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REGIONE AUTÒNOMA DE SARDIGNA
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SEACAP 4 SDG

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)

Tunisia Case: Eco-City TUN (Innovative eco-sustainable process for Sustainable Tunisian cities)

Developed by

المركز المتوسطي للطاقات المتجددة
MEDREC
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SEACAP 4 SDG

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Summary

By implementing Eco-City TUN (Innovative eco-sustainable process for Sustainable Tunisian cities) LL, the Tunisian project team aimed at improving the technical capacities of the public building managers of the municipality of Bizerte, by developing and enhancing energy efficiency actions through tools identified within the SEACAP 4 SDG project.

The Eco-City TUN LL involves various stakeholders such as the building owner, the municipality of Bizerte represented by its agents, decision-makers, and policymakers who are partly the municipal council and also the National Heritage Institute, considering that the building is a heritage site. The project team involved also universities and research institutions within the Living Lab, such as the National School of Architecture and Urban Planning (ENAU), the National Engineering School of Bizerte (ENIB), as well as research centres and startups.

The objective is primarily the transfer of knowledge (good practices/tools methodologies) identified in the SEACAP 4 SDG Toolkit, the exchange of experiences on management and energy efficiency issues, and the establishment of a network strengthening transnational cooperation.

1. Setting up Eco-City TUN Living Lab in Tunisia

1.1 Connect and self-assessment

1.1.1 The coordinator of Eco-City TUN LL in Tunisia

The initiator of the LL in Tunisia is the Mediterranean Renewable Energy Centre (MEDREC) which is a think-tank and an operational platform for regional cooperation based in Tunis, Tunisia. Its core mission is to support and boost collaboration for Sustainable Development and energy transition in the Mediterranean region mainly through the design and the implementation of projects with support from different funding agencies.

MEDREC has been in charge of the following actions:

- Establish a local Living Lab gathering the key actors (energy managers, technicians, experts, researchers…) to collaborate and share knowledge directly with each other to propose and implement the most suitable innovative solutions to be adopted by the beneficiary municipality.

- Provide the necessary support and assistance to municipalities and external entities

- Supervise the entire process and ensure coordination between the municipality and the external entity to facilitate the implementation of the actions carried out.

1.1.2 Eco-City TUN LL stakeholders

Since the start of the project, MEDREC had addressed invitations to potential stakeholders in Tunisia, through an expression of interest, to join SEACAP 4 SDG Living Lab.

The External Entity selected in Tunisia, Atmospheres agency, supported MEDREC in identifying and involving a multistakeholder participation focused on users.

The beneficiary municipality was the first and main stakeholder selected through a call for expression of interest. As a result the municipality of Bizerte (136 917 inhabitants) was selected. A dynamic energy team has been set up since August 26, 2020 to work on the national program "Alliance of Local Councils for Energy Transition

(ACTE)" which aims to strengthen the capacity of Tunisian municipalities to contribute at their levels to the national energy transition, through the exploitation of EE and RE technologies. A Climate Transition Action Plan is available and includes the energy audits performed within the municipality of Bizerte (as part of the ACTE project), and the various areas for improvements.

Furthermore, the project team in Tunisia encouraged the participation of representatives of public and private sectors, civil society, academia and students. It was a step by step approach, identifying these stakeholders and the contact person including:

- The National Agency for Energy Management (ANME), the main institutional decision maker in the field of energy efficiency in Tunisia. ANME was invited to take part in several events such as the trainings on the Selected Reference Projects (SRP) outcomes, the local trainings in Tunisia which were held in the municipality of Bizerte and a main event organized to share best practices in Tunisia etc.
- The Société de Gestion de Technopole de Bordj Cedria which brings together institutions specialized in research, training development and technical education. It is a partner of the ENICBCMED project GreenBuilding. For the socio-economic actors like innovative start ups, the cluster that the Technopark of Bordj Cedria is creating for the project Green Building can facilitate the access to this type of actors.
- The National Heritage Institute (INP) which is the Tunisian public administrative institution responsible for dealing with Tunisian heritage. An expert from INP in charge of the zone of Bizerte was contacted by the Atomspheres agency.
- Green Building Council (TGBC) which promotes sustainable architecture, building and construction practices. The promotion and dissemination of our project and activities through social media gave more visibility to the project. As a result, we were contacted by one member from TGBC which was interested in the project under implementation. An agreement has already been signed by the TGBC as a member of the Eco-City TUN LL.
- The National Federation of Municipalities (FNCT) which provides technical assistance that strengthens the capacities of cities in the context of decentralised development and cooperation in Tunisia. The stakeholder is also a partner of the project SOLE "High Energy efficiency for the pubLIc stOck buildingS in Mediterranean".

- The National School of Architecture and Urbanism (ENAU) and National Engineering School of Bizerte (ENIB), representing the academic stakeholders with their students, professors and researchers. Two of the external entity's experts are professors at ENAU and another one is a professor at ENIB which facilitated the engagement of the students in the LL either through direct invitations and/or through the call of expression of interested launched. An agreement has already been signed by the ENAU as a member of the Eco-City TUN LL.
- DB Sense which is an innovative start up specialized in acoustic issues based in Tunis. Different workshops were organized in collaboration with this startup on "Green Nudging".
- UN Habitat which is an international organization fostering SDGs. The invited one contact person join the LL. Representatives were present in different events organized. There have been difficulties to finalize the LL agreement due to internal administrative process of UN habitat.
- Research centres and teams: ERA, (https://erambiances.jimdofree.com/programme-scientifique/) the team of research in Architectural and urban Atmospheres, and CERTE, another research centre specializing in research on water technology (https://certe.rnrt.tn/).
- The association Edifices et Mémoires which is an organization that aims to streamline communication between scientific research and citizen action. A first meeting online was held between the association, Atmospheres agency and MEDREC and following an agreement was drafted and sent. However, no feedback has been received.
- The association Docomomo, specialized in buildings of the modernity. An invitation was sent to join the Eco-City TUN LL. However, it was declined.

The project team is working on involving other types of stakeholders such as:

- The German association, GIZ which is involved in several projects on sustainable development in Tunisia.
- CTMCCV, the technical center of materials of construction, ceramics and glass.
- private companies offering innovative solutions

All the activities planned in the framework of the support mechanism proposed by the project were planned to be implemented in collaboration with the stakeholders selected through meetings, reflection/training workshops, challenges...

The stakeholders were addressed/involved in Eco-City TUN LL through:

- The expression of interest launched at the beginning phase of the project (LINK)
- The experts of the external entity who had a large network
- Social media through the posts on the project SEACAP4SDG
- Organization and participation to events.
- Emails/phone calls...

Here below is a graph illustrating the reached stakeholders per typology. The details related to these stakeholders are included in Annexe 1 and Annex 2

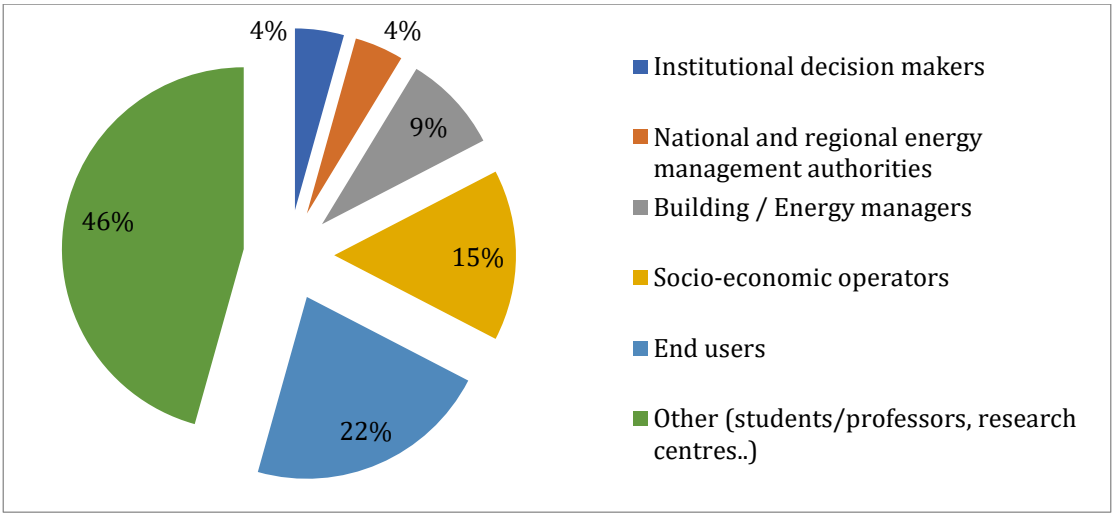

Figure 1: Reached stakeholders per typology

1.1.3 The Eco-City TUN Living Lab scope

Eco-City TUN LL supports the cost-effective energy rehabilitations of the building of Bizerte municipality in Tunisia while adopting a collaborative approach based on co-creation and co-innovation, with the aim to turn users, from subjects testing modules against requirements, into value creators contributing to the exploration of emerging ideas, breakthrough scenarios and innovative concepts. The implementation of this process was initiated by the signature of a collaboration agreement between MEDREC, the external entity Atmospheres ADD and the beneficiary municipality of Bizerte.

Figure 2: Agreement signature for the implementation of the support mechanism

The LL introduces innovative socio-economic tools with novel user-oriented solutions, and financial mechanisms while capitalising on a number of the outcomes of selected reference projects (SRPs) that can be applied and adopted/adapted to the national context.

