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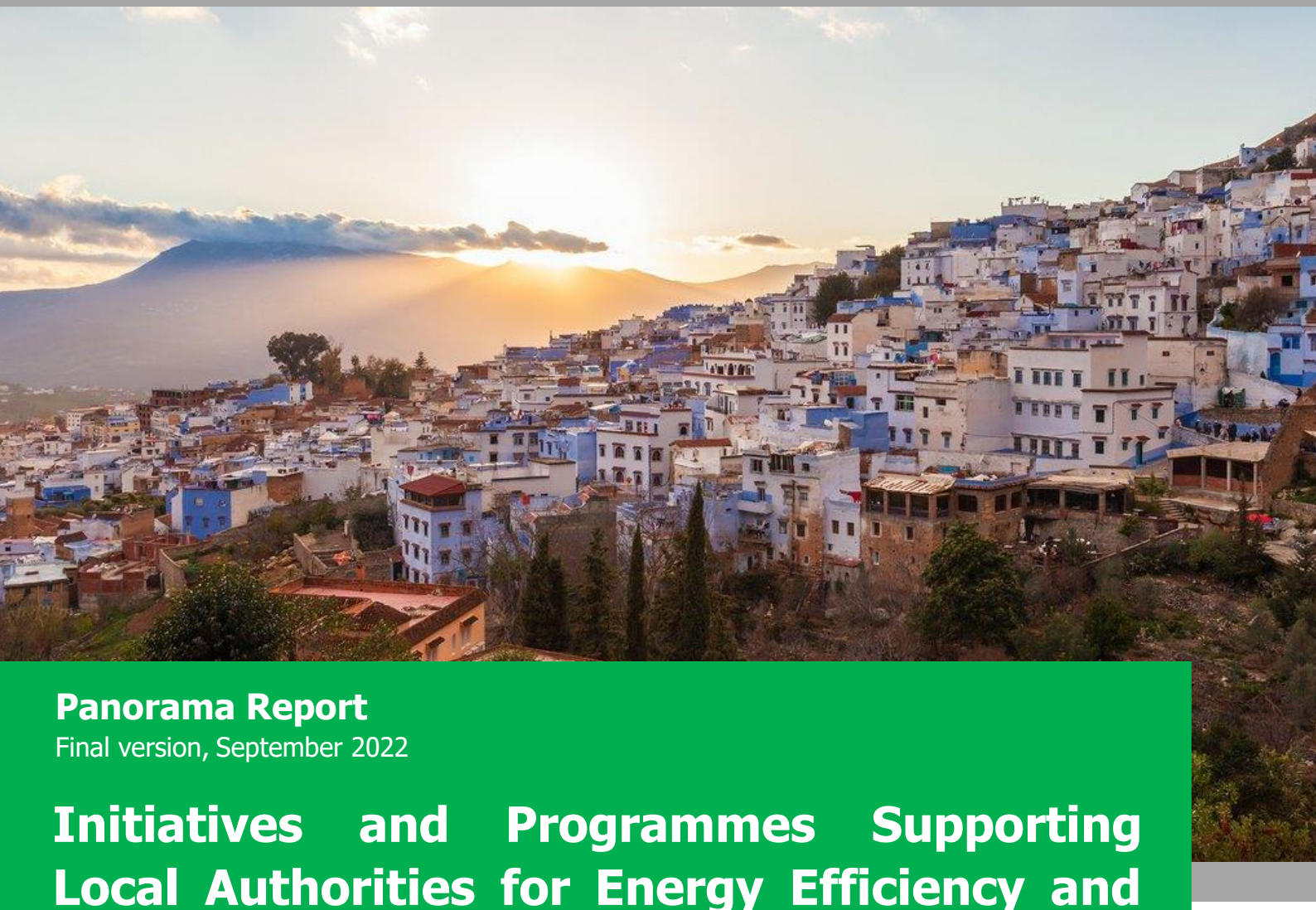
meetMED
Mitigation Enabling Energy Transition in the MEDiterranean region
Together We Switch to Clean Energy



Panorama Report
Final version, September 2022

Initiatives and Programmes Supporting Local Authorities for Energy Efficiency and Thermal Comfort of Buildings in the Mediterranean Area

WP3 (A315) - Improving thermal comfort and energy efficiency in buildings at local scale

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Acknowledgements

This meetMED developed contributes to drawing up state of the art analysis of the tools and initiatives developed in the Mediterranean countries for local authorities in order to promote energy efficiency and thermal comfort of buildings at the local level.

This inventory is a first step towards the dissemination and scaling up of the tools, devices, programs and activities identified with the best replication potential.

This report was prepared by the Institute for Development, Environment and Energy (IDE-E) in close collaboration with the French Agency for the Ecological Transition (ADEME).

The collection of data and information is kindly acknowledged to the committed work by the experts from the national energy agencies partners of the meetMED program : the Algerian National Agency for the Promotion and Rationalisation of Energy Use (APRUE), the Jordanian National Energy Research Centre (NERC), the Regional Centre for Renewable Energy and Energy Efficiency (RECREE), the Lebanese Association for Energy Saving and Environment (ALMEE), the Tunisian National Agency for Energy Management (ANME) and the Moroccan Agency for Energy Efficiency (AMEE).

Executive Summary

In line with their climate commitments, the Mediterranean countries, targets and partners of the meetMED II project, attach great importance to reducing their energy consumption, particularly in energy-intensive sectors such as building and construction. The contribution of local and regional authorities is essential: they regulate construction projects at the local level, manage a significant part of the public equipment and buildings and are able to mobilise territorial actors. In order to support local authorities in improving the energy efficiency of their assets and promoting eco-construction in their territory, the partner countries have developed various tools, mechanisms and dedicated approaches.

This report, prepared as part of activity A315 of the meetMED II project "Improving energy efficiency and thermal comfort in public buildings managed by local authorities", reviews these tools, highlights the role played by national public agencies in their deployment and defines the conditions necessary for their replication. This review is based on bilateral interviews with the national energy agencies of the partner countries, supplemented by a literature review.

Whether it is a question of national technical and financial support mechanisms, thematic networks of cities or mechanisms dedicated to supervising the construction and management of public buildings, this overview highlights various experiences developed in Algeria, Morocco, Tunisia, Palestine, Jordan, Egypt and Lebanon - some of which have significant potential for scaling up and replication.

A common observation, however, remains the dominance of ad hoc initiatives set up thanks to the support of international cooperation, and the under-exploitation of the mechanisms by the communes. This is mainly due to the budgetary limitations faced by municipalities, the financial inability of national agencies to provide the necessary support to facilitate the involvement of municipalities, the lack of visibility of existing schemes (even at the country level), and the lack of capacity (technical and human) essential to the prioritisation of energy and climate considerations at the local level.

Introduction

Mitigation Enabling Energy Transition in the Mediterranean region II (meetMED II)

meetMED is a project funded by the European Union and implemented by MEDENER, an international association of energy management agencies from the North and South of the Mediterranean region, and the Regional Centre for Renewable Energy and Energy Efficiency (RCREEE), an intergovernmental organisation aiming to enable and increase the adoption of renewable energy and energy efficiency practices in the Arab region.

Following the success of its first phase (2018-2020), meetMED project commences its second phase in 2021 aiming to enhance the energy security of beneficiary countries (Algeria, Egypt, Jordan, Lebanon, Libya, Morocco, Palestine and Tunisia) while fostering their transition to a low-carbon economy.

It is in line with the European Neighbourhood Policy and the recent joint EEAS-EC Communication published on 2121//22/99 on "Renewed Partnership with the Southern Neighbourhood, a New Agenda for the Mediterranean" and contributes to a more stable, efficient, competitive and climate change resilient socio-economic framework.

MeetMED II activities aim at strengthening the implementation of energy efficiency measures and improving countries' energy mix focusing on building and appliances' sectors through a multiscale, multipartner and inclusive approach at both local and regional level, thereby fostering regional cooperation.

Context of the Mission

The building and construction sectors combined are responsible for more than a third of the world's final energy consumption and nearly 40% of total direct and indirect CO_2 emissions[1]. In the Mediterranean partner countries of the meetMED II project, the energy demand of buildings and construction is constantly increasing, driven by urbanisation and demographic growth.

The enhancement of energy efficiency in buildings is at the core of national strategies and action plans for reducing emissions. Rationalising the energy consumption of public buildings is thus one of the top priorities of the partner countries, first because the public administration has a duty of exemplarity, but also because of the weight of the electricity bill of these buildings. For instance, in Egypt, the 350,000 public buildings represent around 3% of the country's building stock (WB, 2017) and consume 11% of total electricity (Egypt GBC, 2020). Implementing energy efficiency measures in public buildings in Cairo alone would result in a saving of about USD 99,000 per year, which is equivalent to a 48% reduction in the electricity bill of these buildings (Egypt GBC, 2020). In Jordan, public buildings consume about 7% of total electricity and would see their annual bill fall by about USD 74 million if they reduced their consumption by 20% through energy efficiency measures (NERC, 2019). In Tunisia, the

[1] *https://www.iea.org/topics/buildings*

36,000 public buildings have an energy efficiency potential of 39,667 TOE, or 21% of public sector consumption (ANME, 2020).

