METHODOLOGY TO ASSESS NEEDS FOR CAPACITY BUILDING

*Act Now*GoA 2.2: METHODOLOGY TO DEFINE EE CAPACITY BUILDING SCHEMES IN*MUNICIPALITIES*

ACTION FOR ENERGY EFFICIENCY IN BALTIC CITIES
ACT NOW!

Interreg Baltic Sea Region

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METHODOLOGY TO DEFINE EE CAPACITY BUILDING SCHEMES IN MUNICIPALITIES

1. GoA2.2 DESCRIPTION

The output of this group of activity is an internal progress report for each participating municipality based on a specific methodology to assess the exact needs for capacity building in energy management and increase of energy efficiency. The output will be used as a tool for the development of the capacity building schemes in the project municipalities in the group of activities 2.3 and also for the development of a transferable self- assessment tool for other interested municipalities.

The connection among the GoA2.1, GoA2.2 and GoA2.3 towards the definition of the Methodology to assess needs for capacity building is reported in the scheme of figure 1.1.

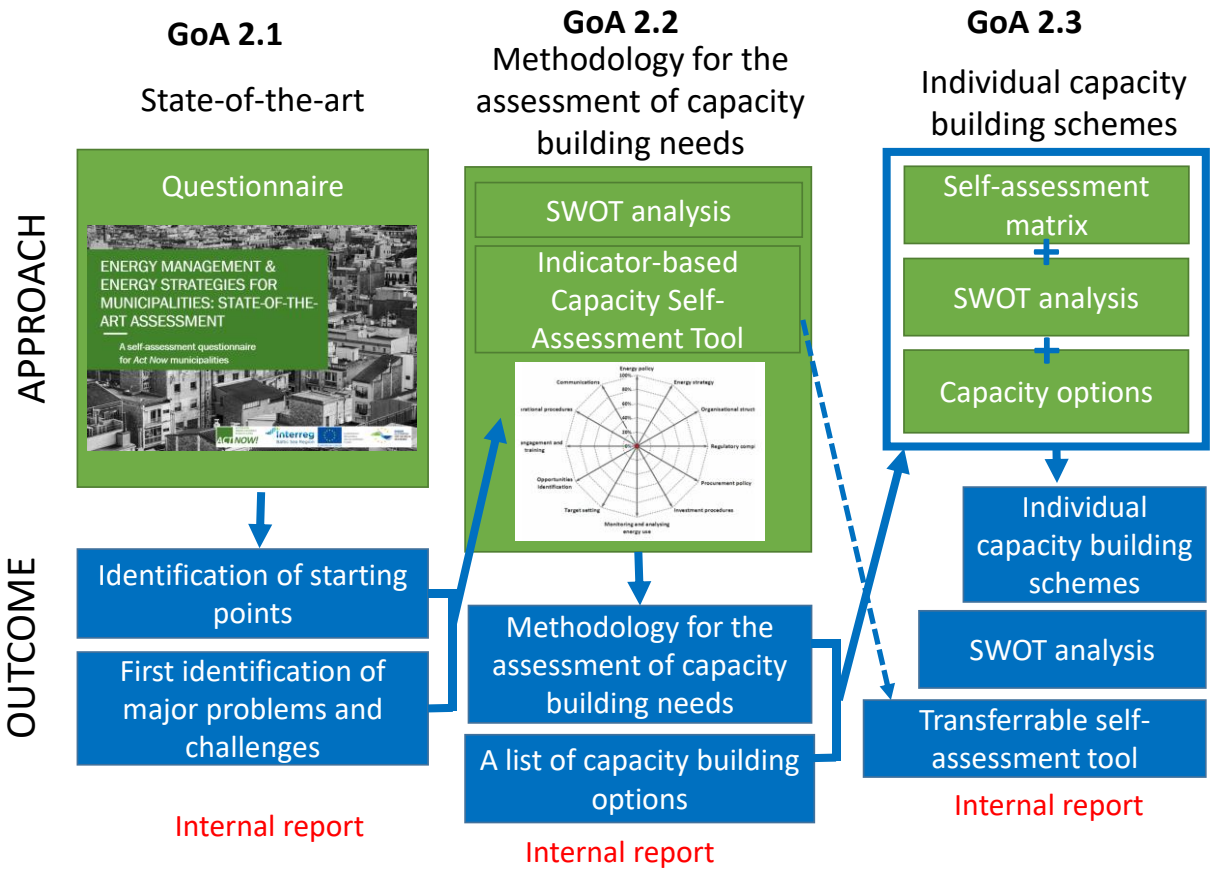


Figure 1.1. Connection among the GoA2.1, GoA2.2 and GoA2.3.

2. METHODOLOGY TO ASSESS NEEDS FOR CAPACITY BUILDING

The methodology is based onto the 4 parts in-depth described:

- definition of a customized questionnaire for the identification of needs and gaps within the field of Energy Management System (EnMs) and Energy Efficiency (EE) (output from GoA2.1);
- finalization of a SWOT Analysis for a clear identification of key priorities within the implementation of C;
- definition of a quantitative self-assessment tool to be merged with the SWOT analysis outcomes for the definition of the strategic plan for capacity building schemes in EnMs and EE in municipality;
- definition and implementation of customized strategies and schemes for capacity building improvement.

Within the assessment methodology a specific focus was addressed to the building stocks of private-owners and housing association that rapresent key groups within the development of an overall Energy Management System (EnMs) and Energy Efficiency (EE) strategies at municipal level. Within this process the model proposed by the project REFURB [http://www.go-refurb.eu/publications/] in terms of "*Customer journey*" model. Within this approach is propose an 11 steps methodology on how create the proper engagement of the private building sector within the overall EE improvement strategy of the municipality.

2.1 Questionnaire

The definition of a specific questionnaire for the collection of basic information about the energy management and the energy efficiency strategies of the participating municipalities must be defined and customized towards the aim of:

• collect basic information about the energy management practices and energy strategies in the participating municipalities and;

• identify key stakeholders for establishing local energy efficiency work groups (LEEG) (in connection with the GoA 3.1 activities of the ActNOW project).

In order to properly identify gaps and needs within the municipality context for the questionnaire it is suggested the structure presented in Table 2.1.

Table 2.1. Structure of 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	3.1 Identification of stakeholders	• Relevant stakeholders

Main part	Specific content	Major outcomes
groups	3.2. Identification of major Act Now target groups	• 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

2.2 Application of SWOT analysis for performance improvement

In order to reach significant capacity improvements in municipalities within the context of EnMs and EE, first, we must sufficiently describe the gap between each municipality's current energy efficiency capacity and the desired capacity/performance. The **definition of this desired performance** should be based on two pillars: (1) the review of the organisation's strategic plans and the needs and context assessment, as well as, (2) evaluation of performance gaps. **Strengths, Weaknesses, Opportunities and Threats (SWOT)** analysis is a commonly used approach to assess the current and desired performance gaps. After the implementation of performance and needs assessment, we may select improvement measures, which in current case are defined as various capacity building strategies. [Gerson, 2007, p23-38]

SWOT analysis is a valuable and structured tool for simple, useful and qualitative analysis of various management procedures, projects and plans [Samolada and Zabaniotou, 2014]. SWOT analysis is a "situation" analysis which allows evaluating the gap between the current and a desired performance or level [Gerson, 2007, Pesonen and Horn, 2014].

