Med SE(A)CAP integration through uniform adapted assessment and financing methods, mainly targeting buildings in education and health sectors, for sustainable development goals in a smart society.

Reports on SEACAP SDG Living Labs (Output 4.2)

Developed by

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Summary

The local living lab in **Lebanon** aims at increasing awareness and developing capacity building skills with regard to energy efficiency (EE) and renewable energy (RE), to help increase the country's energy security and to reach Lebanon's tartes in energy efficiency and renewable energy as well as reduce energy consumption thus theGHGemissions.

The living lab tackles different sectors, such as public buildings owners and managers, decision and policy makers, research and educational centers, universities, business support organizations, technical chambers, innovative companies, and SMEs who can share advanced technological solutions, energy agencies, school owners and users, students "engineering Students", etc.and will:

- transfer existing knowledge (best practices/tools/methodologies) mainly identified in the SEACAP 4 SDG Toolkit.
- involve them actively in the process of exchanging experiences and concerns on EE and REtopics.
- establish a network; improve transnational cooperation and deep networking among them.

Various benefits arise for stakeholders participating in the implementation of the local living lab.

1. Setting up LebanonLiving Lab in Lebanon:

1.1 Connect and self-assessment:

The structure of chapter should follow these subchapters:

1.1.1 The coordinator of Lebanon LL in Lebanon:

The Lebanese Center for Energy Conservation (LCEC) is the national partner in the SEACAP 4 SDG project and has initiated its implementation in Lebanon. The LCEC is identified as the local coordinator of the SEACAP LL, with Dr. Sorina Mortada and Mohammad Hijazi in charge of the living lab activities.

The living lab coordinator has the main role of training the living lab members on the new toolkits that will be used in the implementation of the SEACAP 4SDG project or the projects that might follow, update the members on the Lebanese energy sector in general and to exchange knowledge between members since that is a main pillar of creating a local living lab.

1.1.2 Lebanon LL stakeholders:

The identification of stakeholders was based on defining first the entities that might be interestedin following up on the activities of the project and receiving updates and the entities that would benefit the project implementation based on their knowledge in the field.

Introductory emails and invitations were sent to several types of stakeholders includingenergy service companies (ESCOs), academic professors, undergraduate engineering students and the Municipality staff.

The invitations included the LCEC team, 13 ESCOs, 3 Academic professors (and we kindly asked them to disseminate the invite to their students where 21 students attended), and the municipality staff.

The academic professors could not attend due to their academic commitments, and only one ESCO attended which was EEG, the external consultant selected to assist in the implementation of the project in Lebanon.

The LL training was performed online on the 17th of February 2023. The agenda can be found in the next section.

The evaluation annexes developed by the WP leaders were sent alongside with the living lab evaluation in a google form sheet to keep the attendees "stakeholders" attached to the idea of being members in the living lab. The replies were lower than expected, where fourattendees filled the stakeholder's engagement list, a team member from the LCEC, the Mayor of Jdeidet El Chouf, one from EEG and an undergrad Engineering student.

On the other hand, the living lab evaluation was filled by four engineering students, the same person from EEG, the same LCEC team member and the Mayor of Jdeidet El Chouf.

1.1.3 The Lebanon Living Lab scope:

The living lab aimed at introducing the attendees to the idea behind the sustainable energy access and climate action plan. What is SEACAP;and how to benefit from the action plan; in terms of implementing and in term financing?

The living lab training also targeted the importance of the local living lab and the engagement of stakeholders.

On the technical side, the living lab training included an introduction to the toolkits to be used in the implementation and exercises on how-to use them. In the training, we also tackled the energy crisis in Lebanon since it plays a great role in attracting the ears of listeners. In fact, Lebanon has been suffering from a huge economic and banking crisis since October 2019. Inflation and "unofficial" capital control practices have led to shortages in private generators electricity supply in addition to the existing shortages in electricity supply of the national utility (EDL). Besides, subsidies on fuel have been removed which increased the electricity cost provided by private neighborhood generators. Recently, the ministry of energy has increased the tariffs of electricity supplied by EDL. In order to ensure their energy security and to reduce their monthly energy bills, Lebanese end-users are now more interested in implementing EE and RE measures.

1.1.4 Lebanon Living Lab action plan:

The main aim of the living lab is to close the gap between the citizens and their inability to act upon climate change. This definition is broad butin a smaller perspective, it is to help people become more aware about the activities they might do without noticing, that could be a reason behind releasing more CO_2 into the atmosphere. It also aims to make energy efficiency measures more available to the citizens to help mitigate the issues discussed in the training.

Within the activities of the living lab, it is proposed to:

- Conduct trainings: after verifying the level of knowledge of the stakeholders, we could have another training to enrich their knowledge of topics related to the scope of the project.The training could tackle the implementation of the project, to be divided into 2 sections, a practical session and a theoretical one. After finalizing the energy assessment using the tool selected, another training session could occur based on the outcomes of the tool used, and the second session could be to show the Stakeholders the implementation on site.

- Have a site visit to the municipality in the implementation phase: this would keep the stakeholders engaged and interested in following up on the activities in the municipality and the project itself and future projects.

Maintain the relation with the living lab members for future projects: through seminars, webinars, and trainings.

LCEC will lead in terms of managing the activities of the living lab:

The members of the living lab were mostly students. They could help in pitching ideas to be implemented, if necessary, visit the site with the LCEC team and suggestmeasures that might not be taken into consideration.

The agreement with the stakeholders is verbal whereas the agreement with the Expert company and the municipality which is a signed contract over the period of the project.

In addition, implementation of “low hanging” measures might be physically implemented in Phase 3 depending on budget availability.

The risk we are currently facing is the lack of feedback of stakeholders after conducting the training; few of the stakeholders have filled in the Stakeholders engagement and the living lab evaluation form. It is recommended for next trainings or sessions to send the feedback form within the living lab training agenda and in the training break, to ask the attendees to fill it.

1.2 Educate and plan:

1.2.1 Educate/train stakeholders:

The first training was organized by the LCEC and was held on Friday 17 February 2023. The training was conducted online, and it is planned to have another training or another informative session in parallel with the implementation of EE and RE measures in the municipality.

The purpose of the training was similar to the cross-border training, and it was divided into 5 presentations as shown in the below figure- Event Agenda:

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SEACAP 4 SDG
LCEC

Agenda

09:30am - 09:45am	**Participants Log In**
09:45am - 10:00am	**SEACAP 4 SDG Support Mechanism**
	General Overview of the SEACAP 4 SDG Support Mechanism by Dr. Sorina Mortada, Technical Consultant, Lebanese Center for Energy Conservation **Q&A**
10 :00am- 11 :00am	**Introduction to SEACAPs**
	Overview on SEACAP/SEAP/Climate-Energy action plans principle, process, initiation, planning, implementation, monitoring by Mohammad Hijazi, Energy Engineer, Lebanese Center for Energy Conservation **Q&A**
11:00am – 12:00pm	**SEACAP Living lab**
	Framework , Approach, Members , Governance , Structure , Implementation phases by Dr. Sorina Mortada, Technical Consultant, Lebanese Center for Energy Conservation **Q&A**
12:00pm – 12:30pm	**Break**
12:30pm – 01:30pm	**Involvement and engagement of stakeholders and citizens through LL**
	Key Performance Indicators (KPI) measuring the impact of the Living Lab by Mohammad Hijazi, Energy Engineer, Lebanese Center for Energy Conservation **Q&A**
01:30pm – 02:30pm	**Tool Selection and Implementation**
	SEACAP Update of municipality of Jdeidet El Chouf through toolkit selection and implementation by Myriam Osman, Energy Engineer - EEG **Q&A**
02:30pm – 03:00pm	**Financing Options**
	"Policies and financing mechanisms for energy retrofit interventions" Dr. Sorina Mortada, Technical Consultant, Lebanese Center for Energy Conservation **Q&A**

Figure 1: Local Living Lab Training Agenda- 17 February 2023

The total number of SH attended the training was 25; mainly they were undergrad engineering students and masters'students. They all share the same interest since they major in Energy or Energy related degrees.