Beyond their role of managing part of the public buildings, local authorities are one of the main stakeholders in urban development policies. First, they are responsible for planning urban development on their territory. Then, they are in charge of the regulation of construction projects and must therefore ensure the implementation of national regulations. Finally, they are more generally responsible for the animation of the communal territory and thus have different tools to stimulate local dynamics fostering energy efficiency in buildings at the local level. For all these reasons, the contribution of local authorities is essential in order to achieve national objectives at the territorial level.

This mission is part of the A315 activity of the meetMED II project "Improvement of energy efficiency and thermal comfort in public buildings managed by local authorities" led by ADEME, the French Agency for Ecological Transition. It consists in identifying, characterizing and promoting the main tools, devices and approaches developed in the Mediterranean region, in particular on the southern shore, in examining their capacity to be deployed and replicated in other national contexts, and in identifying and characterizing the role of public agencies in deploying and scaling up these tools and supporting cities for their implementation.

Objectives and Presentation of the Report

This report presents an overview of the tools and mechanisms existing at both national and local levels. The presentation is divided into five sections: the national programmes and mechanisms to support local authorities; the networks of cities committed to energy management; the tools for municipalities to manage their public buildings; the incentives mechanisms for encouraging and supporting eco-construction on municipal territories; and finally, a series of recommendations for the replication and scaling up of the mechanisms presented.

Section I: The contribution of municipalities is essential to meet the national objectives in terms of reducing greenhouse gas emissions and, for most of the countries, to reduce their dependence on the international energy market. Section I introduces national programmes to provide technical and financial support to municipalities willing to commit to energy efficiency in the building sector.

Section II: In order to learn from each other, cities can join networks of municipalities committed to the energy transition. Section II examines the experiences of such thematic cities networks.

Section III: Municipalities hold a large stock of public buildings for which they are responsible. Depending on the country, municipal buildings may include administrative, cultural, sports, educational, commercial or religious facilities, etc. In order to demonstrate its exemplarity, a municipality can construct model buildings that meet or exceed national thermal regulations, refurbish its existing buildings and ensure the efficient management of all its facilities. Section III details the tools and devices tested for the construction, renovation and management of energy efficient public buildings.

Section IV: Municipalities can also act at the scale of their territory in order to promote green building: they are responsible, alongside other actors, for the implementation of national building regulations on their territory. Through their local actions, they integrate into their local

planning tools the deployment of energy efficiency measures in residential and tertiary buildings (animation, awareness raising, information). Section IV describes the measures developed to stimulate the construction and renovation of buildings on the municipal territory.

Section V: Section V concludes this report and details a series of recommendations for the replication of the tools identified.

Methodology and scope of the project

In order to establish this overview, bilateral interviews were conducted with the building managers of each of the national energy agencies of the meetMED partner countries, namely: APRUE (Algeria), AMEE (Morocco), ALMEE (Lebanon), PEC/PENRA (Palestine), RSS/NERC (Jordan) and RCREEE (Egypt). These interviews allowed us to identify and characterise the tools and mechanisms put in place at national or local level to promote energy efficiency in buildings at local level, while situating them in their regulatory and institutional context. Due to lack of availability, no interviews could be conducted with the officials of ANME (Tunisia) and RCREEE in charge of Libya. The project team carried out documentary research to obtain data on these two countries and to complete the interviews conducted. In order to ensure the accuracy of all the information presented, the report was proofread by experts from the meetMED partner agencies.

This overview presents a selection of tools and devices in the building, construction and housing sector. All the tools and devices presented aim to promote energy efficiency in buildings at local level. They have been implemented or are being tested in the meetMED partner countries.

The following criteria have been used to select the tools that are presented:

- **Impact:** devices with the greatest impact - expected or actually measured – to promote energy efficiency in buildings;
- **Maturity**: devices that have been successfully implemented and can demonstrate first concrete results;
- **Sustainability:** devices that are not one-off experiments but regular tools available to municipalities;
- **Scaling up:** pilot tools that can be scaled up (nationally or inter-municipally) with reasonable effort; and;
- **Replicability:** tools with the best potential for replication in other similar contexts.

I. National support mechanisms for municipalities

As part of their international commitments to climate and energy transition, Mediterranean countries, with the exception of Libya, have all set themselves objectives in terms of promoting energy efficiency - particularly in the building sector - and promoting renewable energies. Achieving these objectives depends on the contribution of local authorities, especially municipalities, which play a key role in this sector: they own a large number of buildings, they develop urban areas, are responsible for building permits and have the capacity to raise awareness, provide information and mobilise stakeholders of their territory.

A. National programmes to support local energy management

While these local competences are considerable, the capacity of municipalities to promote energy management in their territories may be favoured or hindered by the regulations and support mechanisms existing at national level. This first section presents an overview of national programmes that support the promotion of energy transition at the local level.

What are the key elements of a national framework for energy efficiency in buildings?

The prerequisite for the establishment of a national framework promoting energy efficiency in buildings is the **political will** of the State to support the energy transition and to reduce the country's energy bill, especially for public buildings, to meet its climate targets. This commitment is reflected in the following elements:

- A clear **institutional framework** is set up and determine the institution(s) responsible for developing, implementing and monitoring the national strategy for energy efficiency in buildings. These structures are endowed with financial means and competent human resources to carry out their mission.
- A **regulatory framework** to promote energy management at the territorial level is defined. It combines **regulatory constraints** (e.g. obligation for municipalities to commit to energy or climate objectives) and a **system of incentives** (e.g. subsidies for energy projects, privileged access to funding linked to compliance with energy criteria, recognition or reward system, etc.).
- In order to support the commitment of the municipalities, a **training and technical support system** for municipalities is established. It aims to train municipal staff to integrate energy efficiency into all of the municipality's tasks, in particular the management of existing municipal buildings, the construction of new buildings, the urban planning and the control of construction on municipal territory. In addition to training, this system can provide technical (or even financial) support to municipalities for the implementation of exemplary actions. It should facilitate the commitment of municipalities for exemplary energy management. It must be open and accessible to all cities wishing to engage in energy management by promoting the integration of energy efficiency measures in local planning documents.

> Finally, the measures taken by the municipalities and the impacts achieved in terms of energy efficiency in buildings are recognised by the establishment of a **national label.** This label proposes a methodological approach to guide municipal energy policies and covers all the needs expressed by municipalities (institutional support, audits, planning support, project implementation and monitoring, technical and regulatory expertise, etc.). The voluntary participation of municipalities is encouraged and aims to create an emulation between local authorities.

Box 1 : The Climate Air Energy - Citergie label in France

In France, ADEME has developed the "CLIMATE - AIR - ENERGY" label to support local authorities wishing to improve **their** energy policy in line with national climate objectives. This label is the French version of the European Energy Award (EEA®) and rewards committed local authorities. A municipality involved in this programme receives technical and financial support from ADEME to establish an inventory of its climate-air-energy policy and define an action plan with the support of an advisor recruited by the municipality. This advisor monitors the implementation of this programme for three years until the municipality is awarded the label, depending on the percentage of actions carried out.

The EEA label was transposed in 2013 in Morocco, under the name "**Jiha Tinou**" and in Tunisia since 2019, under the name "**ACTE-MEA**". In France, it has evolved in 2021 to be included in the national program called "Territories engaged in ecological transition" (Territoires engages pour la transition"

More information : https://territoireengagetransitionecologique.ademe.fr/

Overview, issues and challenges in partner countries

Reducing emissions from the building sector is part of the international climate commitments made by almost all Mediterranean countries. Nevertheless, these national commitments have not been systematically broken down into objectives set at the territorial level. Due to the lack of binding regulatory frameworks in most contexts, **the main motivation for municipalities to commit to energy management is economic**. In Morocco and Tunisia, for example, municipalities face ever-increasing energy bills, which represent on average 10% of their annual budget. Many municipalities are over-indebted, so lowering energy bills improves their cash flow and thus their solvency.

The majority of partner countries have not developed specific support programmes for energy efficiency in buildings for municipalities. Without such programmes, municipalities do not have access to the skills and resources needed to implement or promote energy projects autonomously. Almost all the actions carried out for municipalities are of a one-off nature, carried out for the benefit of pilot cities as part of international cooperation programmes (for example, the SUDEP South, CES-MED or Clima-MED programmes of the European Union).

At this stage, only two countries have developed - with the technical and financial support of international cooperation - their own support programmes for municipalities: Tunisia and Morocco.

Selection of devices

The following national programmes illustrate this type of scheme:

- The Alliance des Communes pour la Transition Energétique (ACTE) programme deployed in Tunisia by ANME since 2019
- The Jiha Tinou programme implemented in Morocco by AMEE between 2012 and 2016

ACTE Programme - Alliance of Municipalities for Energy Transition

OBJECTIVE

To support Tunisian municipalities wishing to actively engage in a sustainable energy management approach through the implementation of local energy management strategies.

DESCRIPTION

The ACTE programme is based on a national support system for municipalities aimed at supporting local action and promoting investment in energy management.

The programme offers all municipalities:

> A **capacity building** programme for municipal officials ;

> Simplified **energy audits** of their assets: public lighting, municipal buildings and vehicles;

> An **energy accounting tool** allowing municipalities to monitor the energy consumption of their facilities and equipment;

> A national **financing mechanism** to support municipal investment in energy projects;

> **Guides** related to key municipal issues.

14 pilot cities receive strong support from this program. They follow a quality approach covering six thematic areas: urban planning, municipal buildings and infrastructures, diversification of energy sources, urban mobility, internal organisation and governance, cooperation and communication.