The LL gathers the identified stakeholders in Tunisia to collaborate and share knowledge directly with each other to propose and implement the most suitable innovative solutions for building refurbishing and improving operation control for achieving significant energy savings, based on the needs of Bizerte municipality, while maintaining the occupant's comfort and promoting environmentally sustainable behaviors.

While establishing the LLL, some challenges and issues have been faced. The identification and involvement of stakeholders took more time than expected. In fact, there were not many responses to the call of expression of interest launched, thus, other means of contact were adopted (direct meetings, emails, social media, phone calls…).

Besides, a lack of reactivity of the actors was noted for different reasons, which creates management issues and difficulties to respect the implementation schedule. Thus the importance of the contact persons as facilitators

Furthermore, the continuous change of the contact persons at the municipality delayed the implementation of activities considerably.

Another challenge is continuity and time management. For instance, the implementation of some activities involving students is linked to the academic year schedule. Thus, it is not relevant to organize meetings/workshops based on the availability of students and of the project team.

1.1.4 Eco-City TUN Living Lab action plan

- **Objective of the LL**

The main objective of LL is to support the municipality of Bizerte in the co-creation of innovative solutions and testing of the SEACAP 4 SDG tools. To meet this target, it is necessary to involve and connect different stakeholders covering all the stages of the process. Another important objective is to work on developing innovative solutions for public buildings in Tunisia.

- **Activities of the LL**

The activities of LL focused on the co-creation of a process for the building energy renovation of Bizerte municipality including:

- Regular meetings were organized with the municipality to identify the contact persons, the plan the activities implementation, to select the pilot building, to collect additional data needed for the evaluation of the building performance...;
- Identification of stakeholders and connection to establish a network at the national and international level;
- Trainings for knowledge transfer;
- Events and meetings to exchange experiences and best practices;
- Workshops for co-creation;
- Dissemination activities including organization and participation in events, promotion through social media...

- **Stakeholders role and responsibilities**

The main role of the stakeholders is to collaborate with each other to propose and implement the most suitable solutions based on the needs and priorities of the

beneficiary municipality. The importance of the role of each stakeholder varies according to the phase and timeline of the process. For example, in the case of students, they have been involved in the phase of knowledge framework and even co-creation to propose scenarios for the renovation of the pilot building selected.

- **Special agreements**

The involvement of some of the LL stakeholders was formalized by the signature of agreements which defines the roles and responsibilities of each party within the framework of the LL. The signed agreements can be found in Annex 4.

- **Cost issues**

The organization costs of trainings, workshops and meetings were not fully covered by the project due to the limited budget available. Thus, the remaining organization costs were covered by MEDREC and by the external entity.

- **Profit issues**

There's no profit derived from the LL.

- **Risk issues**

The availability of the contact persons throughout the LL process should be taken into consideration. Thus, it is important to involve the largest number of stakeholders, especially from the municipality and to include more technical and administrative staff to guarantee an efficient implementation of the LL activities and to ensure a wider impact.

1.2 Educate and plan

1.2.1 Educate/train stakeholders

As part of the cross-border LL activities, a series of training sessions were organized by University of Patras and MEDREC to present the SRPs, which was conducted by the partners who developed the outcomes in question. The repository of the training material is the ICT platform.

The external entity Atmospheres participated, from October 10th to December 7th 2022, in these training sessions. The training was conducted by the respective reference projects partners that developed the selected outcomes.

On January 23rd and 26th, Atmospheres agency took part in another training for the SEACAP local implementation team, on how to develop and implement a SEACAP

through a Living Lab. the role of the external entity was transfer this knowledge to the national LL stakeholders at a local level.

At a local level, this knowledge was transferred in form of a training that was organized on the 14th and 15th of February 2023 at the premises of Bizerte municipality. The training was delivered to the members of the Local Living Lab established in Tunisia and gathered around 35 participants including staff of the Municipality of Bizerte, students from the National Engineering School of Bizerte and the National School of Architecture and Urbanism.

During the first day, the most relevant tools (i.e. PrioritEE, IMPULSE and Med-EcoSuRE) were presented to the living lab stakeholders present. The second day was dedicated to a detailed step-by-step training focusing on the use of the "decision aid tool for optimal renovation measures" of Med-EcoSuRe project.

Certificates of participations were delivered to all participants (Annex 3)

Figure 3: Local training on " LL methodology and SRPs outcomes"

Meetings and training courses were organized with students, in the Atmospheres agency office, to explain the living lab methodology, and the knowledge framework methodology based on physical surveys and even perceptual surveys.

Over the period December 2022 – May 2023, field visits and workshops were organized in the municipality for the collection of additional data, to get a knowledge framework and an ID of the building, to apply the notions transmitted in the training courses... These visits were organized with the presence of architectural students from ENAU.

A number of addressed national stakeholders (UN habitat, ministry of environment, local municipalities, associations..) participated in a public event (≈ 60 participants) organized on the 8th of March 2023, to learn about the methodologies of SEACAP 4 SDG LL, as well as its structure, governance, management, and exploitation. These stakeholders took part also in an engaging round table on new models of sustainable energy development actions to implement in Tunisia (List of participants in Annex 3)

Figure 4: Round table on "new models of sustainable energy development actions to implement in Tunisia"

1.3 Implement

▪ 1.3.1 Process of implementing the Eco-City TUN

a. Tools and methodologies

The tools and methodologies adopted and adapted for the implementation of both demonstrators, levels within the framework of the Eco-City TUN LL are the following:

- **Med-EcoSuRe**

- **Toolkit**: an innovative and interactive bottom up and participative (living lab) programme of training and education for technicians and students, with a list of suggestions for the management and sharing experience, on the field of energy renovation of high educational building in the Med area.
  The Living Lab methodology proposed was the first knowledge transferred to the stakeholders, especially the municipality. This took more time than expected due to the management approach at the municipality level (bottom up). The material presented and transferred was adapted to the case of Bizerte including a the steps for rehabilitation project, based on a collaborative approach from knowledge framework to identifying criticalities to co-creation etc
- **Online platform** for the transfer of knowledge and best practices of the Med-EcoSuRe project. The platform was created to facilitate the cooperation and co-creation in the Living Lab community, to gather information among partners and stakeholders, and to transfer knowledge and best practices. The platform comprises an ICT platform for knowledge sharing (with for example real-time monitoring of pilots), guidelines and action plans including a digital twin of the building of interest in a local living lab, and toolkits. The online platform was scaled up to showcase the results of the support mechanism proposed within SEACAP4SDG to reduce the energy consumption of public buildings, and to increase the capacity of the territories and key actors, to adopt measures to reduce their energy impact in the medium term.
- **Decision aid tool** that was adopted for the current evaluation of the renovation measures of the city hall of Bizerte. The simulation tool was selected because it is designed to be easy to use for building management staff and technicians, simulates different renovation scenarios and provides relevant answers to the KPIs, including frugality

- **PrioritEE** toolkit can be used by local administrations to manage and monitor energy consumption, assess the cost-effectiveness of a predefined solution of a set of energy efficiency (EE) measures and renewable energy sources (RES), and prioritize investments. The PrioritEE toolbox was tested on five pilots in the partner regions.

b. Identification of the measures

Apart from the tools and methodologies used, the project team in Tunisia organized several meetings and workshops with the participation of the stakeholders, to ensure an efficient implementation of the planned activities.

For instance, a three-day event was held at ENAU on the 10-11-12 May 2023, with the participation of students, teachers and municipal engineers and technicians from several Tunisian municipalities. This workshop was part of a challenge launched by FNCT, Tunisian partner of SOLE project, to propose innovative and cost-effective renovation solutions for public buildings in Tunisia, in 48 hours and specifically for the building of Bizerte municipality (concept note of the challenge in Annex 3).

The first day of the event consisted of a series of conferences presenting cases of municipalities facing Energy Efficiency issues. The aim was to enable exchanges of experiences with other municipalities engaged in ENICBCMED projects. In order to efficiently carryout the challenge, the students were provided with reliable source of information to help them propose the most suitable renovation measures. Among these sources, a guide to innovate the renovation process of public buildings in the Med area was made available, which is a tool developed within Med-EcoSuRe project, capitalized on in the framework of SEACAP4SDG.

Following the completion of the challenge, a total of 8 student groups (2 in each group) presented their works on the 12th of May in front of a Jury composed of engineers, architects, and experts.

The winning group proposed a package of renovation solutions linking each intervention to the building and its users in terms of energy consumption and indoor comfort.

The interventions included: Rooftop PV and solar water heaters, green façade, reorganization of indoor spaces, shading devices, natural ventilation…

The group of experts in Tunisia will take into consideration this energy renovation package, as well as the proposal of the other 2nd and 3rd winning groups, while proposing the measures for the pilot building of Bizerte.