The LL coordinators team explained the support mechanism proposed within the SEACAP 4 SDG project. The team as well explained what a SEACAP is, its importance and how it is suggested to implement it.

The external expert had a session to deliver their presentation, which was entitled "**Tool Selection and Implementation**". They shared an update of the SEACAP for Jdeidet El Chouf Municipality, explained the Toolkits selected and how to move on from the toolkit to implementation.

Stakeholders were introduced to several methods to implement EE measures, from simple nudging techniques to actual retrofit solutions such as:Air tightening, Ventilation and night cooling, Shading, Energy efficient glazing, Wall insulation, Roof insulation, Avoiding thermal bridges, Heat Pumps, Evaporative cooling, LED lighting/smart lighting, Efficient split units, Traditional architecture (principles), District Cooling Network / SWAC, PCM heat / cold storage, Aquifer / ground water heating / cooling.

The material used was:

- **SEACAP 4 SDG Support Mechanism:** which was a general overview of the project, explaining the target of the project and the process flow.
- **Introduction to SEACAPs:** which was the presentation delivered in the cross border living lab. It was important to include this section in the training for several purposes. Mainly due to unawareness towards the word SEACAP, not all citizen/ potential stakeholders are familiar with this term and that needs to be addressed. In addition, to share a clear image about the process of a sustainable energy access and climate action plan from the initiation to the monitoring phase.
- **SEACAP Living lab:** this session included the definition and concept of a living lab, a living lab approach and methodology, setting up a living lab in Lebanon and solutions on how to improve in terms of energy efficiency.
- **Involvement and engagement of stakeholders and citizens through LL:** where the living lab approach was explained from identifying stakeholders to educating stakeholders to engaging stakeholders.

- **Tool Selection and Implementation:** where the External Expert gave an intro about the municipality in terms of energy consumption and CO_2 emissions, explained the toolkits selected and suggested some EE and RE measures.
- **Financing Options:** this session Dr. Sorina explained the barriers on financing in Lebanon due to the energy and financial crisis; she also introduces some financing mechanism for projects that were already done and methods to finance future projects.

Stakeholders might need more training on some solutions that were presented, this is the reason that a site visit could happen depending on the timeline of the implementation.

The List of Attendees is shown in the table below:

Sorina Mortada
Celine Jreij
Myriam Osman - EEG
Ayoub Al Ashkar
Danny Khoury
Mohammad Hijazi
Fatimah
Mohamad Arzouni
Fatima (Fatimah)
Iphone
Marwa Jaffal
Fatima Hodroj
Hussein Tfaily
Diyaa
Elsy
I1RIQTUtED8AAAAAAAAAggFURUNOTyBDSDduICg3MDIpAEFnVX
Hiba
Fares Shmayssani
Nour Fassad

Ammar Fadlallah
Abdalrahman Al-Hariri
Ali Sayed Ahmad
Hussein Jouni
Ali Zaraket
Ali Hamie

1.3 Implement:

1.3.1 Process of implementing Edufootprint and Impulse Tools:

The tools from the SRPs were designed to meet the targets of specific buildings and can be replicated to new ones. Based on the fact that we are working on a school and a healthcare building the toolkits were selected based on four main factors: the level of replicability, the ease of use, the data gathering process, and the relevance of updating the SEACAP for the municipality. Therefore, the toolkit selected are as follows:

Edufootprint which is a tool for educational building will be used to implement measures on the school selected, the goal of this tool is to reduce energy and environmental impacts and consumptions of public buildings and increase awareness among students and staff. The tool was selected for its ease of use (it has a mobile app) and its very user friendly. In addition, it can be replicated in the selected municipality public school building.

Impulse will be used for the healthcare facility. Unlike the school, which was renovated 2 years, the building of the facility was not renovated, and it is needed to have several retrofit solutionsto check the most suitable solution; The objective of the tool is to raise the capacity for better management of energy in public buildings at a transnational level. The excel tool helps develop and implement long-term financial planning regarding the gradual energy upgrading of the public building stock. The tool plans a gradual retrofitting according to four levels of performance and investments (minor, medium, major, and deep renovation). This tool was selected due to:

- Prioritization of typologies to renovate.

- Prioritization of energy renovation scenarios per typology (small scale, middle scale, major, deep renovation)
- Projection of results across the entire building stock
- Estimate of total investment cost and total energy saving for renovating the entire building stock depending

For level 2 Demonstrator in, the work plan is shown in figures 2 and 3. They would include the energy efficiency plans of selected buildings where EE and RE measures will be defined based on the outputs of the selected toolkits. In addition, implementation of "low hanging" measures might be physically implemented in Phase 3 depending on budget availability.

Item	Description	Week							
	February 2023 -->	1	2	3	4	5	6	7	8
1.	Demonstrator Buildings Selection								
2.	Field visits and data gathering								
3.	Electrical measurements and readings campaigns								
4	Baseline development								
5	Energy Balance Development								

Figure 2: Time frame of the proposed work plan for phase 2

	April 2023 -->	1	2	3	4	5	6	7	8	9	10	11	12
1	Energy Efficiency Measures Selection and development												
2	legal analysis and feasibility												
3	Economic and financial aspects of the planned investment												
4	Report Submission												
5	Poject Implementation, Testing, and Commissioning												

Figure 3: Time frame of the proposed work plan for phase 3

1.4 Improve and Evaluate:

1.4.1 Generation of potential improvements of Lebanon LL:

As explained previously, Lebanon is suffering from an acute economic crisis where Training might not be the priority of the population which would explain the small engagement of stakeholders till now. However, the increase in the demand to implement EE and RE measures is boosting the ESCO market. This is considered an opportunity that the LCEC will try to benefit from by organizing a site visit to the municipality of Jdeidet El Shouf and/or organize an informative session.

For the case of Lebanon, to improve the living lab it is needed to have an in-person training and meetings to have a better type of contact/ communication with stakeholders. The reason that LCEC held the training online is because of the high fuel prices/ cost of transportation.

One-to-one meetings shall be organized with several types of stakeholders to have their feedback.

1.4.2Lebanon Living Labevaluation:

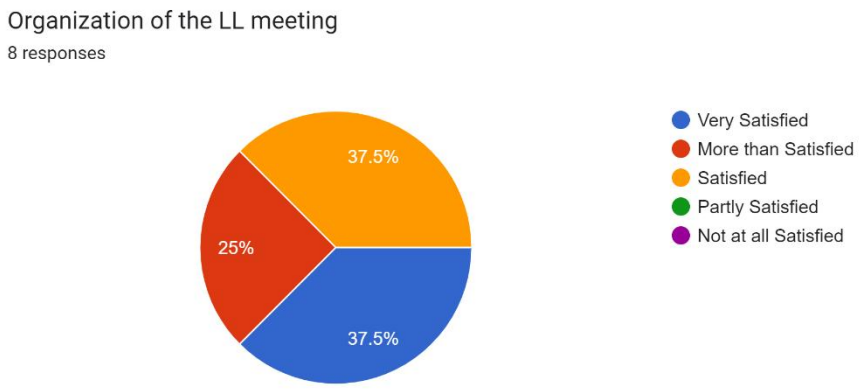
Based on the results of the questionnaire sent to the stakeholders who have attended the training, everyone was satisfied with the training and the training materials. In fact, almost all stakeholders enjoyed the training and benefitted from the content where 50 % were satisfied and the remaining 50% were either more than satisfied or very satisfied.**However, the evaluation form will be sent separately.**