An ACTE label recognises the efforts of the most committed municipalities in terms of sustainable energy management, based on a catalogue of concrete measures. This label is the Tunisian version of the European Energy Award® label.

For these 14 pilot municipalities, the programme offers:

> The provision of one **relay expert** per municipality to support it in the planning, management, monitoring and evaluation of municipal energy projects;

> The realization of **in-depth energy audits** of public lighting, municipal buildings and vehicle fleet;

> Assistance in **project management** and support for the **structuring of municipal investment projects**;

> A budget to carry out at least **one quick-win project** and support in **mobilising financial support**.

KEY DATA

Implementation

Tunisia, 2019 - 2022 (pilot phase)

14 pilot municipalities

Stakeholders involved

- **ANME**: steering and deployment of the programme
- **CPSCL** and **Ministry of Economy**: designing a financial mechanism
- **CFAD**: training programme for municipal employees
- **MALE**: matching the programme to the context of the municipalities

Implementation support

IDE-E, PLANAIR, ALCOR, URBAPLAN, TRANSITEC

Partners and funders

State Secretariat for Economic Affairs (SECO)

Budget

EUR 4.5m (pilot phase 2019 - 2022)

JIHA TINOU Programme

OBJECTIVE

To promote and support municipal initiatives in renewable energy and energy efficiency by strengthening the capacity of local actors to contribute to national energy and climate objectives.

DESCRIPTION

Jiha Tinou is a strategy, programme and label certifying a quality approach to municipal energy management launched in 2012 by the Moroccan Agency for Energy Efficiency (AMEE).

Based on a national system that provides local assistance and support to pilot municipalities throughout the energy planning cycle, the pilot phase of Jiha Tinou has supported 6 Moroccan cities in the implementation of their local energy policies through :

- **Support for local governance** and decision-makers to set up local "energy teams";
- **Capacity building** of municipal officials to support the implementation of energy initiatives;
- Support for **raising citizens' awareness** through support for local communication strategies and the development of diversified tools;
- Support for the **development of financial schemes** to facilitate municipal investment.

Jiha Tinou relies on the methodological framework of the European Energy Award®, adapted to the Moroccan context, to structure the municipal energy planning approach. In 2016, Agadir and Chefchaouen became the first African cities to obtain the Jiha Tinou Middle East & Africa Energy Award.

KEY DATA

Implementation

Morocco, 2012 - 2016 (pilot phase 6 communes)

Stakeholders involved

AMEE: Steering and deployment of the programme

Implementation support

IDE-E

Partners and funders

Swiss Cooperation (REPIC)

ADEME

German International Development Cooperation (GIZ)

Budget

800,000 EUR

Conditions for the deployment of national support programmes for municipalities

The establishment of a national support programme for municipalities requires the following elements

- A high-level **political support** at the national level to affirm the State's commitment to support the energy transition and to provide support to municipalities to contribute to this commitment.
- The establishment of **a governance structure to** steer the programme and manage the national certification process. In Morocco and Tunisia, the national energy agencies have taken on this role.
- The establishment of a **favourable financial and regulatory framework**. This framework should provide a system of constraints and incentives to encourage the commitment of municipalities to the energy transition.
- A sufficiently large **margin of manoeuvre for municipalities** to initiate a local dynamic. The competences attributed to the municipalities must allow them to act on their municipal assets but also at the scale of their territory.
- A **political commitment from the member municipalities** to guarantee a strong and lasting involvement in the programme.
- The existence and availability of a **multidisciplinary team** within the municipality sufficiently trained to carry out the energy projects.
- The availability of **financial resources** to initiate exemplary initiatives by municipalities.

B. Energy efficiency financing mechanisms

The energy consumption of a large majority of public buildings in the Mediterranean region is relatively low; most of them are not equipped with heating or air conditioning systems, and the thermal comfort largely insufficient. Consequently, energy efficiency measures can improve thermal comfort, but the economic profitability of energy interventions is not systematically guaranteed. And when it is guaranteed (especially in buildings where the adoption of energy efficiency measures limits the use of heating and cooling systems), the initial investment remains high and constitutes a significant barrier for most property owners.

Given these challenges and the budget limitations faced by municipalities, financial mechanisms to facilitate investment in energy efficiency measures are needed. These mechanisms are usually designed to (a) facilitate pre-investment studies (e.g. energy audits and audits on plan); (b) reduce the initial investment cost (e.g. concessional credits); or (c) provide a subsidy for municipal investment. The objective is to create a leverage effect, encouraging more municipalities to invest in energy efficiency or to encourage actors in their territories to do so. This next section presents a selection of financing mechanisms implemented in the partner countries.

What are the characteristics of an adequate funding scheme?

- It is designed for municipalities in the form of grants and/or loans. The fund is open to all municipalities willing to invest in energy efficiency and renewable energy. The amount of financial support must be sufficient to **cover the additional costs of energy**

efficiency measures compared to a conventional investment and thus reduce the payback time of the energy measures realized.

- **Various financial instruments** can be used: direct or reimbursable grants, subsidised loans, guarantees, tax exemption, etc. The support must cover all types of interventions related to the energy efficiency of buildings: project design and audit on plan, construction of new energy efficient buildings, energy self-production of buildings, energy audit of existing buildings, thermal renovation.
- **Effective communication** is carried out towards municipalities to promote existing funding opportunities. Procedures for accessing financial support should be clear and simplified.
- Finally, a **monitoring and verification mechanism** is developed. Its purpose is twofold: to monitor the proper use of the funding and to evaluate the impact achieved.

Overview, issues and challenges in partner countries

In all partner countries, the **energy bill weighs heavily on the municipal budget**. For many municipalities, it is the second largest operating expense after the salaries of municipal staff. Municipal buildings and infrastructure have a significant potential for energy savings which could be achieved through appropriate investments in energy efficiency and the development of renewable energy.

The majority of municipalities face severe **budgetary constraints that limit their ability to invest** in energy efficiency. In addition, some energy efficiency actions on buildings remain unattractive due to a low level of profitability.

In order to cope with these challenges, **several countries have created funds** - accessible in particular to municipalities - to stimulate the adoption of energy management measures in buildings. These funding mechanisms cover the additional costs of energy efficiency measures and make such investments more attractive.

However, **these mechanisms are still little used by municipalities**. The reluctance of local authorities can be explained by the lack of visibility of funding opportunities, the cumbersome administrative procedures required to access these funds, and the difficulty of advancing investments (these mechanisms operate mainly on a cost-recovery basis).

An alternative approach is to allow traditional municipal financing systems (municipal banks) to allocate a share of their financing to energy projects. For example, in Morocco, the Communal Equipment Fund (FEC) includes an environmental criterion for each project financed and is currently structuring a financing offer dedicated to climate co-benefit projects.

Box 2 : The Communal Equipment Fund (FEC) in Morocco

The FEC is receiving technical and financial support from French Devlelopment Agency (AFD) of nearly 200 million euros to strengthen its capacity to finance climate co-benefit projects for Moroccan local authorities. Thanks to this support, the FEC's ambition is to develop a portfolio of climate co-benefit projects and to set up a green financing offer to stimulate the emergence of climate change mitigation and adaptation projects by municipalities.

Selection of devices and tools

Three financing mechanisms to promote investment in renewable energy and energy efficiency are presented:

- The Energy Transition Fund (ETF) managed by ANME in Tunisia
- The National Fund for Energy Management, Renewable Energy and Cogeneration, managed by the Ministry of Energy in Algeria
- The Revolving Fund set up in Palestine

Energy Transition Fund (FTE)

OBJECTIVE

Stimulate investments in the fields of energy efficiency and the development of renewable energies by subsidising part of the investments.

DESCRIPTION

This fund was created under the 2004 Finance Act and adjusted in 2017. It is feed mainly from taxes on energy products and consumption and from donations.

ANME is in charge of the management of the fund. The fund is accessible to all categories of Tunisian actors (local authorities, private companies, households, etc.) and covers a wide range of energy projects (energy audit, self-production of renewable energy, eco-construction and renovation of buildings, relamping, etc.).

Municipalities are eligible for subsidies covering up to 70% of the cost of intangible investments (studies, training) and 20% to 30% of tangible investments, with different caps depending on the type of intervention. Subsidies are awarded by decision of the Ministry of Energy after approval by a technical advisory committee.

A programme contract is established with ANME before the investments are made, and the subsidies are paid after ANME has checked that the investments comply with the initial programme contract.

The FTE is still little used by the communes. In 2019, only 3 communes (out of 350) had signed a programme contract with ANME to benefit from this funding.

KEY DATA

Implementation

Tunisia, since 2017

Stakeholders involved

- **ANME**: Management of the fund, granting of subsidies, verification of compliance of installations
- **Ministry of Energy**: Analysis and validation of grant applications

Budget

EUR 12.3 million (2021)

National Fund for Energy Management and Renewable Energy and Cogeneration

OBJECTIVE

Support the implementation of the national energy management programme by supporting the financing of energy actions and projects.

DESCRIPTION

This fund was established by the Ministry of Energy in 2015 to facilitate investment in renewable energy production or energy efficiency projects. The fund's revenues mainly come from taxes on the energy consumption of large industrial consumers.

For energy production projects, the fund grants an amount set by the Ministry of Energy to compensate for the additional costs of producing electricity from renewable sources or cogeneration.