The use of a structured approach, such as SWOT analysis, for the description of the desired performance and performance gaps is suggested because it improves the comparability, transferability of the results, and allows to define more specific and measurable objectives. [Gerson, 2007]

The **input data for SWOT** analysis includes output from strategic plans, from needs assessment and the state of various collected performance measures. The SWOT analysis may be enhanced by adding measured data (interval or ratio scales, e.g. in the form of questionnaire replies), in which case factors may be related and compared. [Gerson, 2007, p39]

SWOT analysis provides a **context for performance improvement and essential information for improved decision-making** [Gerson, 2007, p38]. The output of SWOT analysis will provide significant insight for successful strategy formulation [Kurtilla et al., 2000, p2].

SWOT analysis is carried out through a less formal **„brainstorming" process** by individuals, teams, or organizations. 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 [Pesonen and Horn, 2014].

2.2.1 SWOT analysis application process

The main steps for SWOT analysis application [Srivastava et al., 2005, Gerson, 2007, Pesonen and Horn, 2014] are as follows:

1. Identification of relevant stakeholders (internal and external) – they should represent various business perspectives,
2. Identification of the Strengths, Weaknesses, Opportunities, Threats (SWOT) through collaboration with partners and other stakeholders, through a focus group or by survey.
3. Categorization of SWOT factors into a SWOT matrix.
4. Identification of associated supporting data (hard data, soft data, interval and ratio scales of measurement),
5. Prioritization of factors by assessing their significance.

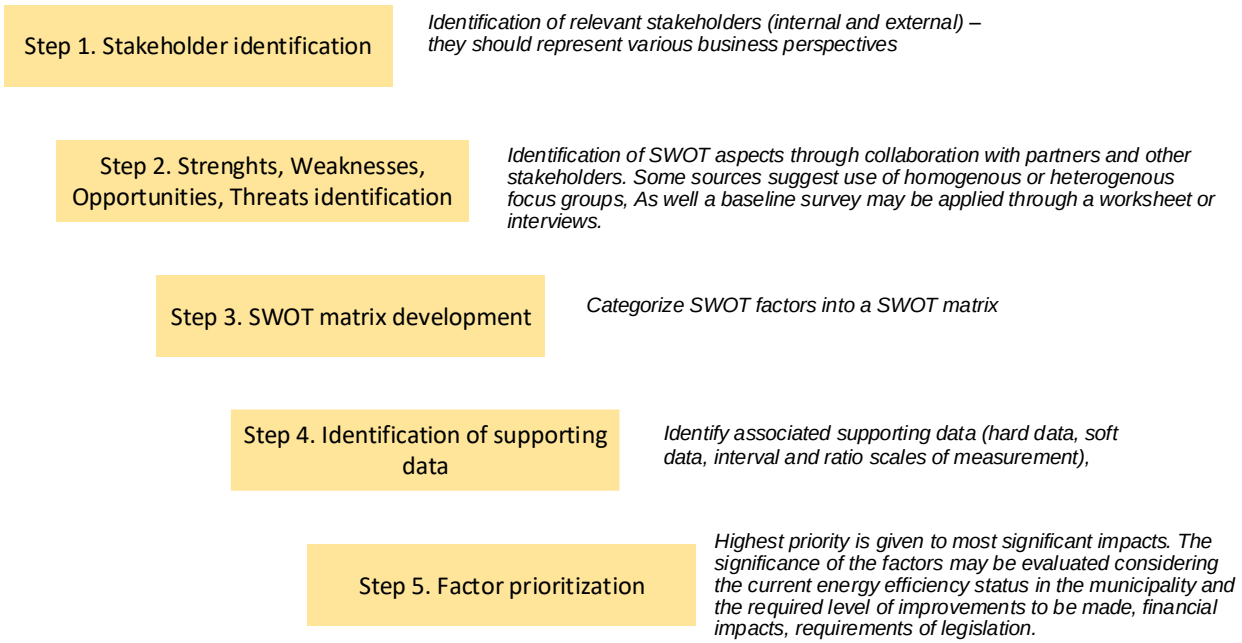


Figure 2.1. SWOT's steps.

The SWOT analysis identifies both situation-related and operational parameters that are substantial for defining an objective (or objectives) for a performance improvement initiative [Gerson, 2007]. These parameters are referred to as **strategic factors** when summarized within SWOT analysis [Kurtilla et al., 2000].

Factors that are enhancing the desired performance are called Strengths, **but those inhibiting it are identified as Weaknesses**. Identification of the **Strengths and Weaknesses**

defined the internal indicators. The Strengths characterize system's own resources and capabilities. For a business initiative Strengths would include employee knowledge, reliable suppliers, new technologies, for a municipality case the Strengths category would include the areas in which the municipality is more effective and efficient than others or in respect to the level requested by Standard. Sequentially, 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 plans. [Polat et al., 2017, Gerson, 2007]

The analysis also considers external conditions that have impact on the desired performance (external analysis). Other sources also characterize 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. Threats for a business initiative would be new competitors, employee recruitment, limited raw materials, similarly for a municipality case Threats would be represented as change in legislation, requirements, lack of energy efficiency specialists in the region. [Reißmann et al., 2018, Gerson, 2007, Polat et al., 2017].

The assessed internal and external factors are summarized in a SWOT matrix (see Table 2.2).

Table 2.2. Generic SWOT analysis matrix

	Enhancing factors	**Hindering factors**
	Strengths	Weaknesses
Internal factors	1. 2. ...	1. 2. ...
	Opportunities	Threats
External factors	1. 2. ...	1. 2. ...

Table 2.3. Key questions for SWOT categories based on [Reißmann et al., 2018]

Internal factors	**Strengths** • What capacities are currently strong? • What are the factors supporting the energy efficiency? • Which are the municipality's advantages over the competition? • ….	**Weaknesses** • What could be improved? • What should be avoided? • What obstacles hinder energy capacity improvement? • What elements need strengthening? • …
External factors	**Opportunities** • 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? • …	**Threats** • 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? • …

The categorization of various SWOT factors can be led by following questions [based on Gerson, 2007]:

- 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 a number of leading questions may be applied as summarized in Table 2.3. In the same table are also described some key example for the identification of external and internal factors.

2.2.2 The SWOT-AHP hybrid method

Thought 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 [Kurtilla et al., 2000]. Therefore **a hybrid SWOT-AHP** (Analytic Hierarchy Process) method was introduced by Kurtilla et al. (2000). This method involves integration of a decision analysis method to complement SWOT with additional quantitative information and prioritize the factors.

Analytic Hierarchy Process (AHP) is a multi-criteria decision-making method intended for complex problem solving [Polat et al., 2017]. AHP provides a measurement of the relative importance of the identified factors accordingly to stakeholder's point of view [Etongo et al.,2018].

Thus, in order to provide more **in-depth analytic approach** to municipality SWOT analysis, the presented methodology includes the implementation of SWOT-AHP analysis according to these three main steps [Srivastava et al., 2005, Etongo et al., 2018]:

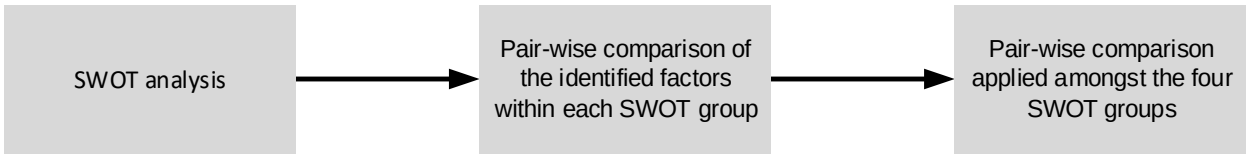


Figure 2.2. SWOT-AHP analysis steps

STEP1. Implementation of SWOT analysis as described in previous section, 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, because large number of factors in each group would lead to more complex and time consuming pair-wise comparisons.