1.4.3 Overall LL evaluation:

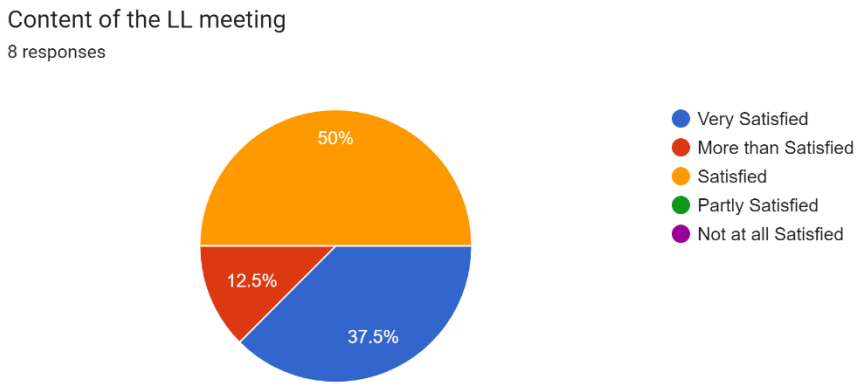
The questionnaire was sent to all the participants, and we have the following charts representing their answers:

A. Level of Satisfaction:

- Organization of the LL meeting:



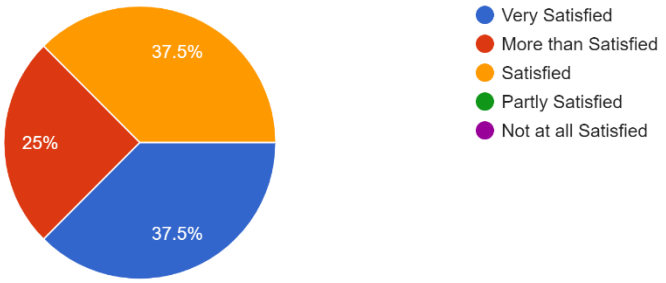
- Content of the LL meeting:



- Relevance of the presented topics on LL meeting:

Relevance of the presented topics on LL meeting

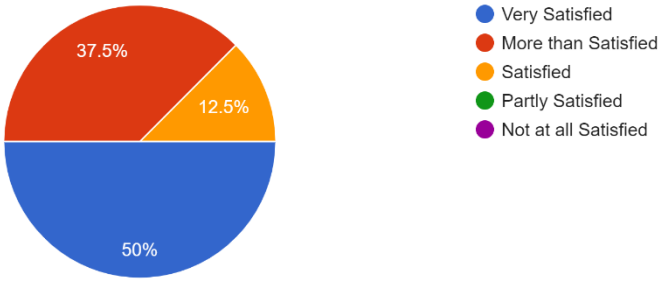
8 responses



- Usefulness of the presented topics on LL meeting:

Usefulness of the presented topics on LL meeting

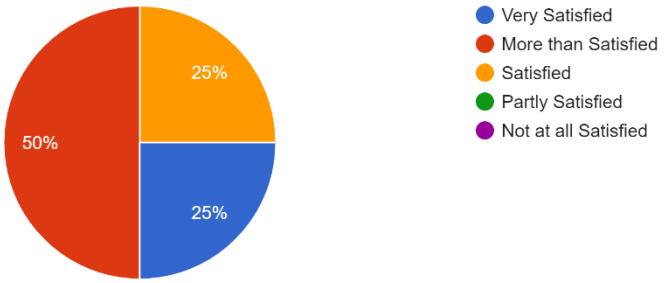
8 responses



- Speakers' skills and competences at the LL meeting:

Speakers skills and competences at the LL meeting

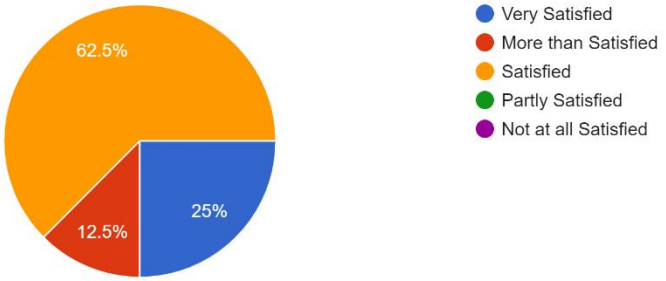
8 responses



- Results of the LL meeting:

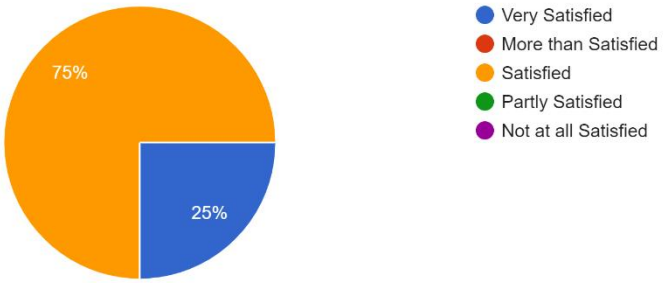
Results of the LL meeting

8 responses



- Duration of the LL meeting:

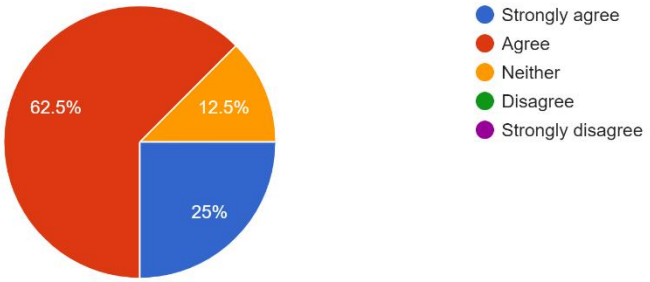
Duration of the LL meeting
8 responses



B. Benefits gained by participating in LL:

- LL enables transferring of user-oriented solutions:

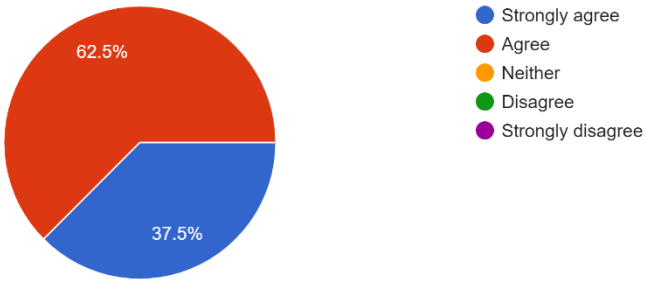
LL enables transferring of user-oriented solutions
8 responses



- LL strengthens the cooperation and trust between public and private sector:

LL strengthens the cooperation and trust between public and private sector

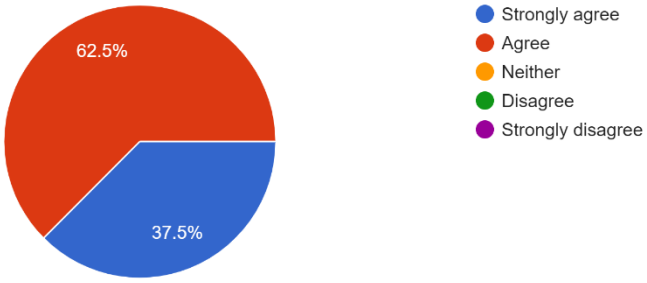
8 responses



- LL supports and strengthens cooperation among LL stakeholders:

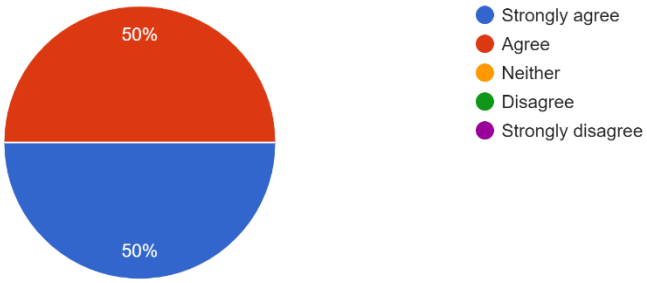
LL supports and strengthens cooperation among LL stakeholders