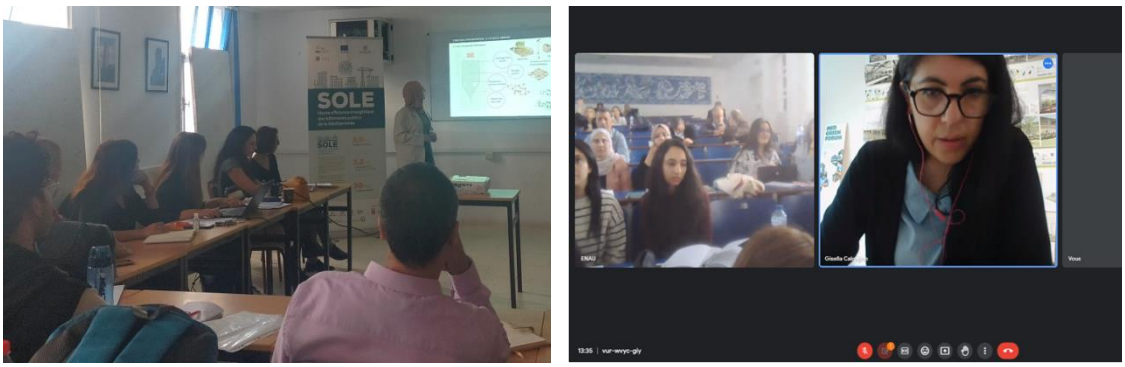

Figure 5: Challenge for innovative and cost-effective renovation solutions for public buildings in Tunisia

Besides, on the 08th of June 2023, a co-creation workshop on "Building energy renovation measures implementation based on a Living Lab approach", was hosted by the Municipality of Bizerte.

The workshop gathered the stakeholders already involved as well as the new ones in Tunisia to present the methodology proposed for the creation and implementation of a Living Laboratory and to discuss solutions for planning energy management measures proposed to the municipality of Bizerte.

During the event were also presented the 3 winning projects of the challenge organized at the National School of Architecture and Urbanism (on 10-12 May 2023) including innovative and eco-sustainable energy renovation solutions customized for the building of Bizerte Municipality.

The Municipality of Bizerte, as main beneficiary as well as the rest of stakeholders discussed the different scenarios presented as well as the main contextualized problems encountered in these type of projects, for example the specificity of the Tunisian market, the difficulty to provide some products…

The team decided on the final set of renovation measures, to be evlauted, based on an evaluation grid set by the project team in Tunisia (participants list in Annex 3)

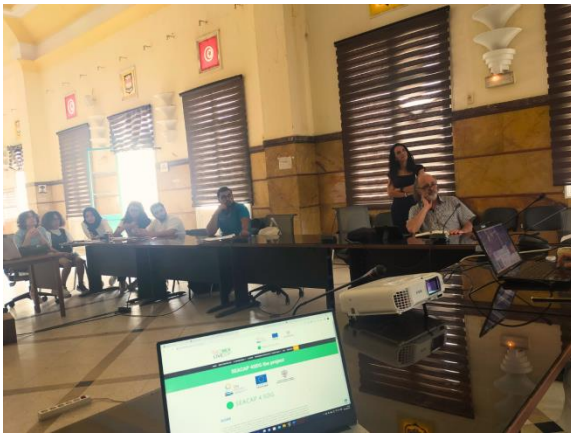

Figure 6: Workshop on "Building energy renovation measures implementation based on a Living Lab approach"

Following, Atmospheres agency launched a call for participation to a challenge on Green Nudges that took place at the National School of Architecture and Urbanism on the 15th of June 2023. Around twenty students with different backgrounds responded to the call published including architects (ENAU), engineers (ENIB), designers (ISBAT) and

psychologists (ESSHT). The team of supervisors was also multidisciplinary, including architects, engineers (energy, ICT) and psychologists.

The concept of "Green Nudging" is a behavioral science applied to promote environmentally sustainable behaviors, and is being widely promoted to encourage energy conservation and altering energy use choices.

The focus of the challenge was on **air conditioning** inside the building. Following a presentation on green nudges, the group was asked to form multidisciplinary teams of 4 people. The idea was to come up with **3 sentences (in Arabic and French)** and design a prototype air-conditioning **sticker**.

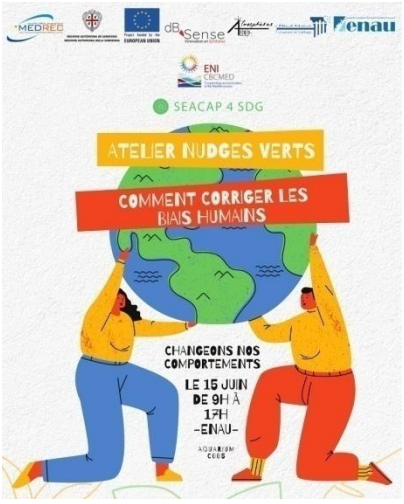

Figure 7: Workshop on "Green Nudging" (photos credit: ENAU)

The process included the definition of the objective, collection and analysis of data, description of the nudge, selection of the levers and finally description of the nudge implementation.

Under real-life conditions, it is advisable to return to the site to check the relevance of the implemented nudges. This phase could not be accomplished due to time constraints.

The results presented demonstrated the variety and relevance of the solutions proposed. The main levers used are related to the game (fun), linked to collective memory, and uses popular Bizerte language and expressions.

Figure 8: Green Nudge challenge results

c. Assessment of the measures

A techno-economic assessment was carried out for the proposed measures using, among others, the SRP outcomes selected, and the impact of each measure was provided (in

terms of energy consumptions, CO2 emissions and cost savings…). This phase was conducted in collaboration with the municipality staff as well as engineering and architecture students.

As a result, the following retrofits are deemed profitable and are therefore recommended in this order of priority:

1) Replacement of all neon lighting by LED lights.

2) Changing the improvised electrical heating by gas heating.

3) Installing 25 kWp of PV electrical generation.

The table below summarizes the impact of the evaluated measures (the recommended measures are in the green frame):

RETROFIT	MINOR RETROFIT	MEDIUM RETROFIT		MAJOR RETROFIT	DEEP RETROFIT
SHORT DISCRIPTION	installation of a photovoltaic system (25 kWp)	gaz heating	LED lighting	windows (double glazed) + wall and roof insulation (U=0.24)	photovoltaic (25kWp)+ Gaz heating + LED + windows (double glazed)+ walls and roof insulation (U=0.24)
Total annual primary energy savings (%)	23.2	7.85	20.1	10.8	54.2
Annual generation of Renewable Energy /Total annual primary energy consumption (%)	30.3	0	0	0	50.7
Total annual avoided CO2 emissions (%)	23.2	0.3	20.1	10.8	54.4
Annual savings of total energy-related operational cost(%)	23.2	21.8	20.1	10.8	65.1
Simple Payback period (year)	7.23	2.65	0.1	44.64	10.85
Total investment cost per total annual energy saved DT/(kWh of primary energy saved)	1.014	1.028	0.013	6.237	1.643

Regarding the behavior change practices, the stickers created in the framework of the Green Nudge challenge/workshop will be adopted and used by the municipality.

1.4 Improve and Evaluate

▪ 1.4.1 Generation of potential improvements of Eco-City TUN LL

The Toolbox of SEACAP4SDG was analyzed mainly by the agency Atmospheres, and in collaboration with the national stakeholders. As a result, the following recommendations have been drawn:

- For the solutions/outcomes proposed focusing on the building performance, it is important to consider users' behavior and to resort to green nudges approches.
- The decision aid tool developed within Med-EcouRe project can be used to assess a building's thermal behaviour, and then to optimize and plan energy renovation by proposing different possible scenarios. However, it is a static simulation tool, and therefore does not take into account, as dynamic tools do, of the building's inertia, which is a significant factor in the case of Bizerte's city Hall. Thus, it is proposed to scale-up the tool to take into consideration the dynamic aspects.
- In case of the Best Practrices catalogue developed within Med-EcoSuRe also, it can be interested to add a book of traditional and even modern devices/technologies like "majen" a traditional water tank for example for water issues or "tiegs", holes on the walls in buildings of the south of Tunisia ensuring ventilation. The architecture of reconstruction has also proposed some interesting examples of devices to ensure comfort control of energy.
- The ICT platform developed within Med-EcoSuRe and scaled-up within SEACAP4SDG can be enhanced to strengthen the collaboration between stakeholders by proposing new ways of communication such as forums/dynamic chat...

Based on the feedback of the stakeholders, it was also recommended to adapt the timeframe of the LL implementation taken into account the lengthy administrative procedures of the municipalities, and of the stakeholders' institutions (in case of public ones).

▪ 1.4.5 Guidelines and recommendations

The recommendations drawn so far are the following:

- It is important to take into consideration the lack of information on public buildings in Tunisia because most of them are not documented and are dated to

the beginning of the 20th century. In fact, most of the municipality buildings are modern built during the French colonization. Thus, it is important to know that this type of architecture wasn't considered as heritage for affective and sociocultural considerations. Nowadays, these types of buildings are listed on heritage institutions like the pilot building in Bizerte. However, there is no available documentations or information. Thus, it will be relevant to include on future projects, and in the LL process research works/surveys...on these types of architectures and on the technology implemented on the building.

- Based on the experience of both level demonstrators, it was noted that an informed process is very crucial in order to ensure the continuity of the activities implementation and to guarantee better results.
- It is also very important to maintain the cohesion and the links between the members of the LL who co-plan the activities and the workshops.

1.5 Disseminate

It is important to communicate on the LL methodology implemented to strengthen approach which based on co-creation and co-innovation multiple stakeholders which will increase the visibility and enlarge the network. It is proposed to choose radio program podcasting events in Tunisia to disseminate the results of LL.