STEP2. 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 (see Figure 1). Using provided Excel tool 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.

STEP3. The pair-wise comparison method is applied amongst 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 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.

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 Fig. 1).
3. The data analysis is performed in provides Excel tool and specific priority indexes are calculated (see example below), and results may be evaluated.

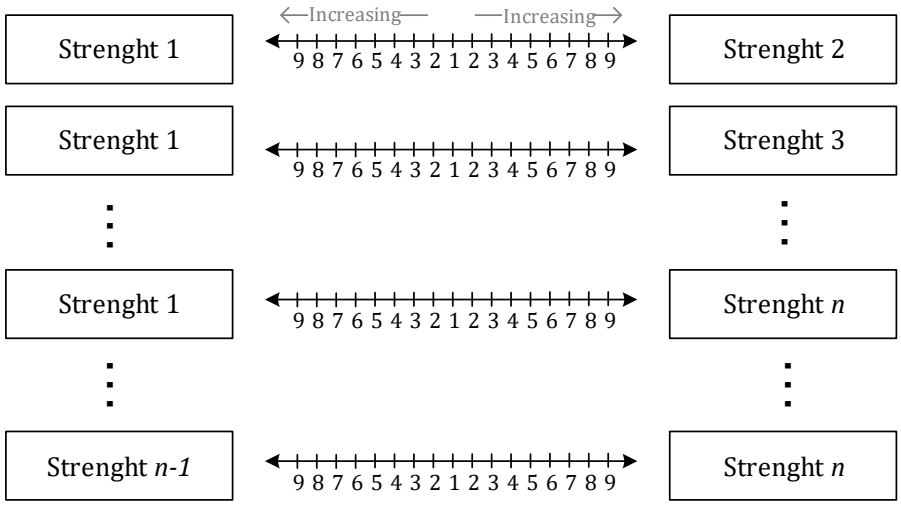


Figure 2.3.The structured guidelines for pair-wise comparison of SWOT factors (for Strengths domain).

2.2.3 Example for implementation of SWOT-AHP analysis

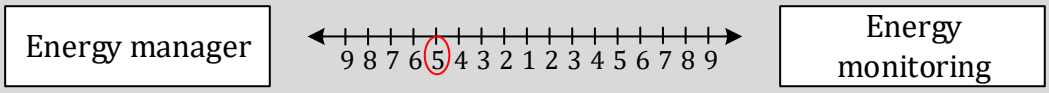
For a case of municipality energy efficiency capacity building the SWOT-AHP analysis should follow these steps:

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 experience-based knowledge (other municipality employees).

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?**

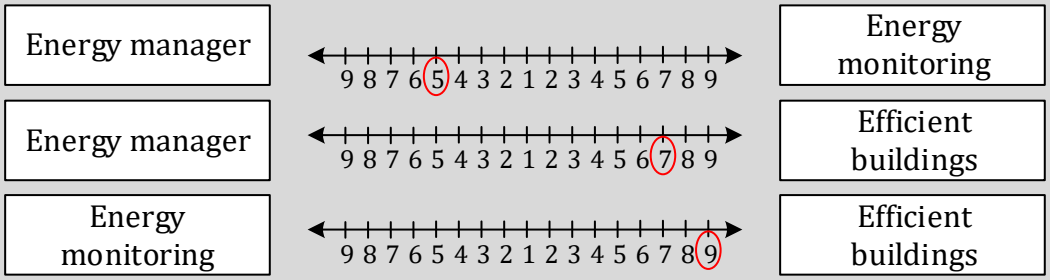
For this example, let us say, that *Energy manager* has more significant impact, as he is the one that can use the *Energy monitoring data* to analyse the actual energy efficiency situation. The evaluation scale would be as follows:



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 [Teknomo, 2006]

	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.

2.3 Capacity self-assessment tool

2.3.1 Summary of the methodological approach for capacity self-assessment

The proposed capacity self-assessment methodology follows guidelines presented in [Kay et al., 2004]. It consists of five strategic phases of capacity development:

1. Assessment of the present capacity ->*Where we are now?*
2. Definition of the desired state/ future vision ->*What do we want to achieve?*
3. 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?*
4. Implementation of capacity building measures ->*What actions do we take?*
5. Monitoring and evaluation to feed back experiences into the planning phase ->*How do we stay there?*

Based on the five steps described above, a schematic representation of the methodology for capacity self-assessment is given in Figure 3.1

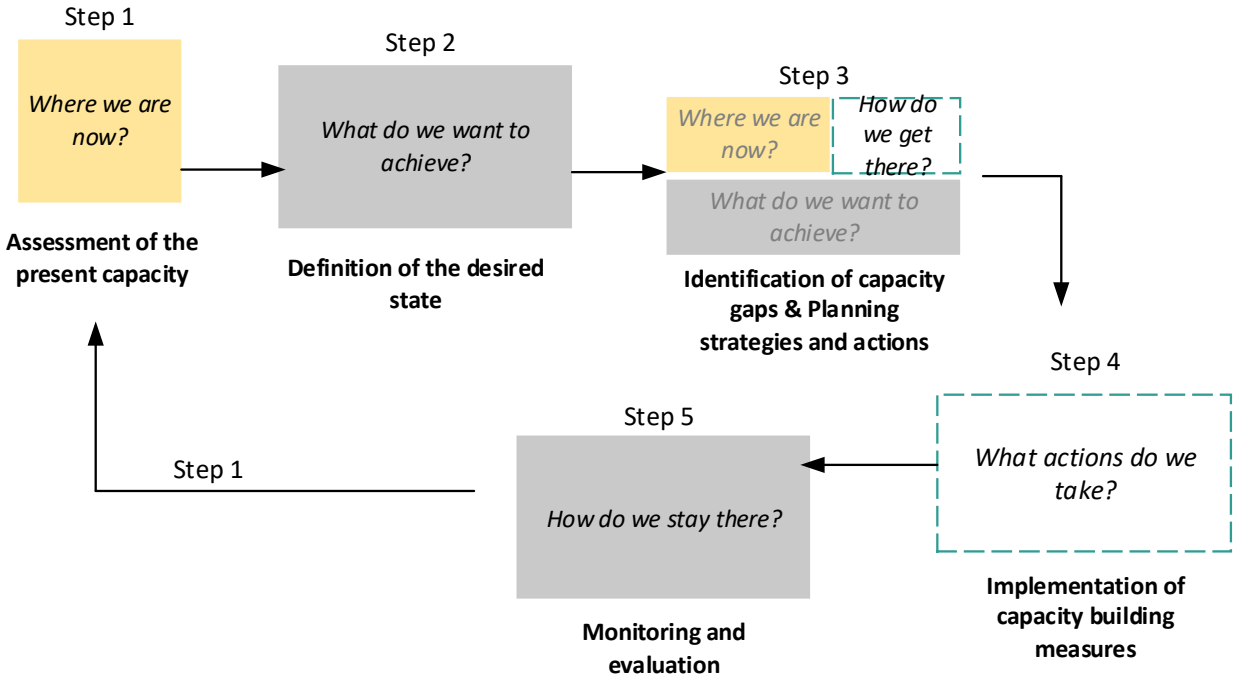


*Figure 3.1 Five steps of capacity building process (adapted from [*Kay et al., xxxx*])*

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, see Table 3.1 below.