8 responses



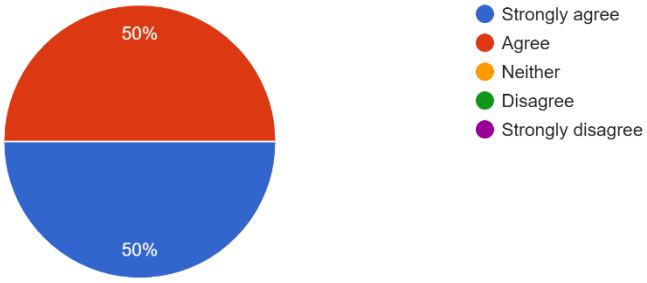
- LL strengthens stakeholders' transnational cooperation and networking with otherorganizations:

LL strengthens stakeholders' transnational cooperation and networking with other organizations
8 responses



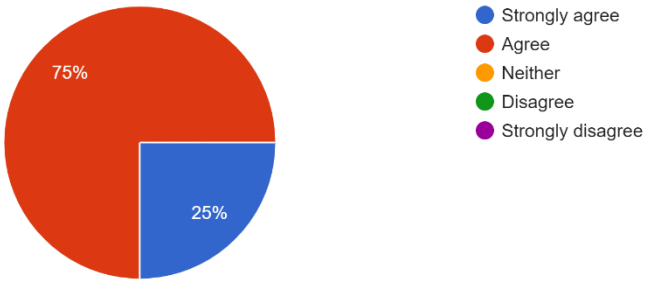
- LL enables the exchange of experiences or knowledge for EE of public buildings:

LL enables the exchange of experiences or knowledge for EE of public buildings
8 responses



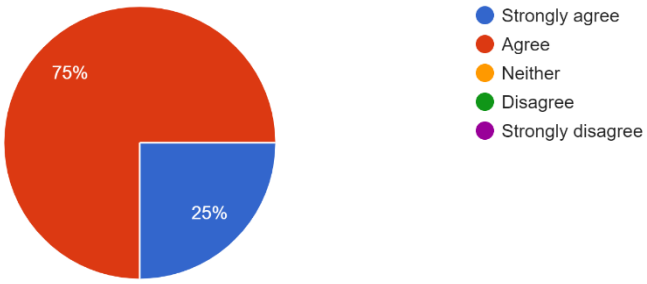
- LL enables more positive attitude towards EE of public buildings among LLstakeholders:

LL enables more positive attitude towards EE of public buildings among LL stakeholders
8 responses



- Participation in LL has increased the capacity of owners and managers of publicbuildings to design and implement better energy efficiency practices:

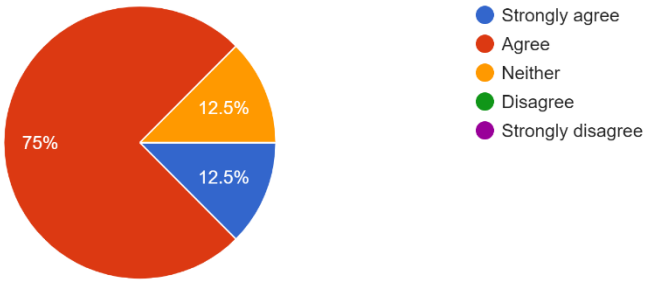
Participation in LL has increased the capacity of owners and managers of public buildings to design and implement better energy efficiency practices
8 responses



- Participation in LL has enabled SMEs to present innovative solutions to potential users:

Participation in LL has enabled SMEs to present innovative solutions to potential users

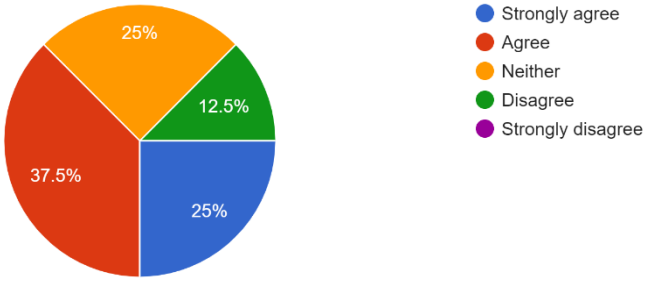
8 responses



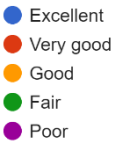
- Policy makers, with participating in LL, feel more competent in field of effective policy recommendations for EE of public buildings in MED area:

Policy makers, with participating in LL, feel more competent in field of effective policy recommendations for EE of public buildings in MED area

8 responses

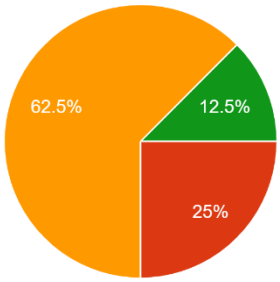


C. Stakeholder knowledge on the topics below before and after participating in LL:

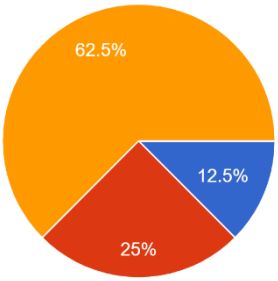


- EE policies (EU, national, local) for public buildings:

Before

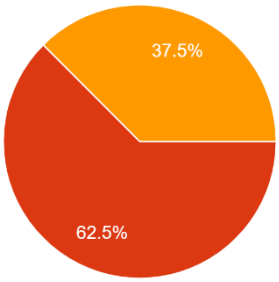


After



- Available mentoring mechanisms for increasing EE of public buildings:

Before



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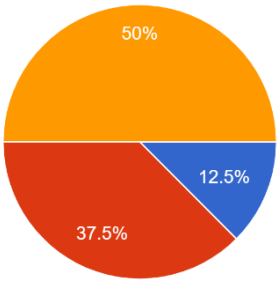
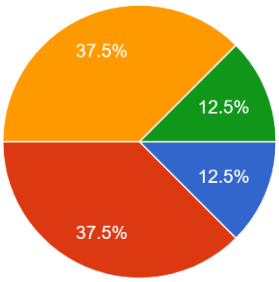
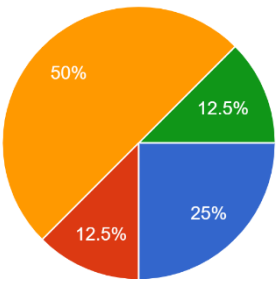


- Funding possibilities for increasing EE of public buildings (e.g., for renovation):

Before

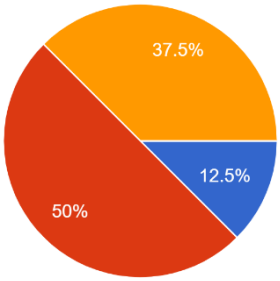
After



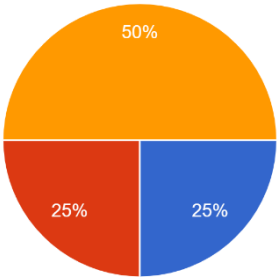


- Existing best practices identified in SEACAP 4 SDG (tools, methodologies, strategies, etc.) aiming to EE of public buildings:

Before

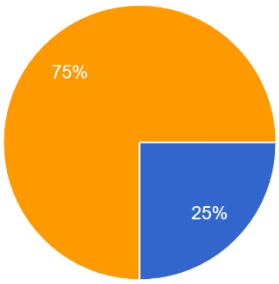


After

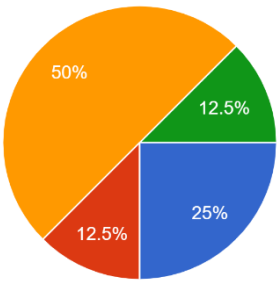


- LL establishment/setup:

Before



After



1.4.4 Measurement of Key Performance Indicators (KPIs):

The invitations for the training (living lab participation) were sent to academic professors and they sent the links to their students. It was planned to have engineering students participating in the living lab activities, as well as the implementation of the measures, hence in the participating stakeholders, engineering students was added as an indicator. For support mechanism, the action planned is not complete yet, so indicators from number 3 till 7 will be filler late on. The KPIs list is filled separately

1.4.5 Guidelines and recommendations:

The main attraction towards the living lab is Lebanon was from engineering students in all fields. As a recommendation, to fulfill their attraction and make their commitment worth it, to train them separately from other stakeholders and to have more technical talks/ meetings with them for many reasons.