For energy efficiency projects, the Ministry of Energy sets annual targets for the number of projects to be financed and distributes the grants based on annual calls for expressions of interest to collect project proposals. The list of selected projects is decided by the Ministry of Energy after consultation with the Ministry of Finance.

Thus, in terms of energy efficiency in buildings, the two following calls for expression of interest are launched annually:

> Installation of **double glazing systems** in 1000 buildings per year (subsidy granted at 80% of the installation cost)

> Construction of **1000 buildings complying with the thermal regulations for new buildings** (subsidy of 80% of the cost of energy efficiency measures required to comply with the regulations).

KEY DATA

Implementation

Algeria, since 2015

Stakeholders involved

- **Ministry of Energy**: Management of the fund, issuing annual calls for applications
- **APRUE**: Coordination of energy projects financed by the fund, advice to the Ministry of Energy on priorities and projects to be financed
- **Ministry of Finance**: Advice on which projects to select

Budget

14 M EUR/year (2013)

Revolving Fund

OBJECTIVE

Improving energy efficiency in public buildings in Palestine by financing projects to rationalise energy consumption and produce renewable energy.

DESCRIPTION

Launched in 2012, this Revolving Fund is dedicated to financing public sector investments in energy efficiency projects. Seed capital was provided by the French Development Agency (AFD) under the SPEED project (Sustainable Energy Efficiency Development in Palestine), for a total of US$1.75 million. In order to ensure the sustainability of the fund, the Ministry of Finance replenishes the fund with amounts equivalent to those invested. It is repaid by the beneficiary public institutions, through payments spread over four years. A dedicated PENRA unit is in charge of managing this mechanism.

The fund is designed to finance energy actions such as the installation of building management systems, solar water heaters or energy performant lighting system, the optimisation of the power factor, the improvement of the performance of heating systems and the thermal insulation of water pipes. The fund prioritises projects with the highest potential rate of return and shortest payback period in pre-audited sites.

KEY DATA

Implementation

Palestine, 2012 - Today

Stakeholders involved

- **PENRA**: Palestinian Energy and Natural Resources Authority
- **Ministry of Finance**

Carrying the mechanism

- PENRA Energy Efficiency Unit

Partners and funders

French Development Agency

Budget

AFD financing: USD 1.75 million over 2 phases

This fund financed more than twenty demonstration projects for a total of over 2 million dollars, including universities, hospitals and administrative buildings in several Palestinian cities (Ramallah, Nablus, Yatta, Jericho, Al-hurosh).

Picture 1 : Installation of solar water heaters at Rafidia Hospital in Nablouse, Palestine

Conditions for the deployment of energy efficiency financing schemes for municipalities

Several key conditions should be met in order to ensure the effectiveness of energy efficiency funds for municipalities:

- **Governance**: A multi-stakeholder governance framework should be established to manage the funding mechanism. A steering structure with sufficient technical expertise must be created to process and monitor funding applications.
- **Universality**: subsidies must be accessible to all municipalities, regardless of resources. They must be attractive and cover *at least* the extra cost of energy efficiency compared to a conventional investment. Subsidies should cover all types of energy efficiency interventions in buildings, from studies to construction or renovation works.
- **Dissemination**: the fund should communicate effectively about the funding opportunities available and how to access them.
- **Accessibility**: administrative procedures for obtaining grants must be clear and accessible. For example, in Tunisia, the FTE gives subsidies directly to the service provider chosen in order to facilitate the process for the project owner.
- **Monitoring**: A monitoring mechanism should be established to check the relevance of the actions carried out with the grants paid and to monitor the proper use of the funding. An evaluation system should also be conducted to measure ex-post the energy savings achieved.
- **Sustainability**: A mechanism for replenishing the fund must be defined to guarantee the sustainability of funding. The fund must have sufficient and constantly available financial resources to meet all requests for financing within acceptable timeframes. For example, in Tunisia and Algeria, energy efficiency funds are financed by a tax on energy consumption.
- **Evaluation and readjustment**: The fund must adapt to changes in the national energy context. The structure in charge of steering the fund should regularly review the nature of the projects and the amounts to be allocated so that the incentives continuously serve the objectives set.

C. Labels and Certifications for Efficient Buildings

The development of a certification scheme for sustainable and energy efficient buildings aims to promote exemplary buildings in terms of energy and environmental performance that go beyond national regulations. These labels can also be used as design and project management tools that describe the principles, methodological approach and performance targets to be adopted in order to construct and certify an exemplary building. This section presents the labels and certification related to construction and renovation developed in the partner countries of the meetMED project.

What are the Advantages of an Exemplary Certification and Recognition Scheme?

> **One or more certifications are created and/or recognised** by the state and national agencies. These may be certifications developed by international organisations (e.g. LEED, EDGE or HQE) or national/ local scale certifications carried managed by national agencies or private organisations.

> **A reference system is associated with these approaches** which describes the targets and performance criteria to be achieved in different key areas to qualify for certification. It may include the following themes: energy and environmental performance, building comfort, health quality, choice of materials, construction project management, etc. The level of performance required to achieve these certifications must exceed the legal minimum required by the national building regulations.

Several key elements are required to promote the adoption of these certifications by project developers:

- Local companies and experts throughout the country must be trained in these certifications and approved by the body in charge of the label to support project owners in the certification process.
- Expert auditors, if possible local ones, should be accredited to assess the projects carried out in a rigorous and independent manner before certification is granted.
- Financial mechanisms must be set to encourage project leaders to adhere to this approach and make these investments more attractive.
- Effective institutional communication must be ensured in order to strengthen the visibility and reputation of this certification.

Overview, issues and challenges in partner countries

Most of the meetMED partner countries have developed **their own certification systems** for sustainable and energy efficient buildings. Several approaches have been followed in designing these certifications:

- In Morocco, Algeria and Tunisia, the national energy agencies have developed and are managing these certifications.
- In Jordan and Egypt, non-profit associations, respectively the Egypt Green Building Council and the Jordan Green Building Council, have developed and manage these certifications. These organisations are members of the international network of Green Building Councils

present in more than 100 countries, which brings together construction professionals committed to the environmental and energy quality of buildings.

- In Lebanon, ALMEE is developing a simplified self-certification system with a regional scope that could be adopted by various Mediterranean countries with the support of the European international cooperation programme meetMED.

These certifications have different levels of maturity:

- In Morocco and Algeria, the two systems - Eco-Binayate and Eco-Bat respectively - are not yet operational (or even still being structured for Eco-Bat). A reference framework and evaluation criteria have been developed by the national agencies, but an entity with a specific mission and competences for deployment has yet to be defined.
- In Tunisia, Jordan, Lebanon, and Egypt, voluntary certification systems - Eco-BAT, Green Building Certification, GrassMED and Tarsheed respectively - have existed for several years and are fully functional. Nevertheless, they face a lack of dissemination and visibility. A very small number of buildings in each country are actually certified.

Several elements contribute to limit the adoption of this type of certification. First, as the minimum energy performance regulations for new buildings are generally not respected, including by municipalities, the commitment to go beyond the regulations seems to be a difficult objective to achieve. Then, there are no - or not enough - financial or non-financial incentives associated with these certifications to convince project developers to adopt these approaches. These certifications have a low level of visibility. Local companies and experts remain poorly trained on these approaches, only a small number of them are certified to implement these labels. Due to the lack of demand, they are not very interested and do not request training for the implementation of these certifications.

Selection of devices and tools

Two certification schemes will be presented below:

- The GrassMED certification system developed by ALMEE in Lebanon
- The Tarsheed label developed by the Egypt Green Building Council

Green label GrassMed

OBJECTIVE

To support the efforts of Mediterranean actors concerned with the reduction of environmental impacted generated by the building industry through the promotion of exchanges and the use of shared tools for training and certification.

DESCRIPTION

GrassMed is a building certification system for Lebanon and the Mediterranean region adapted to the uses of the southern shore countries. Developed in Lebanon as part of meetMED II and activity A316, the tool is being adjusted to other Mediterranean countries. It serves both as a regional platform for training stakeholders concerned with energy efficiency and as a performance standard for new and existing buildings in the residential and commercial sectors.

The standard has 4 levels of certification ranging from 50% to 80.1% and scores are awarded to measure compliance with the requirements in the following 4 categories:

- **The site** must be in an urbanised area, serviced and with a low imperviousness index. The building must be located close to basic services and have parking spaces that stimulate car-sharing and public transport;
- **The building envelope** should make the best possible use of daylight, reduce the use of energy in summer and winter and have a well-insulated roof. For its construction, local and ecological materials are strongly encouraged;
- The building must be equipped with a **solar** water heater and photovoltaic panels, favour natural ventilation and use efficient equipment for lighting, heating and cooling;
- Construction should facilitate the recovery and reuse of rainwater and drinking water should be used efficiently. The **indoor environment** must take into account the health of the users.

KEY DATA

Implementation

Mediterranean countries

Stakeholders involved

ALMEE: management and deployment of the certification system

Implementation support

ADEME

University of Lebanon

Partners/funders

European Union (EU)

Green certification Tarsheed

OBJECTIVE

Promote the adoption of sustainability standards for new and existing buildings in Egypt through a voluntary certification system adapted to the needs and constraints of the local market.