The LL results could also be showcased during all events organized by stakehoders to exchange knowledge and best practices. One potential event is « le salon de l'écoconstruction » and « la foire du bâtiment ».

Awareness raising campaigns are very crucial and effective to ensure a wide dissemination of the LL results with a high impact. These campaigns can be co-organized with students specializing in User-Centered Design of buildings.

2. Conclusions

Eco-City TUN LL proposes a collaborative approach to provide accompaniment to the municipality of Bizerte, with the aim to implement the most suitable renovation process while involving relevant stakeholders in Tunisia.

The main challenges faced while implementing the LL are the lack of reactivity of some stakeholders, the time management which depends on the project timeframe and also on the stakeholders' availabilities, and most importantly the continuous change of the contact persons at the municipality.

In order to prevent any additional delays caused by this latter issue, the implementation process has been very informed to allow the new contact persons to learn about all the ongoing activities, issues... in a short period.

Furthermore, and based on a feedback received from one of the stakeholders, it was noted that it is important to take into consideration the lack of information on public buildings in Tunisia because most of them are not documented and are dated to the beginning of the 20th century.

The LL activities and results have been showcased in several events organized in the framewook of other cooperation projects as well as initiatives. Some of the future events to target to address new potential stakehodlers are "green exhibition, salon de l'écoconstruction at "Union Tunisienne de l'Industrie du Commerce et de l'Artisanat" Tunisian union of industry and commerce and in the international exhibition of building and construction at Kram and Sfax.

The sustainability of the LL could be ensured through maintaining the collaboration with the involved stakeholders and enlarging the network in order to implement the proposed and evaluated renovation measures in the framework of future projects. The aim will be to perform post-process assessment of the solutions and technologies to be implemented in the Tunisian context.

Annexes (attached)

Annex 1. List of potential and participating stakeholders

Annex 2. Questionnaire for the evaluation of the overall LL performance

Annex 3. Certificates of participations and list of participants in LL events

Annex 4. Collaboration agreements with LL members

Annex 5. Certificate of participation in the green nudge workshop

List of Participating Stakeholders

Name of Stakeholder	*Municipality of Bizerte*
Type of stakeholder	*Institutional decision makers*
Short description of stakeholder	The city of Bizerte is located in northern Tunisia, on the southern shore of the Mediterranean Sea.
Short description of cooperation in the project	*Beneficiary municipality of the support mechanism*
Advantage for stakeholders	*The municipality* was awarded the label ACTE/MEA (Middle East & Africa Energy Award) label promoted by ANME (National Agency for Energy Management). An energy audit and an action plan are available
Disadvantage for stakeholders	*NA*
Other notes	*NA*

Name of Stakeholder	*National Heritage Institute (INP)*
Type of stakeholder	*Institutional decision makers*
Short description of stakeholder	Tunisian public administrative institution responsible for dealing with Tunisian heritage. *It is a scientific and technical institution responsible for establishing the inventory of cultural heritage, archaeological, historical, civilization and artistic, of its study, its backup and its development.*
Short description of cooperation in the project	*Feedback on the measures proposed for the pilot building selected.*
Advantage for stakeholders	*INP holds the* safeguarding, protection,

	restoration and exhibition of documents of the pilot building of Bizerte
Disadvantage for stakeholders	*NA*
Other notes	*NA*

Name of Stakeholder	*The National Agency for Energy Management (ANME)*
Type of stakeholder	*National and regional energy management authorities*
Short description of stakeholder	*Administratively independent governmental organisation under the supervision of the Ministry of Industry, Energy and Mines.*
Short description of cooperation in the project	The beneficiary municipality pilot building was awarded the label ACTE/MEA (Middle East & Africa Energy Award) label promoted by ANME (National Agency for Energy Management). The label was obtained following several actions performed among which, an energy audit based on which the local activities of SEACAP4SDG were carried out.
Advantage for stakeholders	*ANME is in charge of i*mplement ing governmental policies in energy management by promoting energy efficiency, renewable energy sources and alternative energy sources.
Disadvantage for stakeholders	*NA*
Other notes	*NA*

Name of Stakeholder	Société de Gestion de Technopole de Bordj Cedria
Type of stakeholder	*National and regional energy management authorities*
Short description of stakeholder	*Aims at the management and promotion of the Borj Cédria technology park, industrial zones and, in general, all financial, industrial, commercial, movable or real estate operations directly or indirectly related.*
Short description of cooperation in the project	*Feedback on the measures proposed for the pilot building selected.*
Advantage for stakeholders	*brings together institutions specialized in research, training development and technical education*
Disadvantage for stakeholders	*NA*
Other notes	*NA*

Name of Stakeholder	The National Federation of Municipalities (FNCT)
Type of stakeholder	*Socio-economic operators*
Short description of stakeholder	*The National Federation of Tunisian Municipalities is a national association that brings together Tunisian municipalities*
Short description of cooperation in the project	*Feedback on the measures proposed for the pilot building selected.*
Advantage for stakeholders	The FNCT provides technical assistance that strengthens the capacities of cities, among which Bizerte, in the context of decentralised development and cooperation.
Disadvantage for stakeholders	*NA*

Other notes	*NA*

Name of Stakeholder	Green Building Council (TGBC)
Type of stakeholder	*Socio-economic operators*
Short description of stakeholder	*The Green Building Council of Tunisia strives to be the main actor in promoting the principles of sustainable development for buildings and resilient urban development in Tunisia and the Maghreb region*
Short description of cooperation in the project	*Feedback on the measures proposed for the pilot building selected.*
Advantage for stakeholders	promotes sustainable architecture, building and construction practices
Disadvantage for stakeholders	*NA*
Other notes	*NA*

Name of Stakeholder	Startup dB.Sense
Type of stakeholder	*Socio-economic operators*
Short description of stakeholder	*A spin-off from the University of Tunis El Manar (UTM). It is incubated at the UTM Innovation Center, founded by PhD engineers*
Short description of cooperation in the project	*Working on the Green Nudge approach to promote sustainable behaviours of building users*
Advantage for stakeholders	*operating in the fields of information and communication technologies.*
Disadvantage for stakeholders	*NA*
Other notes	*NA*

Name of Stakeholder	Students/professors and researchers
Type of stakeholder	*Other*
Short description of stakeholder	*From the National School of Architecture and Urbanism (ENAU) and National Engineering School of Bizerte (ENIB)*
Short description of cooperation in the project	*Working in collaboration with the external entity on the identification and evaluation of the renovation measures for the pilot building selected.*
Advantage for stakeholders	*The Students, professors and researchers contributes notably to proposing innovative renovation measures based on the latest technological developments and while using advanced softwares.*
Disadvantage for stakeholders	*NA*
Other notes	*NA*

Name of Stakeholder	UN habitat Tunisia
Type of stakeholder	*Other*
Short description of stakeholder	*The United Nations Human Settlements Programme (UN-Habitat) is mandated by the UN General Assembly to promote socially and environmentally sustainable towns and cities.*
Short description of cooperation in the project	*Feedback on the measures proposed for the pilot building selected.*
Advantage for stakeholders	*engages local communities in the design and upgrading of public space initiatives to ensure that their needs are well reflected*

Disadvantage for stakeholders	*NA*
Other notes	*NA*

Name of Stakeholder	
Type of stakeholder	*Building energy managers*
Short description of stakeholder	*Engineers and technicians from the municipality of Bizerte*
Short description of cooperation in the project	*Co-creation of the renovation process in collaboration with the LL coordinator and the external entity*
Advantage for stakeholders	*Familiar with the pilot building selected and its specificities, needs...*
Disadvantage for stakeholders	*NA*
Other notes	*NA*

Name of Stakeholder	
Type of stakeholder	*End users*
Short description of stakeholder	*Bizerte municipality staff*
Short description of cooperation in the project	*The renovation process proposed is designed based on the needs of the municipality staff, through surveys, interviews...*
Advantage for stakeholders	*Users of the pilot building*
Disadvantage for stakeholders	*NA*
Other notes	*NA*

List of Key Performance Indicators (KPIs)

1. Living Lab stakeholders

To be filled-in by the LL stakeholders

1. Name of the LL: Eco-City TUN

2. Name of the person filling in the questionnaire: Amira Othman

3. Positions of the person in the stakeholders' organization: Student

4. Name of the LL stakeholder/organization: Institut Supérieur des Sciences Humaines de Tunis

5. Type of the stakeholder

(e.g. Institutional decision makers, National and regional energy management authorities, Building / Energy managers, Socio-economic operators, End users, etc.)

6. Country: Tunisia

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					

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' 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		

List of Key Performance Indicators (KPIs)

2. Living Lab stakeholders

To be filled-in by the LL stakeholders

10. Name of the LL: Eco-City TUN

11. Name of the person filling in the questionnaire: Aziza Challougui

12. Positions of the person in the stakeholders' organization: Student

13. Name of the LL stakeholder/organization: Institut Supérieur des Cadres de l'Enfance

14. Type of the stakeholder

(e.g. Institutional decision makers, National and regional energy management authorities, Building / Energy managers, Socio-economic operators, End users, etc.)

15. Country: Tunisia

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					x

competences at the LL meeting					
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/set up	x					x				

3. Living Lab stakeholders

To be filled-in by the LL stakeholders

19. Name of the LL: Eco-City TUN

20. Name of the person filling in the questionnaire: Lilia Othman Challougui

21. Positions of the person in the stakeholders' organization: Enseignante universitaire en psychologie

22. Name of the LL stakeholder/organization: Institut Supérieur des Sciences Humaines de Tunis

23. Type of the stakeholder

(e.g. Institutional decision makers, National and regional energy management authorities, Building / Energy managers, Socio-economic operators, End users, etc.)