Table 3.1 Capacity assessment matrix for a municipality (adapted from [UNDP, 1997]).

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

Non-compliances with the evaluation criteria

Definition of municipality's goals respect different capacity criteria

2.3.2 Step 1: Assessing the existing energy management capacity

The self-assessment should use attached Excel-based tool "Energy management capacity self-assessment tool". The 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. Within the developed tool the role of home-owners and housing association towards the way to motivate home-owners and how municipality and other stakeholders on realizing their renovation project has an emphasis. In specific the "Customer Journey" approach from the REFURB project [see Annex 1] is proposed to define the identification of the capacity evaluation criteria as proposed in the section 2.3.3.

2.3.3 Capacity evaluation criteria

The capacity evaluation criteria are grouped under six macro-dimensions as shown in Figure 3.2.

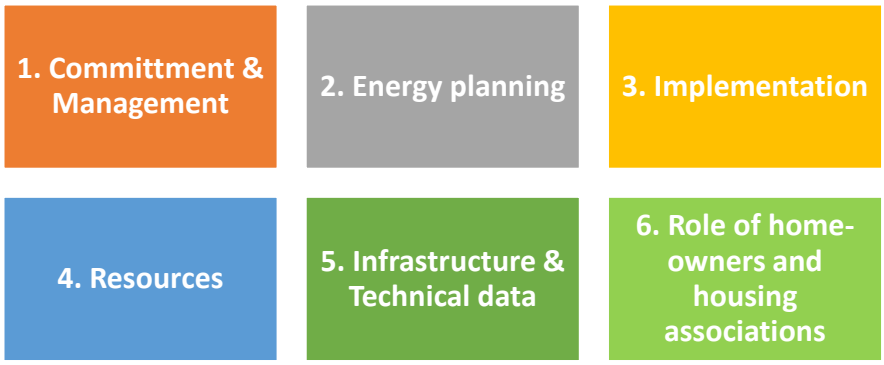


Figure 3.2. Five macro-dimensions for capacity evaluation

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 3.2.

Table 3.2. Selected criteria for existing capacity evaluation

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

Macro-dimension		Micro-dimension		Evaluation criteria
				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 • 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

Macro-dimension		Micro-dimension		Evaluation criteria
				• 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 • 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

Macro-dimension		Micro-dimension		Evaluation criteria
				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 • 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

Macro-dimension		Micro-dimension		Evaluation criteria
				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 • 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

Macro-dimension		Micro-dimension		Evaluation criteria
				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?

Evaluation of the existing capacity based on the set of criteria under the five macro-dimensions is performed using an Excel-based tool as presented in Figure 3.3.

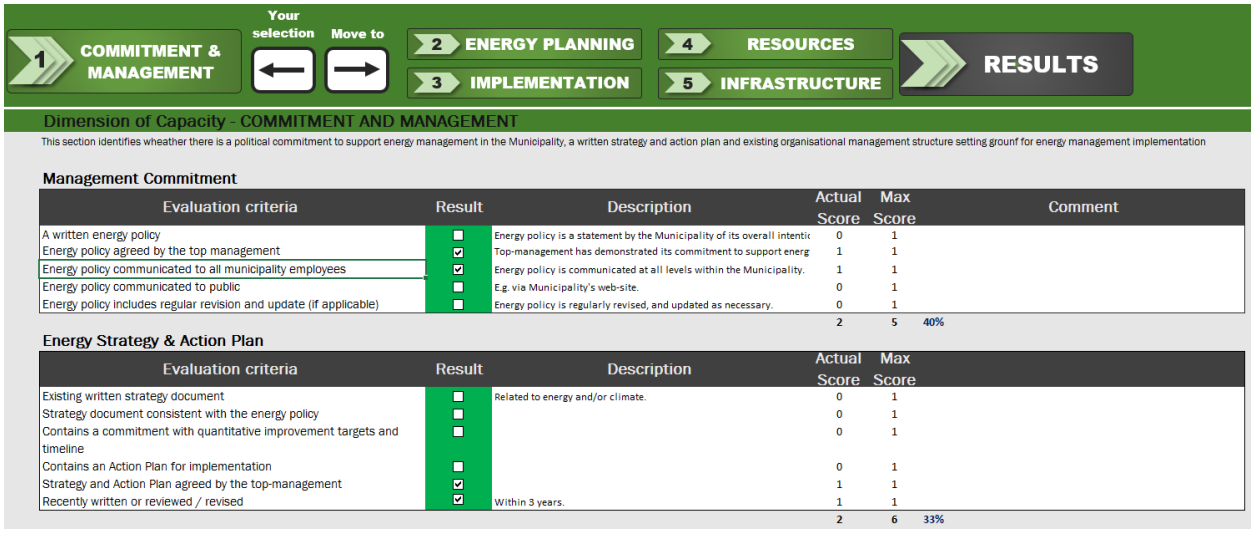


Figure 3.3. Excel-based tool for energy management capacity self-assessment

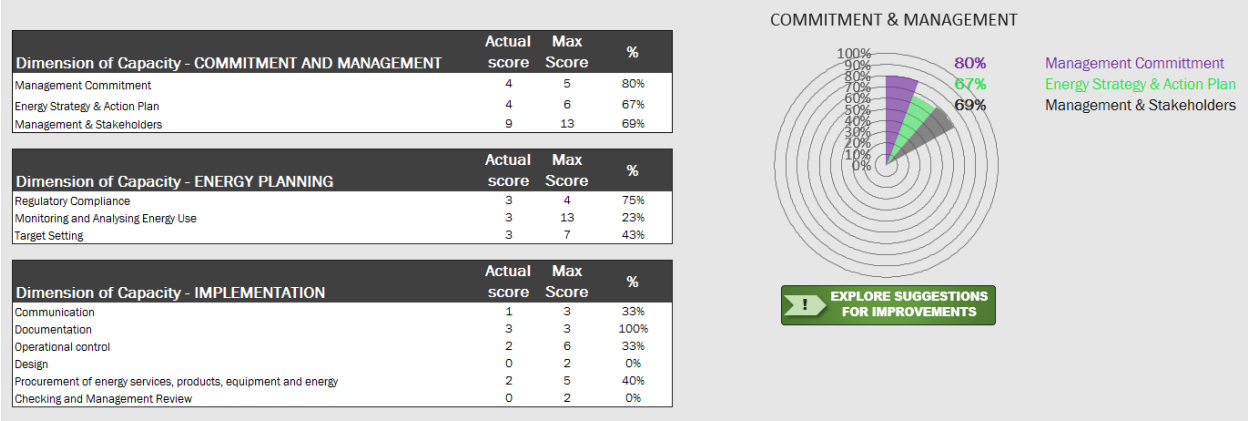
In the Excel tool under each of the five macro-dimensions a set of criteria for capacity assessment is given. The criteria are grouped under several micro-dimensions. The municipality assesses its capacity based on the given criteria. If the municipality fulfils the criteria, tick the box ☒, if not, 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 capacity field as described in Table 4.