Engineering students will be in the work market soon and if not soon they will help disseminate the ideas of the project to their family and friends in a way helping to raise awareness and slowly introducing people to EE measures. On the other hand, when entering the work market they will have a bit of knowledge in the energy efficiency field that could help them in finding employment.

It is also better to issue certificates for the training since that willlead to more attendees.

1.5 Disseminate:

In the training, the focus point was the solutions to be implemented in all types of buildings, specifically the pilotbuildings. Stakeholders have started to have an opinion on that matter, we might be asking for their recommendations before the implementation phase to have an external point of view.

More material should be added to the living lab, other than the ones already explained, but it is important to keep in mind the SDGs and to keep stakeholders within this loop.

As for the events in Lebanon, it is planned to have the Beirut Energy Week in September, where stakeholders could attend.

As it was planned to host the living lab training with ESCosand Engineering students, however they were uncooperative with us, the main stakeholder to focus on now is the engineering students.

2. Conclusions:

The aim of the living lab was to create a community in Lebanon through the SEACAP 4SDG Project tackling energy efficiency and renewable energy. The main issue that we had was that all attendees were students, but that could be used as a strong point because students have a higher potential to spread awareness.

Within the scope of the living lab, it was suggested to have a site visit to the municipality. Stakeholders were interested in this idea and when the implementation of the RE and EE measure starts, the site visit will be discussed.

For the implementation of proposed solutions, the installation of solar PV system is the main talk in the Lebanese energy sector in the current crisis. This topic has been on the mind of all Lebanese citizens. So, it is believed that stakeholders from various sectors would be interested in the solar PV solution the most.

From the evaluation of the local living lab, the most positive feedback was in the “benefits gained by participating in the living lab”, where the answers in this section have shown the value of the living lab in the eyes of stakeholders. It was viewed as a link to strengthen cooperation between LL stakeholders, a link to strengthen the cooperation and trust between the private and public sector.

The living lab could continue after the end of the project, since there are various kinds of projects that we are working on. We can send updates on the project via email and through social media, we can also invite the stakeholders (and new Potential Stakeholders) to attend eventssuch as the Beirut Energy Week 2023.s

List of Participating Stakeholders (in the questionnaires and surveys)

PP5- LCEC

Name of Stakeholder	**Ammar Fadlallah**
Type of stakeholder	Consultancy
Short description of stakeholder	Energy engineer having background in MEP design, energy efficiency, and renewable energy.
Short description of cooperationin the project	Technical and financial due diligence of energy efficiency and renewable energy projects
Advantage for stakeholders	Interaction with different stakeholders in the Lebanese market
Disadvantage for stakeholders	N/A
Other notes	

Name of Stakeholder	**Hisham Fatayri**
Type of stakeholder	Institutional decision makers
Short description of stakeholder	Mayor of the municipality
Short description of cooperation in the project	Working on developing the SECAP and on implementing it
Advantage for stakeholders	Provide more detailed studies to come up with projects that can be implemented.
Disadvantage for stakeholders	No funds to implement the project.
Other notes	We hope that the funds that come will not only tackle studies and visions but also fund concrete projects

Name of Stakeholder	**Hussein Ali Toufaily**
Type of stakeholder	Student of Fresh Graduate, End user

Short description of stakeholder	Person who gives his opinion in a project
Short description of cooperation in the project	Any kind of cooperation is required
Advantage for stakeholders	It sheds light on ideas that were not considered
Disadvantage for stakeholders	Multiple opinions
Other notes	

Name of Stakeholder	**Myriam Osman**
Type of stakeholder	Consultancy (External Company)
Short description of stakeholder	Engineering Graduate
Short description of cooperation in the project	External consultant - training for the stakeholders on the tools that will be used.
Advantage for stakeholders	Interest in renewable energy and energy efficiency projects
Disadvantage for stakeholders	Could be the lack of expertise in the field
Other notes	

Questionnaire for the evaluation of the overall LL performance

PP5-LCEC

- **To be filled-in by the LLLcoordinators (SLIT):**

1. Number of stakeholders (potential and actual)

	Total number of stakeholders **identified** as potential LL stakeholders	Total number of stakeholders **joining** the LL
Institutional decision makers	2	2
National and regional energy management authorities	1	1
Building / Energy managers		
Socio-economic operators		
End users	1	1
Students	21	4
Consultancy	13	1

2. Execution of LL meetings

	Number
Individual/one-on-one meetings (for example between the Municipality and the external expert and/ or the PP/ Local teams).	10+
Joint LL meetings (meetings held among all or almost all LL stakeholders).	1
Average number of participants per joint meetings.	25
Meetings organized between LL coordinatorsof joint LLLs (e.g.,in case of Spain)	
Average duration of joint LL meetings (in hours)	5

3. Total number of presented Selected Reference Project's Outcomes identified in the SEACAP 4 SDG toolkit per type* within LL activities. (*categorizationis based on the factsheet information)

	Total number	**Specify which Outcome (s)**
Number of SRP's Outcomes under type "Tool"	2	Edufootprint - Impulse
Number of SRP's Outcomes under type "Platform"		
Number of MPs' results under category "Methodology"		

❖ Participant 1: AfafDagher

1. Name of the LL: Lebanon Living Lab
2. Name of the person filling in the questionnaire: AfafDagher
3. Positions of the person in the stakeholders' organization: Elec Engineer / master's Student
4. Name of the LL stakeholder/organization: LU
5. Type of the stakeholder:Undergrad / Student
6. Country: Lebanon
7. LL stakeholders' satisfaction regarding the general organization of the LL (state the level of satisfaction by writing down "X" in the corresponding cell).

	Level of satisfaction				
	Not at all Satisfied	Partly Satisfied	Satisfied	More than satisfied	Very Satisfied
Organization of the LL meeting			x		
Content of the LL meeting			x		
Relevance of the presented topics on LL meeting			x		
Usefulness of the presented topics on LL meeting			x		
Speakers skills and competences at the LL meeting			x		
Results of the LL meeting			x		
Duration of the LL meeting			x		

8. Benefits gained by participating in LL (state the level of agreement by writing down "X" in the corresponding cell).

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
LL enables transferring of user-oriented solutions				x	
LL strengthens the cooperation and trust between public and private sector				x	
LL supports and strengthens				x	

cooperation among LL stakeholders					
LL strengthens stakeholders' transnational cooperation and networking with other organizations				x	
LL enables the exchange of experiences or knowledge for EE of public buildings				x	
LL enables more positive attitude towards EE of public buildings among LL stakeholders				x	
Participation in LL has increased the capacity of owners and managers of public buildings to design and implement better energy efficiency practices				x	
Participation in LL has enabled SMEs to present innovative solutions to potential users				x	
Policy makers, with participating in LL, feel more competent in field of effective policy recommendations for EE of public buildings in MED area				x	

9. Stakeholder knowledge on the topics below before and after participating in LL (state the level of knowledge by writing down "X" in the corresponding cell).

	Before **participating in LL**					After **participating in LL**				
	Poor	Fair	Good	Very good	Excellent	Poor	Fair	Good	Very good	Excellent
EE policies (EU, national, local) for public buildings			x					x		
Available mentoring mechanisms for increasing EE of public buildings			x					x		
Funding possibilities for increasing EE of public buildings (e.g. for renovation)			x					x		
Existing best practices identified in SEACAP 4 SDG			x					x		

(tools, methodologies, strategies, etc.) aiming to EE of public buildings										
LL establishment/setup			x					x		

❖ **Participant 2: Ammar Fadlallah**

1. Name of the LL: Lebanon Living Lab

2. Name of the person filling in the questionnaire: Ammar Fadlallah
3. Positions of the person in the stakeholders' organization: Energy Engineer
4. Name of the LL stakeholder/organization: LCEC
5. Type of the stakeholder: Consultancy
6. Country: Lebanon
7. LL stakeholders' satisfaction regarding the general organization of the LL (state the level of satisfaction by writing down "X" in the corresponding cell).