24. Country: Tunisia

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					
Results of the LL meeting					
Duration of the LL					

meeting					

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-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		

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										
LL establishment/set up			x					x		

4. Living Lab stakeholders

To be filled-in by the LL stakeholders

28. Name of the LL: Eco-City TUN

29. Name of the person filling in the questionnaire: CHELBI Mariem

30. Positions of the person in the stakeholders' organization: ENAU Student

31. Name of the LL stakeholder/organization: ENAU

32. Type of the stakeholder

(e.g. Institutional decision makers, National and regional energy management authorities, Building / Energy managers, Socio-economic operators, End users, etc.)

33. Country: Tunisia

34. 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				X	

meeting					
Results of the LL meeting		X			
Duration of the LL meeting			X		

35. 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	

36. 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/set up	X								X	

5. Living Lab stakeholders

To be filled-in by the LL stakeholders

37. Name of the LL: Eco-City TUN

38. Name of the person filling in the questionnaire: Malek Derouiche

39. Positions of the person in the stakeholders' organization: Assistant

40. Name of the LL stakeholder/organization: National School of Architecture and Urbanism of Tunis

41.

42. Type of the stakeholder

(e.g. Institutional decision makers, National and regional energy management authorities, Building / Energy managers, Socio-economic operators, End users, etc.) Resarcher

43. Country: Tunisia

44. 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

45. 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

46. 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/set up		x								x

6. Living Lab stakeholders

To be filled-in by the LL stakeholders

47. Name of the LL: Eco-City TUN

48. Name of the person filling in the questionnaire: Chaima BELHASSEN

49. Positions of the person in the stakeholders' organization: University

50. Name of the LL stakeholder/organization: ENAU

51. Type of the stakeholder

(e.g. Institutional decision makers, National and regional energy management authorities, Building / Energy managers, Socio-economic operators, End users, etc.)

52. Country: Tunisia

53. 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		

54. 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

55. 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/set up		X						X		

7. Living Lab stakeholders

To be filled-in by the LL stakeholders

56. Name of the LL: Eco-City TUN

57. Name of the person filling in the questionnaire: Mariem Ben Jemaa

58. Positions of the person in the stakeholders' organization: architecture student

59. Name of the LL stakeholder/organization: National School of architecture and Urbanisme

60. Type of the stakeholder

(e.g. Institutional decision makers, National and regional energy management authorities, Building / Energy managers, Socio-economic operators, End users, etc.)

61. Country: Tunisia

62. 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					X

presented topics on LL meeting					
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		

63. 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

64. 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	

ENI CBCMED

Project funded by the EUROPEAN UNION

SEACAP 4 SDG

MEDREC

Atmospheres ADD

CERTIFICATE OF ATTENDANCE

Is hereby awarded to

Salem HANNACHI – Municipality of Bizerte

In recognition of his participation in the **Local Living Lab training** held in Tunisia on14-15 February 2023 in the framework of SEACAP 4 SDG project

This training sessions focused on the evaluation and implementation of building energy renovation measures based on the capitalization toolkit proposed by SEACAP4SDG, and while adopting a Living Lab approach

Souha Ferchichi
Technical expert - Mediterranean Renewable Energy Centre

Imen Landoulsi
Architect - Atmospheres ADD agency

CERTIFICATE OF ATTENDANCE

Is hereby awarded to

Med hedi NOMEEN – Municipality of Bizerte

In recognition of his participation in the **Local Living Lab training** held in Tunisia on14-15 February 2023 in the framework of SEACAP 4 SDG project

This training sessions focused on the evaluation and implementation of building energy renovation measures based on the capitalization toolkit proposed by SEACAP4SDG, and while adopting a Living Lab approach

Imen Landoulsi
Architect - Atmospheres ADD agency

Souha Ferchichi
Technical expert - Mediterranean Renewable Energy Centre

Intitulé du l'atelier : « **Design and reflection workshop on energy efficiency in public buildings »**
Projet **:** SOLE
Lieu **:** Ecole Nationale d'Architecture et d'Urbanisme, Tunis
Date : 10,11,12 Mai 2023

Cadrage et mise en contexte

La maîtrise de l'énergie est devenue, depuis une dizaine d'années, une priorité mise en avant par la Tunisie. Les enjeux sont de taille : dépendance énergétique, raréfaction des ressources fossiles, pollution et changement climatique, sont autant de préoccupations qui chaque jour montrent davantage leur actualité. Cela signifie que la question de l'efficacité énergétique doit être intégrée dans tous les instruments de planification et/ou de programmation au niveau national comme local. De ce fait, les communes tunisiennes sont au cœur de la problématique et sont appelées à devenir des acteurs majeurs dans la stratégie nationale de maîtrise de l'énergie, ce qui devrait avoir des retombées sur le budget municipal, les interventions et les services fournis par la commune.

Dans le cadre du développement de ses activités et la mise en œuvre des activités liées au projet ' **Haute efficacité énergétique pour les bâtiments publics en Méditerranée INNEMED- SOLE'** qui vise à promouvoir l'efficacité énergétique dans les bâtiments publics et la capitalisation / diffusion des bonnes pratiques et expériences des communes dans ce domaine, en partenariat avec l'Association nationale des communes italiennes de Toscane – ANCI, la Fédération Nationale des Communes Tunisiennes (FNCT) et l'Ecole Nationale d'Architecture et d'Urbanisme (ENAU) organisent un atelier de réflexion intitulé **' Design and reflection workshop on energy efficiency in public buildings** '.

Objectif général

La tenue de ce workshop constitue une occasion pour faire le point avec les différentes parties prenantes et acteurs clés sur les résultats atteints, les défis à relever et débattre des principales conclusions et recommandations issues du Policy Brief élaboré dans le cadre du projet.

L'atelier sera l'occasion de mettre en lumière le rôle essentiel du 'design' comme levier d'innovation apportant des solutions innovantes et des réponses concrètes et opérationnelles pour renforcer et améliorer la performance énergétique des bâtiments et répondre aux problématiques posées et enjeux soulevés par les différents acteurs de différents secteurs afin de réduire la facture énergétique dans les bâtiments publics 'communaux'.

Objectifs spécifiques

L'atelier permettra également aux étudiants d'aborder la problématique de l'efficacité énergétique et de la partager dans un cadre académique avec de futurs architectes et concepteurs afin de :

- Mener une réflexion commune sur les enjeux liés à l'efficacité énergétique en mettant l'accent sur les bâtiments.
- Formuler des recommandations techniques (architecturales) et opérationnelles pour relever les défis énergétiques au niveau des bâtiments.
- Concevoir une vision innovante et 'futuriste' pour les bâtiments en termes d'amélioration de leur l'Efficacité Energétique.
- Faire le point, évaluer et échanger sur les mesures et les actions à entreprendre sur les bâtiments pour améliorer leur performance énergétique.
- Mettre en place/développer un cadre de concertation, de partage et de coordination qui sera une force de proposition pour la mise en œuvre et la diffusion des approches, méthodes et outils liées à l'efficacité énergétique dans les bâtiments publics. (Milieu académique et institutionnel, centres de recherches, ONG, PTF, communes, experts…).

Méthodologie de mise en œuvre

La méthode retenue dans le cadre de cet atelier repose dans un premier temps sur une alternance entre les aspects théoriques et conceptuels qui permettent une analyse et une lecture globale du contexte énergétique en Tunisie (avec un focus sur les bâtiments) à travers des exposés et des présentations des différents acteurs sur les principales conclusions et leçons apprises des différentes réunions du groupe de travail du projet. ('Policy Brief' comme support).

Dans un deuxième temps, l'atelier débouchera sur une activité de transferts et de mise en applications des connaissances et des acquis au cours de laquelle les étudiants se lancent dans un exercice (une compétition / un concours d'idée) de mise en pratique des aspects techniques et théoriques prédéfinis en les traduisant en **un projet concret** favorisant l'efficacité énergétique, par la promotion d'une **conception éco-énergétique** dans les plans du bâtiment, respectueuses du climat et de l'environnement et par le recours aux énergies renouvelables.

L'atelier prendra la forme d'un challenge de 48h. Les étudiants sélectionnés assisteront à l'atelier et aux discussions avec divers acteurs et panélistes afin de mieux cerner et comprendre les problématiques et les enjeux liées à l'efficacité énergétique dans les bâtiments.

L'exercice sera également une opportunité et **un cadre d'échange, de concertation et de partage entre les architectes des communes, les étudiants et les enseignants** afin de mieux sensibiliser /conscientiser aux avantages de l'Efficacité Energétique dans le bâtiment et au rôle que peuvent jouer les mesures et les actions d'Efficacité Energétique dans l'amélioration du confort thermique pour les occupants et la réduction de la facture énergétique des

bâtiments communaux en particulier, et aux avantages, aussi, que peut apporter l'amélioration de l'Efficacité Energétique dans les bâtiments publics sur le changement du comportement des citoyens ('Make changes in citizen behavior's') et les faire adhérer, ainsi, dans une démarche locale de transition énergétique, à travers la duplication des mesures d'Efficacité Energétique dans leurs logements.