KEY DATA

Implementation

Egypt, since 2015

Stakeholders involved

Egypt Green Building Council: Management of the certification

DESCRIPTION

Tarsheed ("*rationalisation*" in Arabic) is a voluntary certification system for sustainable buildings developed by the Egypt Green Building Council (EGBC), a member of the international World Green Building Council network. The ambition of this system is to align with the principles and performance criteria of international labels (EDGE, LEED, BREEAM, etc.) while adapting to the Egyptian needs and context.

Initially created in 2015, the label has been updated in 2018 to include the concept of *Net-Zero Waste* in its assessment criteria, making Egypt one of the pioneer countries internationally for taking waste into account in its sustainable building certifications.

Tarsheed offers a certification system for different categories of new and existing buildings: residential, commercial, schools, hospitals and communities. Buildings are evaluated based on 3 categories of assessment criteria: energy, water and habitat (i.e. material consumption and environmental impact). Depending on the score achieved in each category, buildings can be awarded a certification divided into 4 levels, from Bronze to Platinum. Technical and methodological guidelines are provided by Tarsheed to assist project developers.

The certification process is organised in three stages:

> First, the client submits its project to the EGBC. After payment of the registration fee, a contract is established to define the scope and budget associated with the expected interventions.

> Then, a pre-assessment of the project based on the building design documentation provided by the client is realized using Tarsheed tools. After a meeting between the project owner and the Tarsheed auditors, the level of certification targeted by the building is formally defined.

> Finally, Tarsheed assessors monitor the project during the construction work. A site visit is organized at the end of the work in order to carry out a final assessment, following which the certification will be awarded.

Picture 2 : SIAC headquarters building in Egypt awarded Tarsheed Gold

Conditions for the deployment of a certification dedicated to the energy efficiency of buildings

There are several key elements that need to be taken into account in order to effectively develop and implement an energy efficiency certification for buildings:

- **Adaptation of the assessment criteria** to the local context. The standard used may be based on existing international certification systems but it must take into account local needs and constraints. In particular, this adaptation must ensure that the performance targets are realistic and achievable within the existing regulatory framework and with local skills and materials.
- **Awareness programme** for end-users and project developers about the interest and feasibility of sustainable and energy-efficient buildings.
- **Incentive system** to encourage project developers to commit to sustainable buildings and to afford the costs of certification. Financial incentives (e.g. bonuses, reduction in the cost of building permits, etc.) or non-financial incentives (e.g. permission to build on additional land) can be used.
- **Availability of approved experts and auditors**. Local experts and architects must be trained in the label in order to support project developers throughout the certification process. Similarly, local auditors present throughout the country must be approved by the certification body in order to assess construction or renovation projects, monitor achievements and issue certifications.
- **Monitoring and verification mechanism** by the certification body. A mechanism to monitor the whole process from the conception to the final realization must be established. This monitoring process must ensure that the certified projects actually meet the targeted performance criteria.
- **Effective communication.** The objective of this communication is to build the reputation of the certification system in order to enhance its attractiveness and to raise public interest.

II. Networks of cities committed to energy management

The establishment of national or international networks of cities addresses several complementary objectives: to stimulate the sharing of experiences and common learning between cities, to promote inter-municipal cooperation on energy projects, to enable each municipality to position itself in relation to its counterparts, to enhance the commitment of member cities and to achieve greater representation to national authorities. This section presents several decentralised cooperation initiatives and networks of cities committed to energy management.

What characterises a network of cities committed to energy management?

- Municipalities committed to energy management are **brought together in a national network**. The network may have a formal legal existence and the municipalities actively participate in the exchanges and activities carried out. In order to foster local cooperation and exchange, this network can be divided into regional sub-networks bringing together neighbouring municipalities wishing to share and collaborate on concrete common projects.
- The network **covers all key issues** related to municipal energy management. Regular meetings - attended by elected officials and municipal technical managers - are organised to enable cities to exchange information on their projects, challenges, solutions and best practices. An online platform accessible to all member cities is set up to facilitate exchanges.

Box 3 : MedCities network of cities

MedCités is a network of Mediterranean cities aiming to promote sustainable urban development. Its objective is to support local governments in addressing the various contemporary challenges of urban governance, including energy issues.
To this end, the network facilitates the exchange of experience, knowledge sharing and capacity building in the following priority areas: development strategies, environment, urban services, and economic and social development. The network also provides specialised technical assistance to member cities for the development, design and implementation of projects.
It currently has 63 members from all sides of the Mediterranean basin.

Overview, issues and challenges in partner countries

The partner countries present a **great diversity of situations in terms of inter-communal exchange and cooperation**. Some countries, such as Tunisia, Lebanon and Morocco, have a long tradition of exchange and cooperation between cities. In these three countries, the cities are grouped together within a national association, with different competences depending on the country, which is responsible for representing the interests of the cities to the national structures and stimulating exchanges between cities. In Lebanon, the cities cooperate within unions of municipalities that encourage the development of inter-communal projects.

Box 4 : Moroccan Association for Eco-cities (AMEV)

The Municipality of Chefchaouen initiated a dynamic of exchange through the creation of the Moroccan Association of Eco-cities (AMEV) in 2010, which brings together more than a dozen cities determined to commit to sustainable development and energy transition. The network relies mainly on the elected representatives of member cities and encourages the exchange of good practices.
Recently, the association has received support from the European Union and UNOPS to help member cities raise awareness among their citizens.

Several international cooperation projects have relied on city networks to create thematic learning networks between cities, such as the CoMun programme implemented by GIZ from 2008 to 2018 in Morocco and Tunisia. Some cooperation projects focus on establishing

partnerships between cities in the North and South in order to promote the transfer of tools, approaches and know-how.

Box 5 : Efficient Building Community

Efficient Buildings is a project of the European Interreg Mediterranean programme to promote energy efficiency in public buildings in the Mediterranean region. The project capitalizes on the tools developed as part of the Interreg MED modular projects and tested in Northern cities.

The project aims to adapt the tools developed for Northern cities to the local context of the targeted Southern Mediterranean countries. The project supports the establishment of strategic and technical partnerships between cities on both sides of the Mediterranean to facilitate the transfer of know-how and to promote the replication and adoption of the tools by cities in the South.

Selection of devices and tools

A networking experience of cities committed to energy management will be presented below:

- The Network of Allied Cities for Climate and Energy Transition (Rev'ACTE) in Tunisia

Network of Allied Cities for Climate and Energy Transition (Rev'ACTE)

OBJECTIVE

To stimulate organised and spontaneous exchanges between Tunisian cities committed to energy management in order to create a community of municipal leaders and to initiate a dynamic of energy transition carried by the cities.

DESCRIPTION

This network of cities was launched in 2019 by ANME with the aim of promoting the transfer of experience, the exchange of good practices and the dissemination of pilot initiatives between cities.

For its pilot phase (2019 - 2021), seven cities have joined the network, selected on the basis of their commitment to energy transition, experience and willingness to cooperate and share. The network is structured around four themes prioritised by the cities: public lighting, eco-construction, diversification of energy sources and fleet management.

The network have realized the following activities to stimulate exchanges and mutual learning:

- **Technical meetings**, site visits and study missions
- **Management training** for the design, financing, management, monitoring and communication of municipal energy projects
- **Technical training** on the topics prioritised by the municipalities
- Sharing of technical documents and tools on a **website** dedicated to municipal energy management
- **Technical support for the** transposition and replication of tools and approaches
- Production of **educational video clips**
- Financing of 3 **pilot projects**

KEY DATA

Implementation

Tunisia, since 2019

Member cities: Bizerte, Mahdia, Nabeul, Sousse, Sfax, Tozeur, Tunis

Stakeholders involved

ANME: Steering the network

Partners and funders

ADEME

Swiss Cooperation (REPIC)

Implementation support

IDE-E, MedCités

Budget

300,000 (during the pilot phase) 2019-2021)

Picture 3 : Rev'ACTE network meeting, Sfax

CONDITIONS FOR SUCCESS

The establishment of a technical and financial support system is crucial to enable member cities to realise concrete projects following the capacity building activities.

Member cities should be selected on the basis of previous commitment, experience and willingness to cooperate with counterparts in order to stimulate the exchanges within the network. A structure must be set up to animate the network, ensure the planning and realisation of relevant activities and mobilise the members.

Finally, a formal political commitment and involvement of elected officials in the network is a key condition for formalising membership and strengthening the commitment of members.

III. Promoting energy efficiency in municipal buildings

A. Management and renovation of municipal buildings

Municipalities have a large stock of public buildings for which they are responsible. Depending on the country, municipal assets may include administrative, cultural, religious, sports, educational or commercial facilities, etc. The first step for a municipality wishing to commit to energy efficiency and thermal comfort in buildings is to be exemplary in the management of its own buildings.

What does an exemplary municipality do in terms of energy management of its buildings?

- An exemplary municipality makes a **formal political commitment to** energy efficiency and thermal comfort of its municipal buildings. Based on this commitment, quantified objectives and target values in terms of energy and thermal performance for each category of buildings are defined.
- In order to achieve these objectives, **energy audits** are carried out on every municipal buildings to **assess the potential for energy savings and the measures to be implemented** in terms of renovation, management and use of renewable energy. The municipality develops and implement the action plans resulting from the audits and integrate them into its annual investment programmes.
- At the same time, the municipality deploys **awareness-raising activities and training programmes** for the users of its buildings to encourage them to adopt good practices and eco-behaviours.
- The municipality establishes a rigorous **energy accounting system** to monitor and evaluate the implementation and impact of its diverse interventions. Through this monitoring system, the municipality measures the savings achieved and communicates its successes to citizens and local stakeholders. The gains made on the energy bill are reinvested in future energy actions.