	Level of satisfaction				
	Not at all Satisfied	Partly Satisfied	Satisfied	More than Satisfied	Very Satisfied
Organization of the LL meeting				x	
Content of the LL meeting				x	
Relevance of the presented topics on LL meeting				x	
Usefulness of the presented topics on LL meeting				x	
Speakers'zskills and competences at the LL meeting					x
Results of the LL meeting					x
Duration of the LL meeting				x	

8. Benefits gained by participating in LL (state the level of agreement by writing down "X" in the corresponding cell).

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
LL enables transferring of user-oriented solutions				x	
LL strengthens the cooperation and trust between public and private sector				x	
LL supports and strengthens cooperation among LL stakeholders				x	
LL strengthens stakeholders'				x	

transnational cooperation and networking with other organizations					
LL enables the exchange of experiences or knowledge for EE of public buildings				x	
LL enables more positive attitude towards EE of public buildings among LL stakeholders				x	
Participation in LL has increased the capacity of owners and managers of public buildings to design and implement better energy efficiency practices				x	
Participation in LL has enabled SMEs to present innovative solutions to potential users				x	
Policy makers, with participating in LL, feel more competent in field of effective policy recommendations for EE of public buildings in MED area				x	

9. Stakeholder knowledge on the topics below before and after participating in LL (state the level of knowledge by writing down "X" in the corresponding cell).

	Before **participating in LL**					After **participating in LL**				
	Poor	Fair	Good	Very good	Excellent	Poor	Fair	Good	Very good	Excellent
EE policies (EU, national, local) for public buildings			x					x		
Available mentoring mechanisms for increasing EE of public buildings				x				x		
Funding possibilities for increasing EE of public buildings (e.g. for renovation)		x					x			
Existing best practices identified in SEACAP 4 SDG (tools, methodologies, strategies, etc.) aiming to EE of public buildings			x					x		
LL establishment/setup			x						x	

❖ **<u>Participant 3: Celine Jreige</u>**

1. Name of the LL: Lebanon Living Lab
2. Name of the person filling in the questionnaire: Celine Jreige
3. Positions of the person in the stakeholders' organization: Engineering Student
4. Name of the LL stakeholder/organization: USEK
5. Type of the stakeholder: Undergrad/Student
6. Country: Lebanon
7. LL stakeholders' satisfaction regarding the general organization of the LL (state the level of satisfaction by writing down "X" in the corresponding cell).

	Level of satisfaction				
	Not at all Satisfied	Partly Satisfied	Satisfied	More than Satisfied	Very Satisfied
Organization of the LL meeting					x
Content of the LL meeting					x
Relevance of the presented topics on LL meeting					x
Usefulness of the presented topics on LL meeting					x
Speakers skills and competences at the LL meeting					x
Results of the LL meeting					x
Duration of the LL meeting					x

8. Benefits gained by participating in LL (state the level of agreement by writing down "X" in the corresponding cell).

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
LL enables transferring of user-					x

oriented solutions					
LL strengthens the cooperation and trust between public and private sector					x
LL supports and strengthens cooperation among LL stakeholders					x
LL strengthens stakeholders' transnational cooperation and networking with other organizations					x
LL enables the exchange of experiences or knowledge for EE of public buildings					x
LL enables more positive attitude towards EE of public buildings among LL stakeholders					x
Participation in LL has increased the capacity of owners and managers of public buildings to design and implement better energy efficiency practices				x	
Participation in LL has enabled SMEs to present innovative solutions to potential users				x	
Policy makers, with participating in LL, feel more competent in field of effective policy recommendations for EE of public buildings in MED area				x	

9. Stakeholder knowledge on the topics below before and after participating in LL (state the level of knowledge by writing down "X" in the corresponding cell).

	Before **participating in LL**					After **participating in LL**				
	Poor	Fair	Good	Very good	Excellent	Poor	Fair	Good	Very good	Excellent
EE policies (EU, national, local) for public buildings				x					x	
Available mentoring mechanisms for increasing EE of public buildings				x					x	
Funding possibilities for increasing EE of public buildings (e.g. for renovation)				x					x	
Existing best practices identified in SEACAP 4 SDG (tools, methodologies, strategies, etc.) aiming to EE of public buildings					x					x
LL establishment/setup					x					x

❖ **<u>Participant 4: Elsy Gerges</u>**

1. Name of the LL: Lebanon Living Lab

2. Name of the person filling in the questionnaire: Elsy Gerges
3. Positions of the person in the stakeholders' organization: Engineering Student
4. Name of the LL stakeholder/organization: USEK
5. Type of the stakeholder

Undergrad/Student

6. Country: Lebanon
7. LL stakeholders' satisfaction regarding the general organization of the LL (state the level of satisfaction by writing down "X" in the corresponding cell).

	Level of satisfaction				
	Not at all Satisfied	Partly Satisfied	Satisfied	More than Satisfied	Very Satisfied
Organization of the LL meeting				x	
Content of the LL meeting			x		
Relevance of the presented topics on LL meeting			x		
Usefulness of the presented topics on LL meeting				x	
Speakers skills and competences at the LL meeting				x	
Results of the LL meeting			x		
Duration of the LL meeting			x		

8. Benefits gained by participating in LL (state the level of agreement by writing down "X" in the corresponding cell).

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
LL enables transferring of user-oriented solutions			x		
LL strengthens the cooperation				x	

and trust between public and private sector					
LL supports and strengthens cooperation among LL stakeholders				x	
LL strengthens stakeholders' transnational cooperation and networking with other organizations				x	
LL enables the exchange of experiences or knowledge for EE of public buildings				x	
LL enables more positive attitude towards EE of public buildings among LL stakeholders				x	
Participation in LL has increased the capacity of owners and managers of public buildings to design and implement better energy efficiency practices				x	
Participation in LL has enabled SMEs to present innovative solutions to potential users			x		
Policy makers, with participating in LL, feel more competent in field of effective policy recommendations for EE of public buildings in MED area			x		

9. Stakeholder knowledge on the topics below before and after participating in LL (state the level of knowledge by writing down "X" in the corresponding cell).

	Before **participating in LL**					After **participating in LL**				
	Poor	Fair	Good	Very good	Excellent	Poor	Fair	Good	Very good	Excellent
EE policies (EU, national, local) for public buildings			x					x		
Available mentoring mechanisms for increasing EE of public buildings			x						x	
Funding possibilities for increasing EE of public buildings (e.g. for renovation)			x						x	
Existing best practices identified in SEACAP 4 SDG (tools, methodologies, strategies, etc.) aiming to EE of public buildings			x						x	
LL establishment/setup			x						x	

❖ Participant 5: Hisham Fatayri

1. Name of the LL: Lebanon Living Lab

2. Name of the person filling in the questionnaire: Hisham Fatayri
3. Positions of the person in the stakeholders' organization: Mayor
4. Name of the LL stakeholder/organization: Jdeidet El Chouf Municipality
5. Type of the stakeholder:Institutional decision makers
6. Country: Lebanon
7. LL stakeholders' satisfaction regarding the general organization of the LL (state the level of satisfaction by writing down "X" in the corresponding cell).

	Level of satisfaction				
	Not at all Satisfied	Partly Satisfied	Satisfied	More than Satisfied	Very Satisfied
Organization of the LL meeting			X		
Content of the LL meeting				X	
Relevance of the presented topics on LL meeting			X		
Usefulness of the presented topics on LL meeting				X	
Speakers skills and competences at the LL meeting				X	
Results of the LL meeting			X		
Duration of the LL meeting			X		

8. Benefits gained by participating in LL (state the level of agreement by writing down "X" in the corresponding cell).

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
LL enables transferring of user-oriented solutions				x	
LL strengthens the cooperation				x	

and trust between public and private sector					
LL supports and strengthens cooperation among LL stakeholders					X
LL strengthens stakeholders' transnational cooperation and networking with other organizations					X
LL enables the exchange of experiences or knowledge for EE of public buildings					X
LL enables more positive attitude towards EE of public buildings among LL stakeholders				x	
Participation in LL has increased the capacity of owners and managers of public buildings to design and implement better energy efficiency practices					x
Participation in LL has enabled SMEs to present innovative solutions to potential users				x	
Policy makers, with participating in LL, feel more competent in field of effective policy recommendations for EE of public buildings in MED area		x			

9. Stakeholder knowledge on the topics below before and after participating in LL (state the level of knowledge by writing down "X" in the corresponding cell).