Modalités de participation

Les étudiants participeront en binôme, chaque binôme sera encadré/accompagné par un binôme d'encadrants composé d'un architecte de la commune et d'un enseignant ENAU.

Support d'étude

Le challenge s'appuiera sur l'Hôtel de ville de Bizerte. Ce bâtiment constitue le pilote du programme d'assistance pour l'évaluation et la planification de la maitrise de l'énergie, dont bénéficie la Municipalité de Bizerte sélectionnée dans le cadre du projet SEACAP 4 SDG1 porté par le MEDREC.

En plus d'un audit énergétique sur plan réalisé dans le programme ACTE, ce bâtiment fait l'objet d'une évaluation en cours croisant analyse architecturale classique, simulation du comportement thermique et enquête auprès des utilisateurs. Les documents graphiques et les résultats de ces investigations seront mis à disposition des participants à l'atelier.

Recommandations

Compte tenu des résultats de l'audit et de l'évaluation entreprise dans le cadre du projet SECAP 4SDG, il s'agit d'identifier des mesures d'amélioration de l'efficacité énergétique et de recours aux énergies renouvelables pour améliorer le comportement thermique du bâtiment et le confort d'usage de ses occupants. Ces mesures doivent être respectueuses de la spécificité architecturale du bâtiment, et mettre en œuvre des techniques à faible coût. Le choix et l'emplacement des dispositifs d'énergie renouvelable devra également prendre en compte les caractéristiques architecturales et esthétiques du bâtiment. La valeur patrimoniale devra être respectée. Il faudra, également, être attentif aux éventuels désordres constructifs qui pourraient résulter d'une isolation d'enveloppe à l'origine poreuse (maçonnerie de pierre, enduit bâtard).

Les scénarii d'usage et le comportement de l'utilisateur affectent le comportement thermique des bâtiments. Il est important d'en prendre acte pour affiner l'analyse et proposer des solutions à venir pertinentes. Dans le cas d'un bâtiment qui présente un certain degré de porosité (bâtiment traversant, enveloppe en maçonnerie, présence de loggia, etc…) propice à l'interaction avec l'environnement particulièrement appréciée par des usagers habitués à une relation franche avec l'extérieur, il convient de préserver cette relation et éviter des étanchéisations qui seraient défavorables à l'habitabilité.

[1] Intégration Med SE(A)CAP grâce à des méthodes d'évaluation et de financement uniformes et adaptées, ciblant principalement les bâtiments des secteurs de l'éducation et de la santé, pour des objectifs de développement durable au sein d'une société intelligente. URL : https://www.enicbcmed.eu/fr/projects/seacap-4-sdg

Déroulement

Equipes participantes

- Le Challenge est ouvert aux étudiants de l'ENAU inscrits en 5e année ou au-delà, pour l'année universitaire 2022/2023 à l'ENAU. Les étudiants doivent concourir en binôme.

Étape 1 – Enregistrement

- Chaque équipe composée de 2 étudiants doit remplir le formulaire d'inscription publié sur le site de l'ENAU.

Etape 2 – Participation à la journée d'étude

- Les équipes participantes sont appelées à assister à la journée d'étude du 10 mai 2023 à l'ENAU. Le programme des interventions est présenté ci-après.

Etape 3 – Démarrage du Challenge

- Le Challenge se déroule sur 2 jours à l'ENAU.
- A l'issue du challenge, les équipes devront remettre **une planche A0**, en version numérique, explicitant la stratégie envisagée et les solutions d'amélioration préconisées.

Etape 4 – Jury

Les critères de sélection intègreront :

- L'ingéniosité et l'innovation dans la résolution des enjeux énergétiques, de confort d'usage, et de revalorisation thermique, aéraulique et acoustique du bâtiment
- La pertinence au niveau de l'utilisation des énergies renouvelables et de l'intention conceptuelle éco-énergétique respectueuse du climat et de l'environnement.

Etape 5 – Prix

- 1er prix : Voyage à Florence pour deux personnes décerné à l'équipe lauréate. Période : Septembre 2023.
- L'équipe lauréate sera invitée à présenter son travail devant les partenaires internationaux du projet « SOLE » lors de la réunion du comité de pilotage prévue le 22 et 23 Mai 2023 à Tunis.

Composition du jury

- Un enseignant de l'ENAU
- 3 architectes / cadres communaux
- Un expert énergétique
- Un représentant de la FNCT
- Un représentant de l'ANME

Comité d'organisation

- Mohamed Ouerghi (FNCT)
- Hind Karoui (ENAU)
- Alia Ben Ayed (ENAU)
- Imen Landoulsi (ENAU)

Equipe pédagogique de l'ENAU

- Alia Ben Ayed
- Chedly Souga
- Dora Ben Yedder
- Dorsaf Zid
- Emna Bchir
- Houda Driss
- Imen Landoulsi
- Kaouther Zair
- Sabri Nasfi

Participants

L'atelier réunira les ministères et organismes publics concernés par la thématique de l'efficacité énergétique, ainsi que les cadres / responsables techniques des communes (des architectes), à savoir le ministère de l'industrie, des mines et de l'énergie, l'agence Nationale pour la Maitrise de l'Energie (ANME), la Caisse des Prêts et de Soutien aux Collectivités Locales (CPSCL), un centre de recherche, la Société de Gestion de la Technopole de Borj-Cedria (Projet Green Building) et le Centre International des Technologies de l'Environnement de Tunis (CITET). Enfin, les communes partenaires du projet 'SOLE' ou autres communes ayant développé des projets pilotes et actions en matières d'efficacité énergétiques et/ou adhérents dans une démarche de transition énergétique locale, membres des programmes nationaux (Bizerte, Nabeul, Tunis, Kairouan, Sousse, Gabès, Mnihla, M'saken , Sfax…).

CHALLENGE 48h « Design and reflection workshop on energy efficiency in public buildings »
Organisé dans le cadre du projet « SOLE »
10, 11 et 12 mai 2023

Mercredi 10 Mai 2023		
Horaire	**Description**	**Intervenants**
08h30-09h00	Accueil et inscription des participants	
09h00 –09h30	Mots de bienvenue 1. Ecole Nationale d'Architecture et d'Urbanisme 2. Fédération Nationale des Communes Tunisiennes	Pr. **Fakher KHARRAT**, Directeur de l'ENAU Mme. **Wiem POUSSE**, Directrice Exécutive - FNCT
1ère Session : Conférence / Débat : Présentation du contexte énergétique tunisien		
09h30 – 10h30	Panel : L'efficacité énergétique dans les bâtiments publics communaux : Réalité , enjeux et perspectives (Communes,ANME,Experts, ONG…)	M. **Karim ELOUARDANI**, Directeur des programmes FNCT
10h30 – 11h00	Efficacité énergétique en tunisie. Cadre général et retour d'expérience pratique: méthodologie de conception d'un bâtiment à 0 énergie.	Mme **Emna BCHIR**, Maître-assistante en architecture à l'ENAU
11h00 – 11h30	Débat et interaction avec les communes, les étudiants et les enseignants	Modérateur
Pause – Café		
2ème Session : Travaux de groupes / Lancement et démarrage		
12h00 – 12h15	Présentation du Challenge 48h	M. **Mohamed Ouerghi** (FNCT) Mme **Hind Karoui** (ENAU)
12h15 – 12h45	Présentation du projet d'application : L'hôtel de ville de Bizerte	Mme **Alia Ben Ayed** et Mme **Imen Landoulsi** (ENAU) Pr **Sadok Guellouz** (expert thermicien)
13h00 – 13h20	Abacus of traditional/innovative solutions for the energy retrofitting of higher educational buildings	Mme **Gisella Calcagno**,, Université de Florence (projet Med-EcoSuRe)
Déjeuner		
Jeudi 11 mai : Suivi et encadrement pédagogique des équipes participantes (Bloc E)		
Vendredi 12 mai : Jury final et prémiation		
13h30 – 18h00	• Restitution / Présentation des travaux des équipes participantes devant le jury • Délibération et proclamation du résultat. • Remerciemnts et Clôture	Membres du jury

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SEACAP 4 SDG

Formation: Evaluation et planification des mesures de maitrise de l'énergie dans le cadre d'un Laboratoire Vivant

Dates: 14-15 Février 2023
Lieu: Municipalité de Bizerte, Tunisie

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SEACAP 4 SDG

Formation: Evaluation et planification des mesures de maitrise de l'énergie dans le cadre d'un Laboratoire Vivant

Dates: 15 Février 2023
Lieu: Municipalité de Bizerte, Tunisie

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SEACAP 4 SDG

Atelier: Mise en place d'un Laboratoire Vivant pour la réhabilitation des bâtiments communaux en Tunisie

Dates: 08 Juin 2023

Lieu: Municipalité de Bizerte, Tunisie

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Convention de coopération

La convention de coopération (« **convention**») est conclue par et entre

Le Centre Méditerranéen des Energies Renouvelables au nom du projet SEACAP4SDG, ci-après dénommé « **Partenaire du projet** », représenté par Souha Ferchichi,

et

Tunisia Green Building Council, ci-après dénommé « **membre du Laboratoire Vivant** », représenté par Mounir Bahri,

ci-après conjointement dénommées : « Parties »

Préambule

Le projet SEACAP 4 SDG (acronyme de 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) s'inscrit dans les efforts régionaux de lutte contre les changement climatiques et vise à réduire la consommation énergétique des bâtiments publics et à accroître la capacité des territoires, à adopter des mesures de maitrise de l'énergie pour réduire leur impact environnemental à moyen terme. Il relève ce défi commun en proposant l'appui au mécanisme des Plans d'Action pour la Maitrise de l'Energie dans les municipalités, moyennant une boîte à outils adaptée pour l'évaluation et la planification des mesures de maitrise de l'énergie, ainsi que des schémas de financement innovants, capitalisant sur les expériences des projets de référence financés par la Commission Européenne.