Table 3.3. Self-assessment tool

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
	2.1.2. Energy policy agreed by the top	☐ = 0 point		

	management			points
	2.1.3. Energy policy communicated to public	☐ = 0 point		
	2.1.4. …	…		
	2.1.5. …	…		

Results are presented from each micro-dimension as shown in Fig.5 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 3.4. An example of visual representation of self-assessment macro-dimension "Commitment & Management"

Following 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":

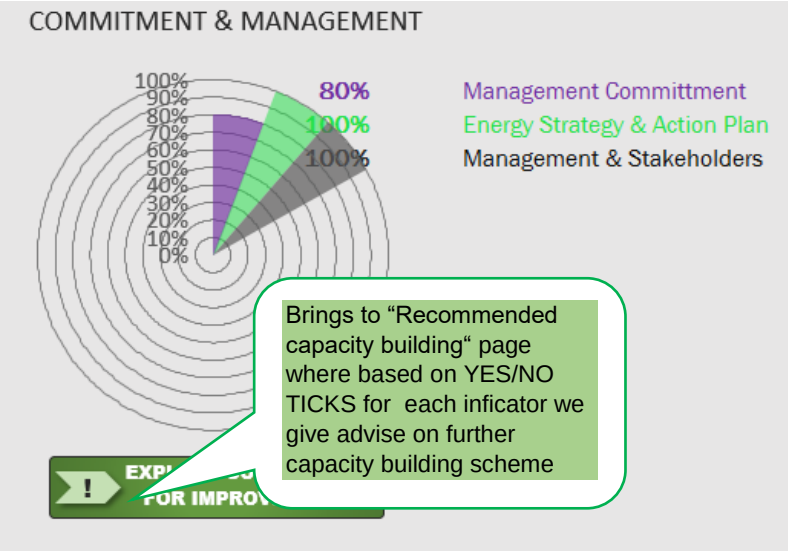
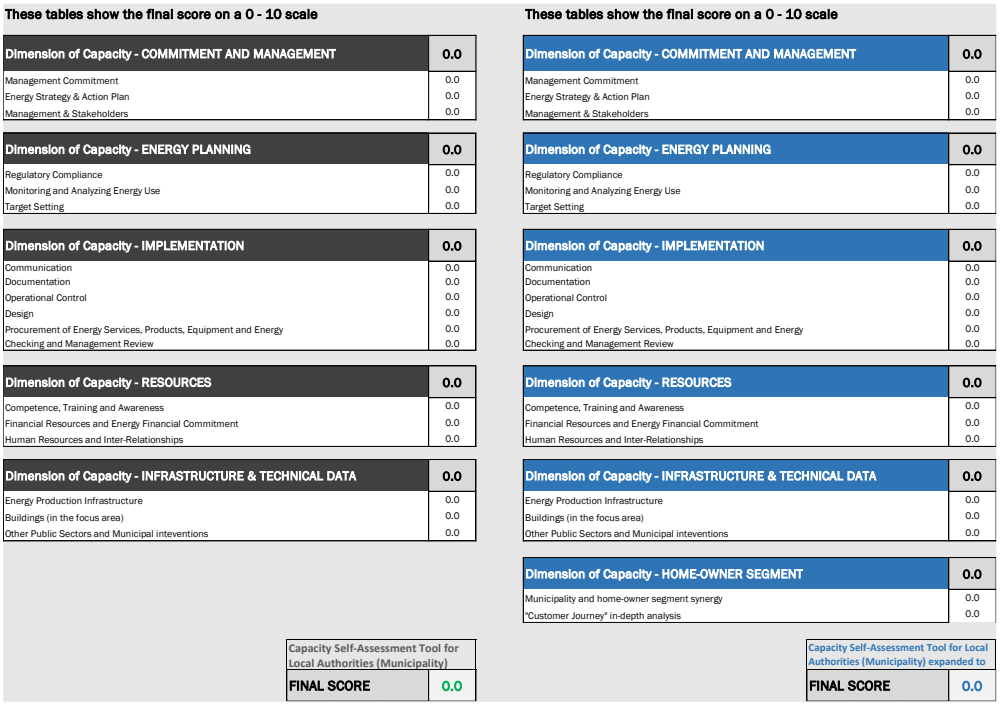


Figure 3.5. Result's visualization

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 stakehodelrers. Etc…). Different weight can further assigned within the context of discussion with the working group.

In order to better understand the role of home-owners and housing association the tool is proposing two types of final score namely with and without the inclusion of the dedicated dimension 6. In this way those municipality with specific focus on such a segment could better established the potential gaps and thus properly address capacity building schemes (see Figure 3.6).



These tables show the final score on a 0 - 10 scale

Dimension of Capacity - COMMITMENT AND MANAGEMENT	0.0
Management Commitment	0.0
Energy Strategy & Action Plan	0.0
Management & Stakeholders	0.0

Dimension of Capacity - ENERGY PLANNING	0.0
Regulatory Compliance	0.0
Monitoring and Analyzing Energy Use	0.0
Target Setting	0.0

Dimension of Capacity - IMPLEMENTATION	0.0
Communication	0.0
Documentation	0.0
Operational Control	0.0
Design	0.0
Procurement of Energy Services, Products, Equipment and Energy	0.0
Checking and Management Review	0.0

Dimension of Capacity - RESOURCES	0.0
Competence, Training and Awareness	0.0
Financial Resources and Energy Financial Commitment	0.0
Human Resources and Inter-Relationships	0.0

Dimension of Capacity - INFRASTRUCTURE & TECHNICAL DATA	0.0
Energy Production Infrastructure	0.0
Buildings (in the focus area)	0.0
Other Public Sectors and Municipal inteventions	0.0

Capacity Self-Assessment Tool for Local Authorities (Municipality)	
FINAL SCORE	0.0

These tables show the final score on a 0 - 10 scale

Dimension of Capacity - COMMITMENT AND MANAGEMENT	0.0
Management Commitment	0.0
Energy Strategy & Action Plan	0.0
Management & Stakeholders	0.0

Dimension of Capacity - ENERGY PLANNING	0.0
Regulatory Compliance	0.0
Monitoring and Analyzing Energy Use	0.0
Target Setting	0.0

Dimension of Capacity - IMPLEMENTATION	0.0
Communication	0.0
Documentation	0.0
Operational Control	0.0
Design	0.0
Procurement of Energy Services, Products, Equipment and Energy	0.0
Checking and Management Review	0.0

Dimension of Capacity - RESOURCES	0.0
Competence, Training and Awareness	0.0
Financial Resources and Energy Financial Commitment	0.0
Human Resources and Inter-Relationships	0.0

Dimension of Capacity - INFRASTRUCTURE & TECHNICAL DATA	0.0
Energy Production Infrastructure	0.0
Buildings (in the focus area)	0.0
Other Public Sectors and Municipal inteventions	0.0

Dimension of Capacity - HOME-OWNER SEGMENT	0.0
Municipality and home-owner segment synergy	0.0
"Customer Journey" in-depth analysis	0.0

Capacity Self-Assessment Tool for Local Authorities (Municipality) expanded to	
FINAL SCORE	0.0

Figure 3.6. Final scores result's visualization

2.4 Strategies for capacity improvement

Overall, there are many types of common capacity building activities described in the literature, see e.g. [Framework.org; Authenticity Consulting]. Of these, peer-to-peer working methods are widely used for capacity building among municipalities. EU projects CASCADE, Conurbant, Cobenant capacity, eReNet, LEAP, 50000&1 SEAPS confirms that methods that encourages learning from each other is an effective strategy to share and compare experiences, successes, lessons learned and extend knowledge exchange among participating parties through mutual learning. Considering experiences from previous EU-funded projects, we focus on three methods enabling learning from each other:

- Peer-to-peer working
- Mentoring
- Work-shadowing

Following you will find a brief description of each method from [Smith et al., 2014].