	Before **participating in LL**					After **participating in LL**				
	Poor	Fair	Good	Very good	Excellent	Poor	Fair	Good	Very good	Excellent
EE policies (EU, national, local) for public buildings			X					X		
Available mentoring mechanisms for increasing EE of public buildings			X						X	
Funding possibilities for increasing EE of public buildings (e.g. for renovation)					X					X
Existing best practices identified in SEACAP 4 SDG (tools, methodologies, strategies, etc.) aiming to EE of public buildings				X					X	
LL establishment/setup			x					X		

❖ **<u>Participant 6: Hussein Toufaily</u>**

10. Name of the LL: Lebanon Living Lab
11. Name of the person filling in the questionnaire: Hussein Toufaily
12. Positions of the person in the stakeholders' organization: Student
13. Name of the LL stakeholder/organization: LU
14. Type of the stakeholder: Undergrad / Student
15. Country: Lebanon
16. LL stakeholders' satisfaction regarding the general organization of the LL (state the level of satisfaction by writing down "X" in the corresponding cell).

	Level of satisfaction				
	Not at all Satisfied	Partly Satisfied	Satisfied	More than Satisfied	Very Satisfied
Organization of the LL meeting				x	
Content of the LL meeting			x		
Relevance of the presented topics on LL meeting				x	
Usefulness of the presented topics on LL meeting					x
Speakers skills and competences at the LL meeting				x	
Results of the LL meeting			x		
Duration of the LL meeting			x		

17. Benefits gained by participating in LL (state the level of agreement by writing down "X" in the corresponding cell).

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
LL enables transferring of user-oriented solutions				x	

LL strengthens the cooperation and trust between public and private sector					x
LL supports and strengthens cooperation among LL stakeholders				x	
LL strengthens stakeholders' transnational cooperation and networking with other organizations					x
LL enables the exchange of experiences or knowledge for EE of public buildings					x
LL enables more positive attitude towards EE of public buildings among LL stakeholders				x	
Participation in LL has increased the capacity of owners and managers of public buildings to design and implement better energy efficiency practices				x	
Participation in LL has enabled SMEs to present innovative solutions to potential users				x	
Policy makers, with participating in LL, feel more competent in field of effective policy recommendations for EE of public buildings in MED area					x

18. Stakeholder knowledge on the topics below before and after participating in LL (state the level of knowledge by writing down "X" in the corresponding cell).

	Before **participating in LL**					After **participating in LL**				
	Poor	Fair	Good	Very good	Excellent	Poor	Fair	Good	Very good	Excellent
EE policies (EU, national, local) for public buildings				x					x	
Available mentoring mechanisms for increasing EE of public buildings				x					x	
Funding possibilities for increasing EE of public buildings (e.g. for renovation)			x					x		
Existing best practices identified in SEACAP 4 SDG (tools, methodologies, strategies, etc.) aiming to EE of public buildings				x					x	
LL establishment/setup				x				x		

❖ **<u>Participant 7: Myriam Osman</u>**

19. Name of the LL: Lebanon Living Lab
20. Name of the person filling in the questionnaire: Myriam Osman
21. Positions of the person in the stakeholders' organization: Energy Engineer
22. Name of the LL stakeholder/organization: EEG
23. Type of the stakeholder: Consultancy/ External Company
24. Country: Lebanon
25. LL stakeholders' satisfaction regarding the general organization of the LL (state the level of satisfaction by writing down "X" in the corresponding cell).

	Level of satisfaction				
	Not at all Satisfied	Partly Satisfied	Satisfied	More than Satisfied	Very Satisfied
Organization of the LL meeting					x
Content of the LL meeting					x
Relevance of the presented topics on LL meeting					x
Usefulness of the presented topics on LL meeting					x
Speakers skills and competences at the LL meeting					x
Results of the LL meeting					x
Duration of the LL meeting					x

26. Benefits gained by participating in LL (state the level of agreement by writing down "X" in the corresponding cell).

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
LL enables transferring of user-					x

oriented solutions					
LL strengthens the cooperation and trust between public and private sector					x
LL supports and strengthens cooperation among LL stakeholders					x
LL strengthens stakeholders' transnational cooperation and networking with other organizations					x
LL enables the exchange of experiences or knowledge for EE of public buildings					x
LL enables more positive attitude towards EE of public buildings among LL stakeholders					x
Participation in LL has increased the capacity of owners and managers of public buildings to design and implement better energy efficiency practices					x
Participation in LL has enabled SMEs to present innovative solutions to potential users					x
Policy makers, with participating in LL, feel more competent in field of effective policy recommendations for EE of public buildings in MED area					x

27. Stakeholder knowledge on the topics below before and after participating in LL (state the level of knowledge by writing down "X" in the corresponding cell).

	Before **participating in LL**					After **participating in LL**				
	Poor	Fair	Good	Very good	Excellent	Poor	Fair	Good	Very good	Excellent
EE policies (EU, national, local) for public buildings		x								x
Available mentoring mechanisms for increasing EE of public buildings				x						x
Funding possibilities for increasing EE of public buildings (e.g. for renovation)				x						x
Existing best practices identified in SEACAP 4 SDG (tools, methodologies, strategies, etc.) aiming to EE of public buildings				x						x
LL establishment/setup					x					x

List ofKey Performance Indicators (KPIs) -
Evaluation of LL performance

PP5-LCEC

Area	No.	Performance indicator name	Metric	Description of performance indicator
Approached stakeholders	1	Number of potentialInstitutional decision makers	7	The indicator measures the number of potential Institutional decision makers contacted by LL coordinator to be involved in LL activities.
	2	Number of potentialNational and regional energy management authorities	1	The indicator measures the number of potential National and regional energy management authorities contacted by LL coordinator to be involved in LL activities.
	3	Number of potential Building / Energy managers		The indicator measures the number of potential Building / Energy managers contacted by LL coordinator to be involved in LL activities.
	4	Number of potential Socio-economic operators		The indicator measures the number of Socio-economic operators contacted by LL coordinator to be involved in LL activities.
	5	Number of potential End users	1	The indicator measures the number of potential End users contacted by LL coordinator to be involved in LL activities.
	6	Number of potential other organizations (Energy Service Companies)	13	The indicator measures the number of potential other organizations contacted by LL coordinator to be involved in LL activities.
Participating stakeholders	7	Number of Institutional decision makers	2	The indicator measures the number of Institutional decision makers, involved in LL activities.
	8	Number of National and regional energy management authorities	1	The indicator measures the number of National and regional energy management authorities involved in LL activities.
	9	Number of Building / Energy managers		The indicator measures the number of Building / Energy managers involved in LL.
	10	Number of Socio-economic operators		The indicator measures the number of Socio-economic operators involved in LL activities.
	11	Number of End users	2	The indicator measures the number of End users involved in LL activities.