Le projet SEACAP 4SDG, qui s'insère dans le cadre du programme de coopération transfrontalière dans le bassin méditerranéen IEV CTF MED 2014-2020, est géré par le Métropole Nice Côte d'Azur, représentant le Réseau des Villes Euromed et assurant la coordination d'un consortium formé de neuf partenaires de 8 pays méditerranéens, dont le Centre Méditerranéen des Energies Renouvelables (Tunisie).

S.F

En Tunisie, la municipalité de Bizerte a été sélectionnée à travers un appel à manifestation d'intérêt, et sera assistée dans l'adoption des outils proposées dans le cadre du projet. Ce mécanisme de renforcement de capacités et de formation sera mis en œuvre en adoptant une approche collaborative entre les acteurs clés nationaux impliqués, sous forme de "Laboratoire Vivant".

Dans ce contexte, le partenaire du projet MEDREC a lancé un appel à manifestation d'intérêt pour identifier les membres du Laboratoire vivant. Le Membre du Laboratoire vivant signataire de cette convention a répondu favorablement à cet appel à intérêt et a exprimé sa volonté de prendre part à cette initiative, selon les termes de la présente convention.

Article 1. Cadre de collaboration

La présente convention est conclue dans le cadre de la mise en œuvre des activités du Laboratoire Vivant du projet SEACAP4SDG et a pour objet de fixer les modalités de collaboration entre le partenaire du projet et l'organisation membre du laboratoire vivant.

La collaboration dans le cadre du Laboratoire Vivant vise à mettre en place le dispositif d'accompagnement apporté par le projet SEACAP4SDG qui comporte deux phases d'assistance aux municipalités :

- **Phase 1.** Sélection d'un ensemble d'outils/méthodologies à adopter par les municipalités bénéficiaires pour l'évaluation des mesures de maitrise de l'énergie identifiées.

- **Phase 2.** Elaboration d'une feuille de route pour la planification de mise en œuvre des mesures de maitrise de l'énergie prioritaires, permettant d'obtenir un minimum de 10 000 kWh d'économies par bâtiment (énergie primaire non renouvelable) et une économie de 5% sur la consommation énergétique totale de la municipalité, ayant un cout d'investissement réduit, ainsi qu'un ensemble d'actions de sensibilisation des usagers du bâtiment permettant d'obtenir un minimum d'économie estimée de 50 000 kWh d'énergie primaire non renouvelable par an.

Article 2. Objectifs de la convention

Cette convention de coopération a deux objectifs principaux de :

1) Favoriser l'engagement de la municipalité bénéficiaire à utiliser les résultats et réalisations des projets de référence sélectionnés dans le cadre du projet dans leur travail au quotidien. (https://www.enicbcmed.eu/seacap-4-sdg-identifies-main-tools-and-instruments-be-proposed-mediterranean-cities-updating-their)

2) Accompagner cette municipalité à utiliser ces sources pour l'analyse détaillée et la planification des mesures de maitrise de l'énergie dans des bâtiments municipaux.

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L'accompagnement de la municipalité sera assuré par l'équipe du projet (partenaire du projet et une entité externe désignée) en collaboration avec le membre du Laboratoire vivant local, qui assisteront les municipalités sélectionnées lors du développement des deux phases et par des sessions de formation spécifiques.

Article 3. Rôle du Partenaire du Projet

Le Partenaire du Projet entreprendra, aux fins de permettre d'atteindre les objectifs du projet dans le cadre de la présente Convention, les actions suivantes :

- Fournir le soutien et l'assistance nécessaires au membre du laboratoire vivant.
- Superviser l'ensemble du processus et assurer la coordination entre la municipalité et l'entité externe pour faciliter la mise en œuvre des actions prévues.

Article 4. Rôle du membre du laboratoire vivant

Le membre du laboratoire vivant mettra à disposition les compétences nécessaires pour assister et appuyer l'équipe du projet à réaliser les actions suivantes :

- Identifier, en collaboration avec les autres membres du laboratoire vivant, des mesures d'efficacité énergétique et de recours aux énergies renouvelables permettant de réaliser des économies d'énergie au sein des bâtiments identifiés par la municipalité.
- Développer et conduire, en collaboration avec les autres membres du laboratoire vivant, un programme de renforcement des capacités des représentants de la municipalité pour l'évaluation et la planification des mesures de maitrise de l'énergie, prévues, en se basant sur l'analyse de la consommation énergétique des bâtiments identifiés comme cas d'étude et en exploitant les outils et méthodologies sélectionnés.
- Elaborer une feuille de route comprenant les trois sections suivantes :
  - **Section technique** : portant sur l'identification d'un ensemble de mesures de maitrise de l'énergie permettant d'obtenir un minimum de 10000 kWh d'économies par bâtiment (énergie primaire non renouvelable) et une économie de 5% sur la consommation énergétique totale de la municipalité, ayant un cout d'investissement réduit, ainsi qu'un ensemble d'actions de sensibilisation des usagers du bâtiment permettant d'obtenir un minimum d'économie estimée de 50000 kWh d'énergie primaire non renouvelable, par an.
  - **Section légale** : portant sur une étude de faisabilité légale des mesures de maitrise de l'énergie envisagées qui souligne les exigences légales applicables à l'investissement correspondant ainsi que les éventuelles incitations et obstacles juridiques et/ou réglementaires qui existent.

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- **Section d'analyse économique et financière** : portant sur les indicateurs financiers sur la viabilité économique, tels que le retour sur investissement..., les risques critiques pouvant affecter la mise en œuvre des actions de maitrise d'énergie et les mesures d'atténuation potentielles ainsi que l'approche de financement envisagée identifiant les sources de financement potentielles pour l'investissement envisagé.

- Collaborer avec le partenaire du projet pour diffuser les résultats obtenus des actions prévues.

Article 5. Calendrier de mise en œuvre

La mise en œuvre des actions prévues dans le cadre de cette convention s'étalera sur une période de six mois, de Janvier à Juin 2023.Cette période peut être mise à jour en cas d'extension de la durée du projet.

Article 6. Visibilité et Propriété intellectuelle

Tous les événements publics, activités, rapports, publications, communiqués de presse, et autres documents produits dans le cadre du projet SEACAP4SDG doivent mentionner le support total ou partiel du projet, et doivent indiquer clairement que les actions susmentionnées sont mises en œuvre sous la coordination du MEDREC en tant que partenaire du projet, en collaboration avec tous les membres du laboratoire vivant.

Article 7.Confidentialité

Sous peine d'engager leurs responsabilités, les Parties s'engagent à traiter de manière strictement confidentielle toute information et tout document liés à l'exécution de la présente convention, et à ne pas les utiliser ni les divulguer à des tiers. Les Parties demeurent tenues par cet engagement après l'achèvement des activités objet de cette collaboration.

Les parties obtiennent de tous les membres de leurs personnels et de leurs organes d'administration et de direction ainsi que de ses sous-traitants éventuels, dont elles les garantes l'engagement de respecter le caractère confidentiel de toute information liée, directement ou indirectement, à l'exécution de la convention, et de ne divulguer à des tiers, ou d'utiliser pour leur profit personnel ou celui de tiers, aucun document ni aucune information obtenue à l'occasion de l'exécution de la présente convention.

L'utilisation d'informations dont l'une des Parties a eu connaissance à l'occasion de la collaboration à d'autres fins que l'exécution de la convention est interdite, sauf dans le cas d'un accord commun préalable écrit par toutes les Parties.

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SEACAP 4 SDG

L'obligation de confidentialité survit à la résiliation et à l'achèvement de la convention.

Les Parties ont fait exécuter la présente convention de coopération par leurs représentants respectifs.

Signé pour et au nom du Partenaire du projet	**Signé pour et au nom du membre du laboratoire vivant**
Nom complet Souha Ferchichi	Mounir BAHRI
Fonction Expert technique	Président
Date 10/03/2023	03/03/2023
Signature	Signature

Mediterranean Renewable Energy Centre MEDREC

TUNISIAGBC
مجلس تونس للأبنية الخضراء
TUNISIA GREEN BUILDING COUNCIL

Convention de coopération

La convention de coopération (« **convention**») est conclue par et entre

Le Centre Méditerranéen des Energies Renouvelables au nom du projet SEACAP4SDG,ci-après dénommé « **Partenaire du projet** »,représenté par Souha Ferchichi,

et

L'Ecole Nationale d'Architecture et d'Urbanisme,ci-après dénommé « **membre du Laboratoire Vivant** », représenté par, Fakher Kharrat

ci-après conjointement dénommées : « Parties »

Préambule

Le projet SEACAP 4 SDG (acronyme de 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) s'inscrit dans les efforts régionaux de lutte contre les changement climatiques et vise à réduire la consommation énergétique des bâtiments publics et à accroître la capacité des territoires, à adopter des mesures de maitrise de l'énergie pour réduire leur impact environnemental à moyen terme. Il relève ce défi commun en proposant l'appui au mécanisme des Plans d'Action pour la Maitrise de l'Energie dans les municipalités, moyennant une boîte à outils adaptée pour l'évaluation et la planification des mesures de maitrise de l'énergie, ainsi que des schémas de financement innovants, capitalisant sur les expériences des projets de référence financés par la Commission Européenne.