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 asa 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.

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.

Table 3.4. Description of methods for learning from each other – PEER-TO-PEER WORKING, MENTORING, WORK SHADOWING (created based on [Smith et al., 2014; Framework.org]).

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	✓ 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	• 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

Capacity building method	Description	Applications	Important for effective implementation	Resource implications
	covering.	✓ Very helpful for local authorities who have little or no experience in sustainable energy ✓ Stakeholder involvement: different actors with different levels of competence		(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 partner shadowing staff with more experience in a chosen topic	✓ Among two or more municipalities with different levels of experience and knowledge ✓ 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	• The participating local authorities should have similar characteristics (e.g. 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)	✓ Time intensive ✓ Travelling ✓ Openness of "recipient" municipality / individual being shadowed, polus time available to explain and answer questions

REFERENCES

Authenticity Consulting. Online resource, available at: https://managementhelp.org/misc/np-capacity-building-types.pdf

Etongo D., Kanninen M., Epule T.E., Fobissie K. Assessing the effectiveness of joint forest management in Southern Burkina Faso: A SWOT-AHP analysis. Forest Policy and Economics, Vol. 90, 2018, 31-38.

Framework.org. Online resource, available at: https://www.framework.org.uk/wp-content/uploads/Capacity-building-programme-methods-template-signed1.pdf

Gerson, R.F. Performance by Design : The Systematic Selection, Design, and Development of Performance Technologies That Produce Useful Results. HRD Press, 2007.

Kay. M., Franks, T. & Tato, S. 2004. Capacity needs assessment in agricultural water management:Methodology and processes. ICID Workshop on Capacity Needs Assessment, Moscow.

Kurttila M., Pesonen J., Kangas M., Kajanus M. Utilizing the analytic hierarchy process (AHP) in SWOT analysis- a hybrid method and its application to a forest-certification case. Forest Policy and Economics. Vol.1, 2000, 41-52.

Melvyn KAY, Tom Franks , Sonia Tato. Capacity needs assessment methodology and processes. http://www.fao.org/tempref/docrep/fao/008/y5899e/y5899e01.pdf

Pesonen H.L., Horn S. Evaluating the climate SWOT as a tool for defining climate strategies for business. Journal of Cleaner Production, Vol. 64, 2014, 562-571.

Polat Z.A., Alkan M., HicretGürsoySürmeneli. Determining strategies for the cadastre 2034 vision using an AHP-Based SWOT analysis: A case study for the turkish cadastral and land administration system, Land Use Policy, Vol.67, 2017, 151-166.

Reißmann D., Thrän D., Bezama A., Techno-economic and environmental suitability criteria of hydrothermal processes for treating biogenic residues: A SWOT analysis approach, Journal of Cleaner Production. Vol. 200, 2018, 293-304.

REFURB project, http://www.go-refurb.eu/publications/

Samolada M.C., Zabaniotou A.A. Energetic valorization of SRF in dedicated plants and cement kilns and guidelines for application in Greece and Cyprus. Resources Conservation and Recycling. Vol. 83, 2014, 34-43.

Srivastava P.K., Kulshreshtha K., Mohanty C.S., Pushpangadan P., Singh A. Stakeholder-based SWOT analysis for successful municipal solid waste management in Lucknow, India. Waste management. Vol 25, 2005, 531-537.

Smith, D., Bruun-Kiaer, I., Fontana, I., Rosa, M., Rambelli, G., Tsalakanidou, I., De Cunto, A.K., Psarras, I., Papadopulou, A. Sustainable Energy Action Planning: Learning from each other. A Report on Successful Peer-to-Peer working. Experience from the Intelligent Energy Europe projects LEAP, Conurbant, Covenant CapaCITY, CASCADE and eReNet. 2014.

UNDP. 1997, Draft UNDP. Capacity development assessment guidelines 2. Draft Capacity assessment guidelines – the programme approach: assessment and methodologies. Author Thomas Hopkins.

ANNEX 1: The REFURB compelling offer creation toolbox

The presented methodology for the home-owner segment is based on methods described in the EU H2020 REFURB project (www.go-refurb.eu). This document is an extract of the projects main Deliverable D4.4 Report: Constituting the Compelling Offer – for more information, please study the full report: http://www.go-refurb.eu/wp-content/uploads/2017/12/REFURB_D4_4_Constituting-the-compelling-offers.pdf

For each dweller/dwelling segment, three main tools will support the offer creation and tested using the fourth tool.

The four-main offer-creation tools used for developing "an offer you can't refuse" are

1. Customer journey: Describing how home-owners become motivated and how stakeholders will support home-owners realizing their renovation project
2. Value proposition: Identification of the value proposition to the chosen dweller/dwelling-segment
3. Business model generation: Generation of the business model to secure stakeholders organising a commercial consortium along the customer journey ensuring a realistic market uptake
4. Lean Start Up: Identification and development of a prototype package for market test, measurement, learning and improvement

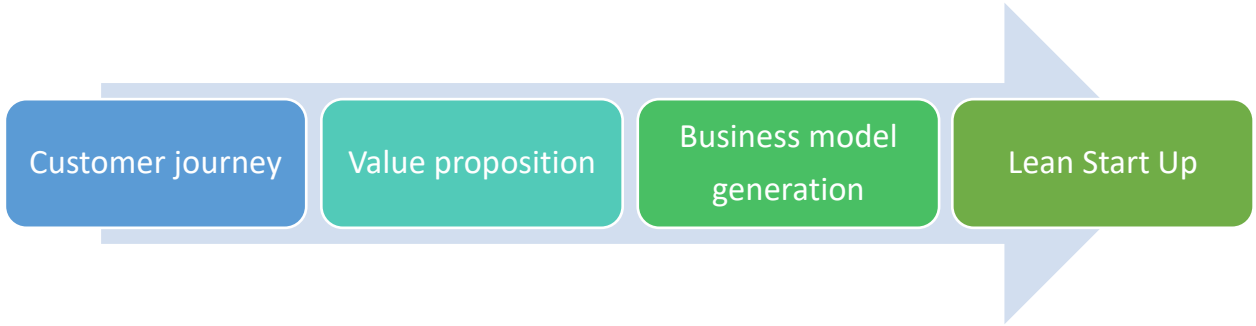


Figure A.1: The methodology building blocks for creating renovation packages

The methodology behind each of the building blocks is described in more detail in the following.

A1. The Customer Journey

The first building block is the . The REFURB Customer journey is based on the customer journey-model of Dutch VNG "Klantenreis energiebesparing woningeigenaren". The Dutch VNG Customer Journey model has been translated and adapted as the REFURB Customer Journey model [1].

The REFURB Customer Journey describes the 11 steps that home-owners go through in the purchase process of energy renovation. The 11 steps are linked with positive and negative experiences during the journey. The 11 stages are: (1) Becoming aware, (2) Becoming interested, (3) Becoming active, (4)

[1] For further explanations about the search for a customer journey model, see the REFURB Delivery D2.5 "Marketing the tailored demand drivers" Report.