	12	Number of potential other organizations (Energy Service Companies)	1	The indicator measures the number of other organizations involved in LL activities.
	13	Engineering Students	21	This indicator measures the number of engineering students attending the local living lab training.
LL meetings	14	Number of individual meetings	10+	The indicator measures the number of individual/one-on-one meetings (for example between the Municipality and the external expert and/ or the PP/ Local teams).
	15	Number of joint LL meetings	1	The indicator measures the number of joint LL meetings (meetings held among all or almost all stakeholders).
	16	Number of participants in joint LL meetings	25	The indicator measures the average number of participants per joint meetings.
	17	Number of meetings between LL coordinators of joint LLLs		The indicator measures the number of meetings organized between LL coordinators of joint LLLs (e.g. in case of Spain)
	18	Average duration of joint meetings	5	The indicator measures the average duration of joint meetings (in hours).
Themes presented	19	Number of SRP's Outcomes under type "Tool"	2	The indicator measures the number of Number of SRP's Outcomes under type "Tool" (categorization is based on the factsheet information) presented within LL activities.
	20	Number of SRP's Outcomes under type "*Platform*"		The indicator measures the number of Number of SRP's Outcomes under type "*Platform*" (categorization is based on the factsheet information) presented within LL activities.
	21	Number of SRP's Outcomes under type "*Methodology*"		The indicator measures the number of Number of SRP's Outcomes under type "*Methodology*" (categorization is based on the factsheet information) presented within LL activities.
Benefits gained	22	Transferring of user-oriented solutions	Level of agreement: -Strongly disagree -Disagree -Neither agree or disagree -Agree -Strongly	The indicator measures if LL enables transferring of user-oriented solutions.

			agree	
	23	Strengthen the cooperation and trust between public and private sector	Level of agreement	The indicator measures if LL strengthens the cooperation and trust between public and private sector.
	24	Strengthen cooperation among LL stakeholders	Level of agreement	The indicator measures if LL supports and strengthens cooperation among LL stakeholders.
	25	Strengthen LL stakeholders' transnational cooperation and networking	Level of agreement	The indicator measures if LL strengthens stakeholders' transnational cooperation and networking with other organizations (PAs, SMEs, clusters, business support organization, etc.).
	26	Exchange experiences or concerns for EE of public buildings	Level of agreement	The indicator measures if LL enables the exchange of experiences or concerns for EE of public buildings among LL stakeholders.
	27	More positive attitude towards the design and implementation of better energy efficiency practices	Level of agreement	The indicator measures if LL enables more positive attitude towards the design and implementation of better energy efficiency practices among LL stakeholders.
	28	Adoption of innovative solutions	Level of agreement	The indicator measures if participation in LL has enabled public buildings' owners and managers to be familiarised with innovative energy management solutions.
	34	Effective policy recommendations for enhancing EE of public buildings in MED area.	Level of agreement	The indicator measures if policy makers, with participating in LL, feel more competent in field of effective policy recommendations for enhancing EE of public buildings in MED area.
Knowledge	35	Knowledge on EE policies (EU, national, local) for public buildings	Level of knowledge: -Poor -Fair -Good -Very good -Excellent	The indicator measures level of knowledge of LL stakeholders on EE policies (EU, national, local) for public buildings before and after participating in LL activities.
	36	Knowledge on available mentoring mechanisms for increasing EE of public buildings	Level of knowledge	The indicator measures level of knowledge of LL stakeholders on available mentoring mechanisms for increasing EE of public buildings before and after participating in LL activities.

	37	Knowledge on funding possibilities for increasing EE of public buildings (e.g. for renovation)	Level of knowledge	The indicator measures level of knowledge of LL stakeholders on funding possibilities for increasing EE of public buildings (e.g. for renovation) before and after participating in LL activities.
	38	Knowledge on existing best practices (tools, methodologies, strategies, etc.) aiming to EE of public buildings	Level of knowledge	The indicator measures level of knowledge of LL stakeholder on existing best practices (tools, methodologies, strategies, etc.) aiming to EE of public buildings before and after participating in LL activities.
	39	Knowledge on LL concept/establishment/setup	Level of knowledge	The indicator measures level of knowledge of LL stakeholders on LL concept/setupbefore and after participating in LL activities.
Support mechanism extent	40	N° of cities involved/territories covered	1	The indicator measures the number of the cities involved/territories covered while implementing the support mechanism
	41	Area covered	2.5km^2	The indicator measures the area of intervention covered (municipality /city area involved)
	41	Building stock addressed	Number	The indicator measures the number of buildings that were object of studies and analysis
	42	Energy consumption/CO_2 emissions	121,000 MWh/47,000 Tons	The indicator measures the baseline energy consumption and CO_2 in the selected municipality/city **(if it is available)**

List ofKey Performance Indicators (KPIs) – Support mechanism: EE/RE actions planned

No.	Performance indicator name	Metric	Description of performance indicator
1	Baseline SEACAP (or equivalent) plans	46	The indicator measures the number of SEACAP (or equivalent) plans of the selected cities/municipalities available
2	Baseline target of the SEACAP (or equivalent)	60,566 MWh/ 29,076Tons	The indicator measures the target set in the SEACAP (or equivalent) of the selected municipality /city in terms of Energy consumption to be reduced and CO_2 emissions to be avoided
3	Actions planned	To be filled later	The indicator measures the number of actions that are planned (EE/RE) to be proposed in the framework of the support mechanism
4	Impact of the actions planned	To be filled later	The indicator measures the amount of energy consumption to be reduced and CO_2 emissions to be avoided thanks to the actions that will be proposedin the

			framework of the support mechanism
5	Technical studies	To be filled later	The indicator measures the number of technical studies delivered to evaluate the proposed actions while exploiting the capitalization toolkit
6	Economic studies **(For level two demonstrators)**	To be filled later	The indicator measures the number of economic studies delivered to evaluate the proposed actions while exploiting the capitalization toolkit
7	Legal framework **(For level two demonstrators)**	To be filled later	The indicator measures the number of feasibility legal studies of the actions proposed which highlights the legal requirements applicable to the corresponding investment as well as any legal and/or regulatory incentives and obstacles that exist.

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Company	Type of Entity	Contact Person	Role
APAVE Liban	ESCO	Bassam Habre (Head of Inspection Department)	provide technical assistant and recommendations in terms of implemention and in theory if needed
Beta Engineering	ESCO	Ali Berro (CEO)	provide technical assistant and recommendations in terms of implemention and in theory if needed
Earth Technologies	ESCO	George Abboud (COO)	provide technical assistant and recommendations in terms of implemention and in theory if needed
Eco Consulting	ESCO	Maya Karkour CEO	provide technical assistant and recommendations in terms of implemention and in theory if needed
Energy Efficiency Group (EEG)	ESCO	Ronald Diab (CEO)	the external expert, working on the implemention and an active member of the living lab represented by Myriam Osman (Energy engineer)
Free Renewable Electric Energy (FREE)	ESCO	Antoine Skayem (CEO)	provide technical assistant and recommendations in terms of implemention and in theory if needed
Green Essence	ESCO	Francois Farage (General Manager)	provide technical assistant and recommendations in terms of implemention and in theory if needed
METACS	ESCO	Emile Azar (General Manager)	provide technical assistant and recommendations in terms of implemention and in theory if needed
OTB	ESCO	Nader Hajj Shehadeh (CEO)	provide technical assistant and recommendations in terms of implemention and in theory if needed
Phoenix Energy	ESCO	Rabih Osta	provide technical assistant and recommendations in terms of implemention and in theory if needed
Pierre Dammous and Partners (PDP)	ESCO	Pierre Dammous	provide technical assistant and recommendations in terms of implemention and in theory if needed
Smart Age	ESCO	Saad Khoury	provide technical assistant and recommendations in terms of implemention and in theory if needed
SMG-Energy/Enexys	ESCO	Fares Kikano (General Manager)	provide technical assistant and recommendations in terms of implemention and in theory if needed
USEK	University	Dr. Joseph Al Assad	Advisor to the Minister of Energy and Water- Dean of Faculty of Engineering has a role in lobying policies suggestion at the ministry's level and awareness raising and capacity buildign at the academic level. The ministry is our associate partner in this project/
ULFG III	University	Dr. Hassan Shreim	Academic professor; to encourage students to participate in the living lab and the trainings that could be conducted by the LL Coordinators
Master ULFG &ESIB	University	Dr. Nazih Moubayed	Academic professor; to encourage students to participate in the living lab and the trainings that could be conducted by the LL Coordinators
Municipality of Jdeideh El Shouf	Municipality	Hisham Fatayri	To provide suggestion based on his knowledge with the municipality, he aslo is the Mayor of the municipality