Le projet SEACAP 4SDG, qui s'insère dans le cadre du programme de coopération transfrontalière dans le bassin méditerranéen IEV CTF MED 2014-2020, est géré par le Métropole Nice Côte d'Azur, représentant le Réseau des Villes Euromed et assurant la coordination d'un consortium formé de neuf partenaires de 8 pays méditerranéens, dont le Centre Méditerranéen des Energies Renouvelables (Tunisie).

En Tunisie, lamunicipalité de Bizertea été sélectionnée à travers un appel à manifestation d'intérêt, et seraassistée dans l'adoption des outils proposées dans le cadre du projet. Ce mécanisme de renforcement de capacités et de formation sera mis en œuvre en adoptant une approche collaborative entre les acteurs clés nationaux impliqués, sous forme de "Laboratoire Vivant".

Dans ce contexte, le partenaire du projet MEDREC a lancé un appel à manifestation d'intérêt pour identifier les membres du Laboratoire vivant. Le Membre du Laboratoire vivant signataire de cette convention a répondu favorablement à cet appel à intérêt et a exprimé sa volonté de prendre partà cette initiative, selon les termes de la présente convention.

Article 1. Cadre de collaboration

La présenteconvention est conclue dans le cadre de la mise en œuvre des activités du Laboratoire Vivant du projet SEACAP4SDG et a pour objet de fixer les modalités de collaboration entre le partenaire du projet et l'organisation membre du laboratoire vivant.

La collaboration dans le cadre du Laboratoire Vivant vise à mettre en place le dispositif d'accompagnement apporté par le projet SEACAP4SDG qui comporte deux phases d'assistance aux municipalités :

- **Phase 1.** Sélection d'un ensemble d'outils/méthodologies à adopter par les municipalités bénéficiaires pour la l'évaluation des mesures de maitrise de l'énergie identifiées.

- **Phase 2.** Elaboration d'une feuille de route pour la planification de mise en œuvre des mesures de maitrise de l'énergie prioritaires, permettant d'obtenir un minimum de 10 000kWh d'économies par bâtiment (énergie primaire non renouvelable) et une économie de 5% sur la consommation énergétique totale de la municipalité, ayant un cout d'investissement réduit, ainsi qu'un ensemble d'actions de sensibilisation des usagers du bâtiment permettant d'obtenir un minimum d'économie estimée de 50 000 kWh d'énergie primaire non renouvelable par an.

Article 2. Objectifs de la convention

Cette convention de coopération a deux objectifs principaux de :

1) Favoriser l'engagement de la municipalité bénéficiaire à utiliser les résultats et réalisations des projets de référence sélectionnés dans le cadre du projet dans leur travail au quotidien. (https://www.enicbcmed.eu/seacap-4-sdg-identifies-main-tools-and-instruments-be-proposed-mediterranean-cities-updating-their)

2) Accompagner cette municipalité à utiliser ces sources pour l'analyse détaillée et la planification des mesures de maitrise de l'énergie dans des bâtiments municipaux.

L'accompagnement de la municipalité sera assuré par l'équipe du projet (partenaire du projet et une entité externe désignée) en collaboration avec le membre du Laboratoire vivant local, qui assisteront les municipalités sélectionnées lors du développement des deux phases et par des sessions de formation spécifiques.

Article 3. Rôle du Partenaire du Projet

Le Partenaire du Projetentreprendra, aux fins de permettre d'atteindre les objectifs du projet dans le cadre de la présenteConvention, les actions suivantes :

- Fournir le soutien et l'assistance nécessaires au membre du laboratoire vivant.
- Superviser l'ensemble du processus et assurer la coordination entre la municipalité et l'entité externe pour faciliter la mise en œuvre des actions prévues.

Article 4. Rôle du membre du laboratoire vivant

Le membre du laboratoire vivant sera représenté parune équipe d'étudiants accompagnés de leurs enseignants pour d'une part bénéficier des formations concernant les outils et méthodologies d'Evaluation et de planification des mesures de maitrise de l'énergie dans le cadre d'un Laboratoire Vivant, et d'autre part, assister et appuyer l'équipe du projet à réaliser les actions suivantes :

- Mener des enquêtes qualitatives et des observations auprès des utilisateurs pour évaluer l'aspect comportemental et perceptuel lié à la consommation énergétique et au confort ambiantal au sein de de l'hôtel de ville de Bizerte
- Procéder à des relevés sur place des caractéristiques constructives du bâtiment cible
- Identifier, en collaboration avec les autres membres du laboratoire vivant, des mesures d'efficacité énergétique et de recours aux énergies renouvelables permettant de réaliser des économies d'énergie au sein des bâtiments identifiés par la municipalité.
- Développer et conduire, en collaboration avec les autres membres du laboratoire vivant, un programme de renforcement des capacités des représentants de la municipalité pour l'évaluation et la planification des mesures de maitrise de l'énergie, prévues, en se basant sur l'analyse de la consommation énergétique des bâtiments identifiés comme cas d'étude et en exploitant les outils et méthodologies sélectionnés.
- Elaborer la **section technique et architecturale**de la feuille de route portant sur l'identification d'un ensemble de mesures de maitrise de l'énergie englobant la conception de dispositifs ambiantaux tenant compte de l'aspect patrimonial du bâtiment,permettant d'obtenir un minimum de 10000kWh d'économies par bâtiment (énergie primaire non renouvelable) et une économie de 5% sur la consommation énergétique totale de la municipalité, ayant un cout d'investissement réduit. ainsi qu'un ensemble d'actions de

sensibilisation des usagers du bâtiment permettant d'obtenir un minimum d'économie estimée de 50000 kWh d'énergie primaire non renouvelable, par an.

Article 5.Calendrier de mise en œuvre

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Les parties obtiennent de tous les membres de leurs personnels et de leurs organes d'administration et de direction ainsi que de ses sous-traitants éventuels, dont elles les garantes l'engagement de respecter le caractère confidentiel de toute information liée, directement ou indirectement, à l'exécution de la convention, et de ne divulguer à des tiers, ou d'utiliser pour leur profit personnel ou celui de tiers, aucun document ni aucune information obtenue à l'occasion de l'exécution de la présente convention.

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REGIONE AUTONOMA DELLA SARDEGNA

SEACAP 4 SDG

Les Parties ont fait exécuter la présente convention de coopération par leurs représentants respectifs.

Signé pour et au nom du Partenaire du projet

Nom complet

____**Souha Ferchichi**_____

Fonction

_____**Expert technique**_____

Date

27 AVR 2023

Signature

Mediterranean Renewable Energy Centre
MEDREC

Signé pour et au nom du membre du laboratoire vivant

Nom complet

_____ **Fakher Kharrat** _____

Fonction

_____**Directeur**_____

Date

Signature

République Tunisienne
MINISTERE DE L'ENSEIGNEMENT SUPERIEUR ET DE LA RECHERCHE SCIENTIFIQUE
Ecole Nationale d'Architecture et d'Urbanisme

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MEDITERRANEAN RENEWABLE ENERGY CENTRE

Atmosphères ADD

CERTIFICATE OF ATTENDANCE

Is hereby awarded to

Lilia Attia – Ecole Bouabdelli

In recognition of her participation in the **Green Nudge workshop** held in Tunisia on June 15th 2023 in the framework of SEACAP 4 SDG project

Souha Ferchichi
Technical expert - Mediterranean Renewable Energy Centre

Mediterranean Renewable Energy Centre MEDREC

Imen Landoulsi
Architect - Atmospheres ADD agency

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Is hereby awarded to

Mouna Darguech – Ecole Nationale d'Architecture et d'Urbanisme

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Souha Ferchichi
Technical expert - Mediterranean Renewable Energy Centre

Mediterranean Renewable Energy Centre MEDREC

Imen Landoulsi
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Mediterranean Renewable Energy Centre MEDREC

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Feryel Bchini – Ecole Nationale d'Architecture et d'Urbanisme

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Chaima Belhassen – Ecole Nationale d'Architecture et d'Urbanisme

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Youssef Ben Hamda – Ecole Nationale d'Architecture et d'Urbanisme

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Technical expert - Mediterranean Renewable Energy Centre

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Mariem Ben Jemaa – Ecole Nationale d'Architecture et d'Urbanisme

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Wafa Ben Salem – Ecole Nationale d'Architecture et d'Urbanisme

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Nihel Blaghji – Ecole Nationale d'Architecture et d'Urbanisme

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Mariem Chelbi – Ecole Nationale d'Architecture et d'Urbanisme

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Meriam Chouchani – Ecole Nationale d'Architecture et d'Urbanisme

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Wissal Dkhili – Ecole Nationale d'Ingénieurs de Bizerte

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Aziza Challougui – Institut Supérieur des Cadres de l'Enfance

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Iheb Dridi – Ecole Nationale d'Architecture et d'Urbanisme

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Makram El Alk – Ecole Nationale d'Architecture et d'Urbanisme

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