Consider the options, (5) Financing, (6) Selecting a supplier, (7) Installation and payment, (8) Experience, (9) organizing - search for service, (10) Sharing experiences, (11) Want to have more.

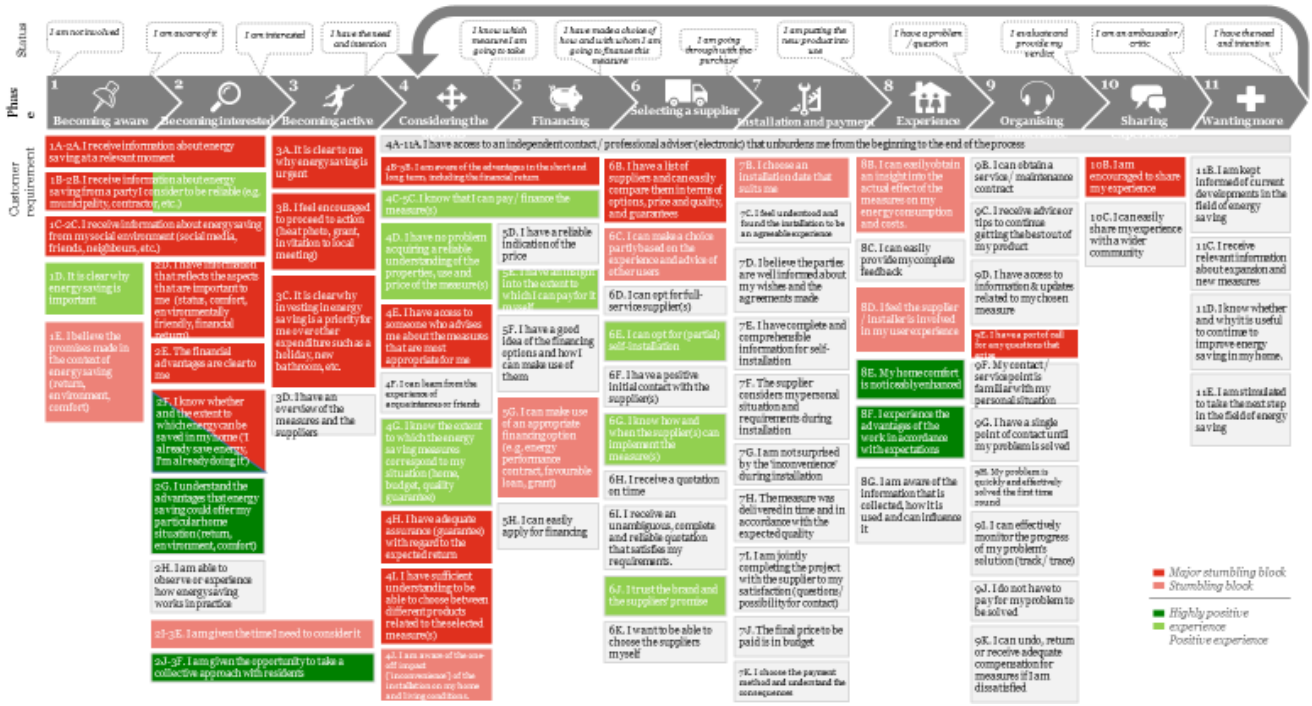


Figure A.2: The 11 step REFURB Customer Journey model as developed by the Region Friesland, NL

Figure A.2 shows the REFURB customer journey and its 11 steps. Every step of the journey is essential for a successful completion. Each step has a number of named stumbling blocks, which addresses challenges (and positive experiences) along the journey. Majority of the (red) stumbling blocks are identified along the initial 4 steps of the Customer Journey. After successful completion, the customer wants to share (and become ambassador for new customers) and him/her-self want more, which can trigger a new journey with new renovation packages.

Below is listed the 11-step Customer Journey with highlighted essentials of each step:

Step 1 Becoming aware – essential is, that the information is **(timely)** received by the home-owner at the relevant moment. A relevant moment is a renovation project, an addition to the family, or at a point of time when people are motivated to invest, either by motivation or because of component break-down.

Step 2 Becoming interested – essential is a thrusted party providing the information.

Step 3 Becoming active – essential is that the homeowners understand why they must act now.

Step 4 Considering the offer – essential is the value proposition and potentially connecting to a single-point of contact (advisor).

Step 5 Financing – essential is an indication of price and how the investment can be financed.

Step 6 Selecting a supplier – essential is an overview to make simple comparisons between the options and the possibility drawn on others´ experiences.

Step 7 Installation and payment – essential is a personal approach and structured communication.

Step 8 Experience – essential is impact measures and comfort in accordance with expectations.

Step 9 Organizing – essential is maintenance contract and proactive providing advice and tips.

Step 10 Sharing – essential is to encourage users to share their experiences both for spreading the word of mouth publicly, but also for own confirming of decisions made.

Step 11 Wanting more – essential is to stay in touch with the home-owner and keep him/her up to date about new measures.

The REFURB Customer Journey can also form a circular process, initiated by a successful step 1-3, followed by a cycle 4-10 leading to a new cycle – step 11 "Wanting more" (the next renovation package), re-entering step 4.

Figure A.3: the REFURB Customer Journey process shown as a circular process

A.2. The Value Proposition Design

The second building block for creating a compelling offer is to clearly identify the value proposition for the identified home-owner segment. A strong value proposition identifies the Pains (Barriers), Gains (Drives) and Jobs (Solutions) relevant for the chosen segment to transforms this into a short value proposition, which can be summarised by answering the following bullet points:

- for (target customers)
- who are dissatisfied with (the current alternative)
- the REFURB renovation package is a (new package)
- that provides (key problem-solving capability)
- unlike (the renovation package alternative)

A graphic method for identifying the value proposition is the method developed by Alexander Osterwalder described in his book:

" The Value Proposition Design - How to Create Products and Services Customers Want".

For more information, please study the detailed description:
http://businessmodelalchemist.com/blog/2012/08/achieve-product-market-fit-with-our-brand-new-value-proposition-designer.html

Figure A.4 shows the design elements of the value proposition.

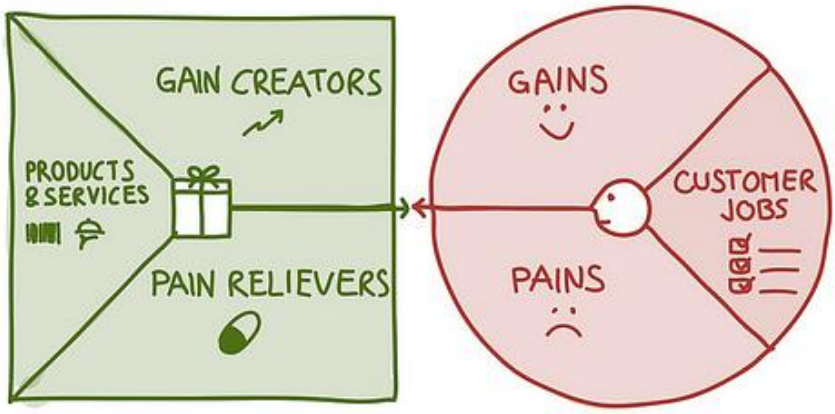


Figure A.4: The Value Proposition Design Model, illustrated by Alexander Osterwalder.

In the REFURB project, the value proposition model is being used to understand the value proposition for the selected home-owner segment and secure a successful completion of step 1 – 4 in the Customer Journey (becoming aware, becoming interested, becoming active, considering the offer).