Overview, issues and challenges in partner countries

There are no regulations in the meetMED partner countries regarding energy performance in existing municipal buildings. There is **no obligation** for municipalities **to carry out energy audits** and rationalise the energy consumption of their municipal buildings. As a result, they are not aware of the potential gains to achieve and have little incentive to invest in energy efficiency of their building stock. The monitoring of the energy consumption of buildings is almost non-existent and is based primarily on an administrative and accounting monitoring of invoices rather than on an analysis of the evolution of the energy consumption.

Several pilot initiatives have been realized with cities in all meetMED partner countries to assess and optimise the energy consumption of municipal facilities. These projects consist of carrying out energy audits of energy-intensive municipal buildings - in particular city halls - developing an action plan and implementing priority measures. These measures focus on the renovation of the building, the awareness and training of users, and self-production of renewable energy. However, these are mainly strictly one-off initiatives generally financed as part of international cooperation projects.

In addition to the audits, several countries have experimented with tools to support municipal decision-makers in the identification and implementation of energy efficiency projects (e.g. the Municipal Energy Management Dashboard in Morocco, Tunisia and Algeria; PrioritEE in Algeria and Palestine, and RETScreen in Jordan). All these initiatives have been developed and financed as part of international cooperation projects and are therefore not yet widely used in the municipalities. In order to extend this type of tool to as many municipalities as possible, Tunisia has developed a simplified energy accounting tool that will be deployed to all municipalities in the country from 2023.

Box 6 : RETScreen Expert Software training in Jordan by the Royal Scientific Society (RSS)

The RETScreen Expert Software is a low-carbon project management software developed by the Canadian government. Its objective is to support decision-makers in the identification, planning, implementation and monitoring of cost-effective energy efficiency, renewable energy and cogeneration projects.
RSS is the only accredited organisation in Jordan to deliver training certificates for the RETScreen software. Several training sessions have been organised for different municipalities in the country to support them in the use of this tool.

Selection of devices and tools

Two tools tested by cities will be presented below:

- The Municipal Energy Management **Scorecard** (MEMS) tested in Morocco and Tunisia
- The **PrioritEE** device deployed in Mostaganem (Algeria)

Municipal Energy Management Dashboard (MEMD)

OBJECTIVE

Establish a rigorous monitoring of energy consumption of the municipal assets, particularly public buildings.

DESCRIPTION

The MEMD is an online tool that enables municipalities to systematically monitor energy consumption and maintenance costs of its assets, in particular municipal buildings. Thanks to this tools, the users can reconstruct their history of consumption and expenditure, follow its evolution, carry out analyses to detect anomalies or irregular consumption, identify priority actions, plan investments and assess the impact achieved by the interventions realised.

The MEMD is a decision support tool for decision makers and municipal officials responsible for the management of municipal assets. It supports the municipal energy planning by facilitating the definition of energy performance targets and the evaluation of whether the targets have been achieved.

In order to effectively use its MEMD, the municipality needs to establish an iterative user protocol to define responsibilities for *collecting* data, *analysing* consumption and expenditure, *identifying measures* to be taken, and assessing their energy and financial *impact.*

The implementation of this protocol aims to initiate a cycle of continuous improvement in energy performance.

CONDITIONS FOR SUCCESS

It is necessary to realize energy audits of the municipal assets in order to collect the information needed to feed the initial database of the MEMD.

Support must be provided to the municipality to facilitate its appropriation of the tool. This support must cover :

> Support for the **collection and updating of data** needed
> Support for the establishment of an **organisation chart and a protocol for the use of** the TBGE. This protocol should be integrated into municipal procedures.
> Training in **data analysis** and support for developing an **energy action plan** based on the analyses carried out.

KEY DATA

Implementation

Morocco :Agadir (*prototype*), Chefchaouen, Midelt, Er-rich, Tata, Fam-el-Hisn

Tunisia: Sousse

Algeria: *deployment planned in 30 communes in 2022*

Stakeholders involved

- **AMEE/ ANME/ MICLAT**[5] : Promotion of TBGE
- **Municipalities**: TBGE operations

Implementation support

IDE-E

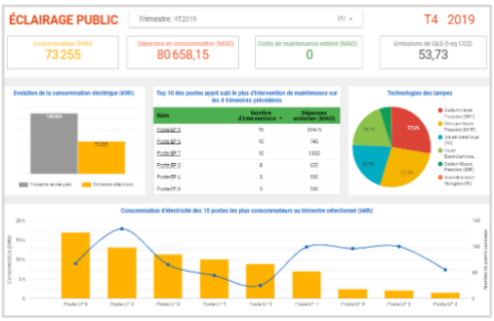
Partners/funders

ADEME, GIZ, Swiss State Secretariat for Economic Affairs (SECO)

Budget

EUR 30 000 to 40 000 for development

10,000 per municipality to support the adoption of the tool



Picture 4 : illustration of the Energy Monitoring Board

[2] MICLAT: Ministry of the Interior, Local Authorities and Territorial Development

PrioritEE

OBJECTIVE

Support local decision makers in identifying and prioritising measures to improve energy efficiency in municipal public buildings.

DESCRIPTION

PrioritEE is a toolkit for local authorities to support local decision-makers in managing and monitoring the energy consumption of their buildings, identifying energy efficiency measures, assessing the cost-effectiveness of different solutions and prioritising investments. PrioritEE includes the following elements:

> A database of **technical solutions** that presents and compares different energy efficiency measures classified by end-use: lighting, heating, cooling and ventilation, water heating and cooking. The database also includes measures to reduce passive energy consumption and produce energy from renewable sources.

> An **online decision support tool** allowing decision makers to estimate the energy and financial savings generated by the implementation of energy efficiency measures, and thus to evaluate and prioritise their investments.

> Methodological guides for implementing energy efficiency measures, financing investments, raising public awareness or managing buildings.

> A **reference tool for good practice** in awareness raising and behaviour change.

The PrioritEE tool has been developed by the European Interreg MED Efficient Buildings programme and implemented by several European cities. The tool is currently being tested in Mostaganem as part of this European programme and thanks to a partnership with the Italian city of Potenza. An energy audit has been carried out on three municipal buildings and the municipality is using the PrioritEE toolkit to develop and prioritise efficiency measures and investments.

KEY DATA

Implementation

Algeria: Mostagenem (2021)

Experimentation planned in the framework of Meet-MED II in Algeria and Palestine with the support of ADENE.

Stakeholders involved

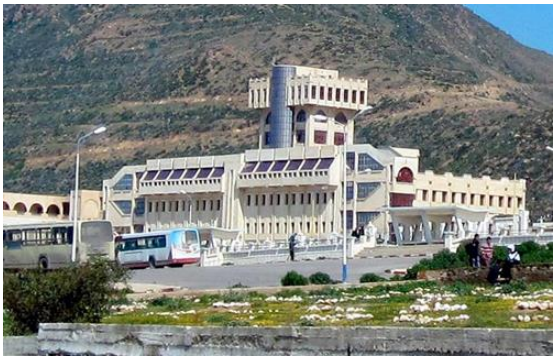
- **Municipality of Mostaganem**: Steering and implementation of the project
- **APRUE**: Technical partner

Implementation support

EnergyCities, Municipality of Potenza (Italy)

Partners/funders

Interreg MED Efficient Buildings Programme



Picture 5 : University of Mostaganem, Algeria

CONDITIONS FOR SUCCESS

Support should be provided to the municipality to implement the energy efficiency measures identified through the use of the PrioritEE tool. This support should include capacity building for municipal decision makers to use the PrioritEE tools, technical support for the implementation of the prioritised solutions and a financial scheme to enable the municipality to make the necessary investments.

B. Construction of new municipal public buildings

As a building owner, a municipality can target a high level of energy performance for all its new construction projects. Thus, the strict application of the regulations for all construction projects and the realisation of model building sites and new constructions is a privileged way to reduce its energy bill and demonstrate its commitment for energy management.

What does an exemplary municipality do in the construction of new buildings?

> An exemplary municipality makes **formal political commitments to energy efficiency** and thermal comfort in its buildings.

> This commitment begins with the **systematic application of the national thermal regulations** for every new construction of a municipal building. Thus, the municipality includes the required energy performance in the technical specifications for all its future constructions, checks the compliance of the bids with the existing thermal regulations before issuing the building permit and ensures an active monitoring of the construction work.

> Some of its **new buildings achieve a high level of energy and environmental performance**. To this end, it sets ambitious target values in the technical specifications of its calls for tender for future buildings. These buildings are labelled by recognised national or international certification systems (e.g. LEED, HQE, etc.) in order to guarantee their energy performance to promote the municipality's commitment to its citizens and the stakeholders of its territory.

Overview, issues and challenges in partner countries

In all of the meetMED partner countries, **national thermal regulations are still rarely enforced**, including by municipalities for their own construction projects. Some countries (Morocco, Tunisia) require municipalities to comply with national regulations or even to reach a higher minimum energy performance level for all their construction work. However, these national directives are rarely applied.

