better exchange of learning outcomes.	✓ Among two or more municipalities ✓ Suits local authorities working in similar areas (e.g. the same stage of EnMS development, monitoring, revision or implementation) ✓ Concrete problem solving ✓ Can be conducted independently or include mentoring and work shadowing ✓ Short and long-term ✓ Stakeholder involvement: local authorities, local community organisations & associations, technical partners, politicians,	• Peer groups should include partners with different skill sets to exchange and support each other over the topic of peer-working (e.g. technical experts, decision makers, local stakeholders) • It is important to have a tangible and practical task for peer-groups to work on.	✓ Finding peers ✓ Time available for participating peers ✓ A SWOT self-assessment analysis early on the process helps to create background context ✓ Travelling
Mentoring	Mentoring is a partnership between two participants, the "mentor" and the "mentee". Mentoring involves knowledge transfer from more experienced individuals to less experienced staff. The "mentor" will be someone having a greater expertise than the mentee in regards to the topic that the mentoring is covering.	✓ Among two municipalities ✓ Very effective for building capacity on specific energy efficiency related projects and initiatives, e.g. development of an energy management system (EnMS) in a municipality, certification of EnMS, data monitoring, … ✓ Mentoring is most successful when the mentee has clear needs and is seeking for answers and solutions ✓ Very helpful for local authorities who have little or no experience in sustainable energy ✓ Stakeholder involvement: different actors with different levels of competence	• Good match between partners, based on similar projects, challenges and aims • Agreed agenda and structure of the sessions • Assessment of mentees' learning needs before the visit (see e.g.) • A written mentors feedback after the visit (see e.g.)	✓ Finding the mentor ✓ Availability of timing that suits both the mentor and mentee ✓ Empathy and openness to share and get advice ✓ Preparation of documentation prior (agenda, mentees learning needs) and after (mentors feedback) the visit ✓ Travelling
Work shadowing	A training technique involving one (or more) participant spending a period of time in the workplace of another	✓ Among two or more municipalities with different levels of experience and knowledge	• The participating local authorities should have similar characteristics (e.g.	✓ Time intensive ✓ Travelling ✓ Openness of "recipient"

Capacity building method	Description	Applications	Important for effective implementation	Resource implications
	partner shadowing staff with more experience in a chosen topic	✓ Very helpful for learning about practical applications of knowledge and skills in "real life" situations ✓ Focus on practical learning around specific topic (e.g. arranging energy events, or EnMS development including different departments) ✓ Stakeholder involvement: local authorities, key stakeholders that work closely with the local authority, decision makers	organizational structure, size or type of area being governed) • Clear and specific objectives • Identify the amount of time that each participant will need to spend shadowing or hosting. • Clarity about outcomes (how the learning will be applied back in the on-going work situation)	municipality / individual being shadowed, polus time available to explain and answer questions

Table 6: Description of knowledge capacity building methods.

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