A.3. The Business Model (Canvas) generation

The "Business Model Canvas" generation is a strategic management and lean start-up template for developing new or documenting existing business models. It is a visual chart with nine elements describing a firm's or product's value proposition, infrastructure, customers and finances.

The Business Model Canvas is developed by Alexander Osterwalder and documented in the book "Business Model Canvas".

For more information, please study the presentation of the Business Model Canvas:
http://www.slideshare.net/timdelhaes/the-pitch-method-busines-model-canvas-v2.

In the REFURB-project, the Business Model Canvas generation is being used to secure that key stakeholders are aligned with the supporting jobs to be completed during the customer journey´s step 4-9.

The Business Model Canvas is visualised in the model template illustrated in figure 5 and include the following 9 key elements:

- Customer segment
- Value proposition – to the compelling offers key stakeholders
- Customer relationship
- Channels
- Key activities
- Key partners
- Key resources
- Revenue streams
- Cost structure

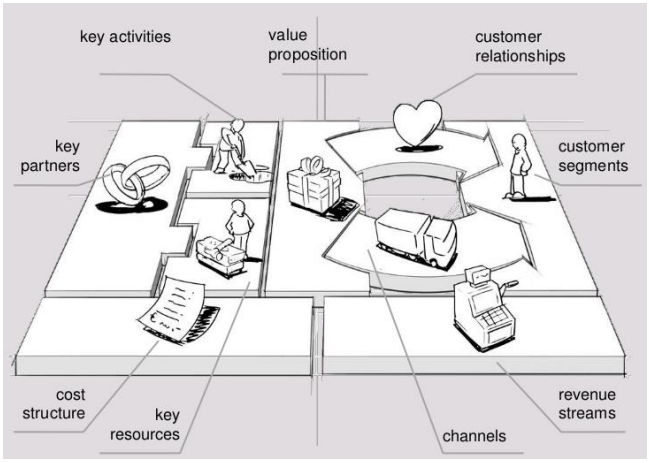


Figure A.5: The Business Model Canvas Model, illustrated by Alexander Osterwalder.

A.4. The Lean startup model and the PDCA approach

Lean startup is a product/services development tool/model to shorten product development cycles by adopting a combination of business-hypothesis-driven experimentation, iterative product releases, and validated learning.

The central hypothesis of the lean start-up model is that, if start-up companies invest their time into iteratively building products or services to meet the needs of early customers, they can **reduce the market entry risks**. But the improvement model can also be applied for existing activities and companies.

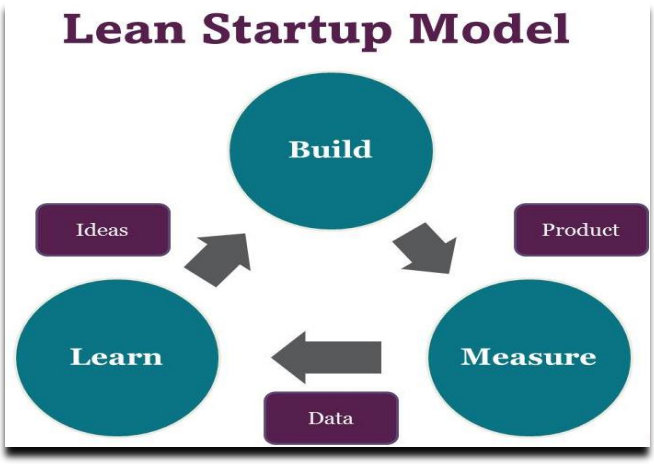


Figure A.6: The Lean Start up Model, by Eric Reise

The model builds on creating a minimal variable prototype product, which is tested in the market with focus on measurement and learning feedback cycles. The Lean start-up method was developed by Eric Rise and the methodology is visualized in figure 6 below.

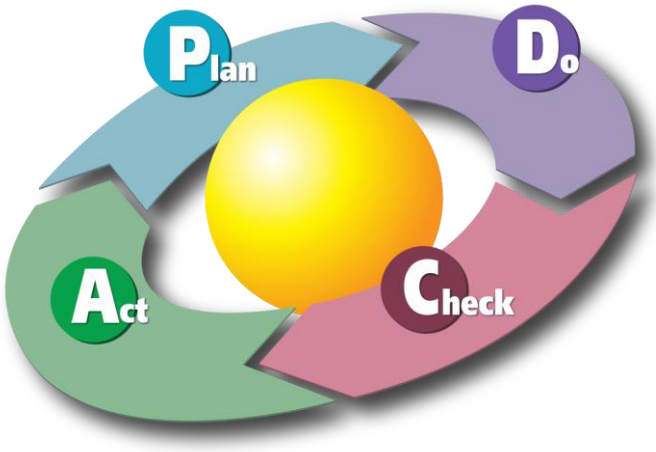
For more information about the model, please study the website: www.52weekturnaround.com/lean-startups-brussels-2014/.

The PDCA-approach, a further development

Another, common adapted methodology, for continuous improvement is the PDCA-model, which can be seen as a further development of the Lean Startup model. The PDCA is based on a four step approach. The following description is based on Wikipedia (https://en.wikipedia.org/wiki/PDCA):

Plan

Establish objectives and processes required to deliver the desired results.



Do

The do phase allows the plan from the previous step to be enacted. Small changes are usually tested, and data is gathered to see how effective the change is.

Check

During the check phase, the data and results gathered from the do phase are evaluated. Data is compared to the expected outcomes to see any similarities and differences. The testing process is also evaluated to see if there were any changes from the original test created during the planning phase. If the data is placed in a chart it can make it easier to see any trends if the PDCA cycle is conducted multiple times. This helps to see what changes work better than others, and if said changes can be improved as well.

Act

Also called "Adjust", this act phase is where a process is improved. Records from the "do" and "check" phases help identify issues with the process. These issues may include problems, non-conformities, opportunities for improvement, inefficiencies and other issues that result in outcomes that are evidently less-than-optimal. Root causes of such issues are investigated, found and eliminated by modifying the process. Risk is re-evaluated. At the end of the actions in this phase, the process has better instructions, standards or goals. Planning for the next cycle can proceed with a better base-line. Work in the next do phase should not create recurrence of the identified issues; if it does, then the action was not effective.

The below figure A.7 describes a continuous improvement process based on the PDCA-approach.

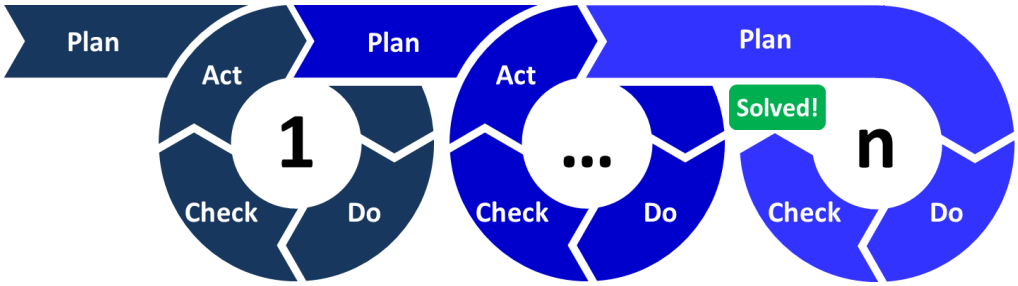


Figure A.7 describe a continuous improvement process