Several reasons can explain the lack of enforcement of the national regulation:

- The low financial resources of municipalities, combined with the lack of financing mechanisms for energy efficiency, do not allow municipalities to afford the additional costs of green building.
- There is little awareness and no incentive for municipal officials to implement energy measures in buildings. Indeed, the priority for municipalities is to provide users with the facilities they need at the lowest cost and in the shortest possible time.
- Municipalities are also not sufficiently trained to be able to define the technical requirements for optimal energy performance, to assess the energy and thermal performance of an architectural design and to ensure effective monitoring of the execution of the work.
- This is compounded by the lack of training of construction actors. In most countries, architects are not systematically trained to master national thermal regulations and energy efficiency techniques. The supply of local design offices, engineers and architects, able to

support municipalities in their exemplary construction projects, is weak or sometimes non-existent.

Nevertheless, a few pilot projects for the construction of energy-efficient municipal public buildings have been carried out in several countries. These are mainly exemplary buildings that have been built with international funding as part of cooperation projects.

These model buildings demonstrate the feasibility and interest of eco-construction to the beneficiary muncipalities. However, these initiatives benefit from very strong technical and financial support from international cooperation, which limits the possibilities of replication.

Selection of devices and tools

The following scheme will be presented below:

- The audit procedure on plan in Tunisia

Energy audit on plan

OBJECTIVE

Assess the thermal and energy performance of a construction project in order to design high performance buildings.

DESCRIPTION

The energy audit on plan is a procedure supervised by ANME aiming at carrying out an energy study from the design of a building in order to reach the highest level of energy performance. This study is conducted by a pair of energy auditors composed of an architect and an engineer from among the 33 experts approved by ANME.

Several softwares have been approved by ANME to realize this energy study. The most effective, TUN-eQuest, is an energy simulation tool for buildings, adapted to the Tunisian context (materials, climatic zones, etc.). With this tool, the user can enter all the characteristics of the construction project and evaluate its energy needs according to the building envelope (facade, glazing, roofing, etc.) and all the equipment (air conditioning, heating, ventilation, lighting, etc.).

Simulations can also be carried out to compare the impact of different energy efficiency measures. In this way, the auditors are able to identify the energy efficiency actions needed to achieve the highest levels of energy performance with reference to national regulations.

Between 2010 and 2020, 256 energy audits on plan have been carried out. By signing a programme contract between ANME and the establishment, the latter is eligible for financial support from the Energy Transition Fund (FTE) through subsidies of up to 70% of the cost of the audit and 30%, with a ceiling of EUR 61,000, of the additional cost generated by the energy saving actions.

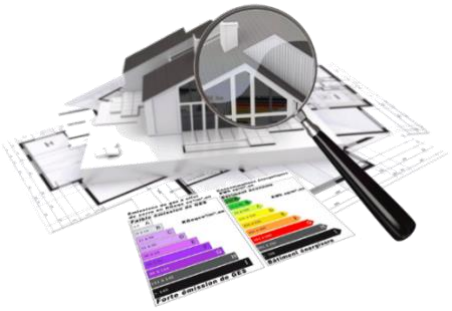
KEY DATA

Implementation

Tunisia, since 2004

Stakeholders involved

- **ANME**: Creation of the CLIP tool, training for its use, supervision of the audit procedure on plan
- **Ministry of Energy**: implementing decrees for the on-plan energy audit procedure



CONDITIONS FOR SUCCESS

The audit on plan procedure is supervised by ANME, which controls the quality of the reports and deliverables developed by the two auditors at each phase of the project. Thus, the availability of sufficient competent human resources at national agency to monitor all construction projects is a prerequisite.

This initiative has been deployed nationwide thanks to the prior training of a large number of design offices and the approval of some 15 architects and 48 engineers, as well as good coverage of the territory.

Raising end-users' awareness of the benefits of having efficient buildings is also a prerequisite for the extensive use of plan audits.

The design audit procedure should also be linked with a rating and certification system that sets a target energy performance for the building

IV. Committing the municipality to eco-construction

A. Regulating construction and enforcing thermal regulations

The implementation of building regulations is a key competence assigned to municipalities. Through the issuing of building permits and the monitoring of construction projects, the municipality has to ensure that the national building regulations, and in particular the regulations on the energy performance and thermal comfort of buildings, are respected.

What are the key elements to ensure the implementation of the national thermal regulations?

- A **thermal regulation is developed at national level**. It define the minimum energy performance thresholds that are mandatory for every new buildings. It can also provide a set of technical prescriptions to achieve the required level of energy performance.
- This regulation comes with **an application procedure** defined by the national authorities to enable its effective implementation at local level. This procedure determines the bodies responsible for implementation and monitoring, the administrative and technical documents to be provided by project promoters and the penalties for non-compliance.
- The various stakeholders, in particular architects and design offices, are **trained in the enforcement of these regulations**. The municipalities, which are responsible for the study and issuing of building permits, are also trained to assess and verify the compliance of construction projects with the regulations.
- **A control** is realised during the construction works and/or at the delivery of the housing permit in order to ensure the conformity between the construction project and the end building. The stakeholders have the necessary tools, including sanctions, to enforce the regulations.

Overview, issues and challenges in partner countries

All the partner countries (except Libya) have thermal regulations that set a minimum level of thermal performance to be achieved for the building envelope. In Egypt, Morocco, Tunisia and Jordan, these regulations are mandatory, while other countries (e.g. Lebanon and Algeria) have opted for voluntary compliance. However, in both cases, the adoption of thermal performance standards and regulations has not led to a massive increase in the construction of more energy efficient buildings due to the absence of a systematic enforcement mechanism and control of the regulations at the local level.

The main challenges faced by partner countries in ensuring effective enforcement are:

- The significant additional cost of constructing efficient buildings (or even just buildings that comply with the regulations) combined with the weakness or even absence of financial incentives.
- The definition of an entity responsible for the enforcement and control process;

- The publication of implementing decrees to define a procedure for enforcing the regulations and define measures to penalise non-compliance;
- The appropriation of the regulation by all stakeholders (architects, politicians, craftsmen, end-users, etc.);
- Lack of training and lack of skills of local actors for the application and control of thermal regulations.

Selection of devices and tools

The following systems and initiatives will be presented below:

- The mechanism of application of thermal regulation at the local level in Morocco
- The local building regulations decided by the Municipality of Greater Amman in Jordan

Mechanism for implementing thermal regulations at the local level

OBJECTIVE

Ensure that all new construction complies with the current thermal regulations.

DESCRIPTION

In order to ensure that any new construction complies with the thermal regulations, the Ministry of Housing, in collaboration with AMEE, has established a procedure with tools that are systematically imposed on construction professionals:

> An **energy study** on plan is mandatory to ensure that the construction project meets the minimum energy performance set out in the thermal regulations.

> A **free online tool (*Binayet*)** is offered by AMEE to carry out this study based on the building plans.

> This tool delivers a thermal regulation **compliance report** which is required for any building permit application (required for the submission of the application through the ***Rokhas* online platform** used for building permit files).

> During construction, the architect is responsible for ensuring that all energy efficiency measures undertaken to achieve the target performance level are recorded. The architect is responsible for the compliance of the works with the submitted project. Non-systematic **compliance checks** may be carried out by the urban agency when the building permit is issued.

KEY DATA

Implementation

Morocco, since 2021

Stakeholders involved

- Ministry of Housing: publication of implementation decrees
- AMEE: training for architects and urban agencies
- Urban agencies: evaluation of energy studies
- Municipalities: issuing building permits

CONDITIONS FOR SUCCESS

The compulsory and systematic application of the thermal regulations is dependent on the publication of all the **decrees implementing** the procedure.

AMEE organised an intensive **training cycle** to train all 4,000 architects in the country to comply with the thermal regulations.

Thermal regulation has also been integrated into the curriculum of universities to ensure the **training of new generations of architects**. Training has also been offered to municipalities and urban agencies (responsible for the study of construction projects) to equip them for the evaluation of energy studies and to train them in the implementation of the thermal regulations.

Local building regulations

OBJECTIVE

Foster the application of thermal regulations and the adoption of energy efficiency measures for construction projects.

KEY DATA

Implementation

Amman, Jordan, since 2015

Stakeholders involved

- Greater Amman Municipality: definition of local regulations, monitoring of implementation
- Jordan National Building Council (JNBC): Development of building regulations

DESCRIPTION

The Jordanian National Construction Council has developed a national code for energy efficient buildings, which is not mandatory. In order to encourage project developers to adopt this regulation, the Greater Amman Municipality has set up an incentive system. Any project developer who commits to the code will receive

> a **one-stop shop** for all registration and monitoring procedures of the construction project;

> **payment facilities** for local taxes;

> facilities for the installation of metal structures for **photovoltaic systems** on flat roofs and car park roofs;

> a derogation to build on **an additional surface** (from 10% to 25% of additional surface, depending on the energy performance level targeted by the building).

Other Jordanian municipalities have also developed their own incentive systems, including measures to allow for a larger building area, an additional floor, or a reduction in the cost of the building permit.

In addition to this system of incentives, the Municipality of Greater Amman has also decided on a local regulation that requires all new construction in the area to be equipped with solar water heaters. The delivery of the housing permit by the Municipality is dependent on the respect of this rule.

CONDITIONS FOR SUCCESS

This incentive system is currently not widely used: only one construction project has reportedly benefited from this regulation. Several conditions should be met in order to encourage the adoption of this incentive:

> **Economic interest**: The application of the regulation represents an additional cost that will be borne by the project developer. An evaluation of the system must be carried out to ensure that the incentive represents a real economic added value compared to the additional costs generated.

> **Communication**: Effective communication must be provided by the municipality to ensure that project developers are aware of the scheme and understand its benefits.

B. Raising awareness and engaging local stakeholders communal

In addition to its role in regulating construction, the municipality is one of the main stakeholders in municipal planning. This gives it considerable scope to promote the inclusion of energy efficiency in urban development. The municipality can also act as a catalyst for energy efficiency in buildings by mobilising citizens, associations, companies and local actors.

How can an exemplary municipality engage the stakeholders in its territory?

- An exemplary municipality develops a local energy strategy in consultation with all stakeholders (economic actors, universities, NGOs, etc.) which defines quantified performance objectives, including in the building sector.
- An exemplary municipality ensures that **the energy issue is taken into account in the urban planning regulations** on its territory, which reflect the objectives of its energy-climate strategy. It promotes eco-districts and works with property developers on exemplary construction or renovation projects.
- It also establishes **cooperation with the other actors in its territory** (businesses, industries, universities, etc.) in order to encourage their contribution for the definition of the local energy strategy and their involvement and grouping within clusters. The municipality develops communication strategies targeted at the different stakeholders in order to raise their awareness of energy issues and encourage them to adhere to local climate and energy objectives.
- It provides **advice, training, technical and financial support** to stakeholders to facilitate their commitment to green building and thermal renovation. In particular, it can inform the private actors about the thermal regulations and certification systems.
- Through the implementation of all these measures, the municipality creates an **environment favourable to the emergence of eco-construction or thermal renovation projects** realized by different local actors, whether industries, private companies or households.

Overview of the situation in the partner countries

It is clear that the municipalities in the partner countries of the meet-MED programme are **very poorly involved** for the mobilization of their territory to energy efficiency.

No experience of sustainable urban development realised by a municipality was identified in the countries studied. Indeed, the existing urban planning codes do not include directives for energy efficiency. The lack of obligation - or even incentive – for the municipalities, combined with the lack of experience of municipal officials and local planning offices for integrating energy requirements into planning regulations, hinder the emergence of this type of initiative.

Moreover, **raising awareness and engaging local stakeholders** for energy management is not part of the compulsory tasks to be carried out by the municipalities. Consequently, municipalities have limited human and financial resources to establish this type of collaboration. In general, the only awareness-raising actions carried out by municipalities consist in promoting the actions realised on the municipal assets. A few initiatives carried out as part of international cooperation projects have supported municipalities in setting up local

advisory bodies for local stakeholders by involving local associations (in particular, the establishment of Energy Information Centres (CIE) in Morocco and Tunisia).

Nevertheless, despite the lack of support from the municipalities, **several one-off private initiatives regularly emerged**. These initiatives can be led by private promoters, companies or even associations. They may either respond to national initiatives and benefit from technical or financial support from the national authorities or simply be a desire of the project owner to express its commitment to energy management. These projects usually follow national or international certifications to structure their approach and communicate on the energy performance of the buildings constructed or renovated.

Box 7 : The Mohammed VI Green City in Benguerir (Morocco)

Located 50 km from Marrakech, the Mohammed VI Green City in Benguerir is a sustainable university city launched by the King of Morocco in November 2012 and developed by the Office Chérifienne des Phosphates (OCP) group.

Spread over 1,000 hectares, this LEED ND certified urban project[3] since 2015 is intended to be a platform for the integration of multiple infrastructures designed around research and green technology: The city includes an incubator for start-ups, academic and training infrastructures (polytechnic university, "Lycée d'Excellence", coding school, vocational training centre), research centres (R&D platforms in solar technology, energy efficiency and smart buildings, researchers' villas built according to a bioclimatic architecture) and will host a cluster of high-tech green companies. The city also offers rental residences built according to LEED ND certification criteria, and will soon host the new regional headquarters of OCP.

Selection of devices and tools

The following initiatives will be presented below:

- The Centre Info-Énergie (CIE) deployed in Morocco (and being deployed in Tunisia)
- The experience of certification of an exemplary building in Palestine
- The experience of renovating a historic district in Egypt

[3] LEED for Neighborhood Development (LEED-ND), or Leadership in Energy and Environmental Design, is a rating system that integrates the principles of smart growth, urban planning and green building into a national system for neighborhood design.

Energy Information Centre (EIC)

OBJECTIVE

To support the local energy and ecological transition by involving the actors of the communal territory through awareness-raising, training, advice and support.

DESCRIPTION

An Energy Information Centre (EIC) is a local advisory structure set up to raise awareness, train, advise and support local stakeholders in the development of renewable energy and energy efficiency, particularly in the building and construction sector.

The establishment of an EIC aims to mobilise local actors through various activities:

> The establishment of a **training site** during the construction work of the EIC's building to train local professionals and actors in eco-construction;

> The installation of the EIC in an **exemplary building** (built or renovated);

> Raising public awareness on zero cost **insulation and energy efficiency techniques** to reduce energy bills;

> Training and provision of tools for **local construction professionals**.

> Contribution to **territorial energy planning.**

Several models of EIC governance have been tried in Morocco: direct management by the municipality (Chefchaouen, Oujda) or by associations or cooperatives of local associations (Tata).

CONDITIONS FOR SUCCESS

The animation of an EIC relies on local associations in close collaboration with the municipal teams. The establishment of a multi-actor governance is crucial to facilitate the maximum involvement of local associations in the management of the CIE. Thanks to the involvement of several association, the EIC benefit from multiple expertise, while taking advantage of their knowledge of the ground, their flexibility in terms of management and their capacity to mobilise local actors.

Due to the lack of resources, raising citizens' awareness is not a priority mission of the municipality, and the financial resources that a municipality can allocate for the animation of an EIC are limited. A financing mechanism for the deployment and running of EICs must be defined at national level in order to ensure the sustainability of these bodies.

KEY DATA

Implementation

Morocco: Chefchaouen, Midelt, Oujda, Tata

In project in Agadir, Tangier, 8 cities of the Tangier-Tetouan-Al-Hoceïma region (Morocco); in Nabeul, Médenine and Sousse (Tunisia)

Stakeholders involved

- **Local associations**: animation of the CIE, provision of staff, technical expertise
- **Municipality**: coordination with CIE activities
- **AMEE / ANME**: Promotion of the CIE scheme, definition of a national deployment strategy

Implementation support

GERES: setting up the CIE, training managers, technical support

Partners/funders

Several financial partners are involved depending on the project, notably : **AFD, GIZ, Nexans, ADEME**

Budget

75,000 per municipality (*not including the costs of constructing/fitting out the CIE in an exemplary building)*

Animation: EUR 50 000 per year

Certification of an iconic building

OBJECTIVE

To make the only Palestinian museum a model of eco-building.

DESCRIPTION

The ambition of the project is to perfectly integrate the building in its physical setting in the middle of typical gardens by prioritizing the use of techniques that preserve the environment. This building is the only **LEED-Gold** certified museum in Middle East. It takes into consideration the life cycle of the building: its location, architecture, construction and use.

> The **choice of site** massively reduces the environmental impact and more than half of the site is green space;

> In a water-stressed region, this building uses 50% less water; **all rainwater** on the building and gardens is **collected and reused** for the needs of the space. Wastewater is treated and used for irrigation;

> **Accessibility** to public transport and environmentally friendly vehicles has been guaranteed;

> **The architecture and orientation** of the building maximise natural light and several techniques have been used for effective thermal regulation.

> The **use of renewable energies was taken into** account from the design phase, making the building an example in terms of the use of photovoltaic panels;

> **The use of local resources** for the construction has been privileged and exceeds 40% of the products and materials used. In addition, more than 32% of the construction materials are recycled and more than 95% of the waste generated by the site could be recycled or reused;

> Particular attention was paid to the **quality of life in the building,** including the use of innovative ventilation measures.

KEY DATA

Implementation

Palestine, 2013 - 2016

Stakeholders involved

- **Palestinian NGO TAAWON:** funding and project implementation
- **Palestinian Green Building Council**: technical support for implementation

Budget

30 Million USD

CONDITIONS FOR SUCCESS

The construction of an exemplary building depends on the consideration of energy and environmental performance criteria from the design phase, rigour during construction and a management policy that combines technology with behaviour.

Picture 6 : Palestinian Museum, LEED-Gold certified, Birzeit, Palestine

Exemplary renovation of historic buildings

OBJECTIVE

To launch a dynamic for the renovation of historic buildings in Old Cairo in compliance with energy requirements by using the "La Viennoise" hotel as a model.

DESCRIPTION

Residential use in Egypt accounts for more than 40% of electricity consumption and is expected to grow rapidly in the coming years. It has a significant potential for emissions reduction.

Old Cairo, composed of 3,300 old buildings including 650 in the Khedival district, is at risk of serious degradation. The renovation of these buildings should respect both architectural specificities and the rational use of energy.

The Egyptian authorities, in collaboration with several partners, are trying to inventory and classify old buildings based on their energy saving potential. At the same time, they promote energy-efficient restoration initiatives. The rehabilitation of the former hotel "La Viennoise" is intended as a model for future operations.

KEY DATA

Implementation

Egypt, in 2018

Stakeholders involved

- **Al-Ismaelia for Real Estate Investment :** Real-estate developer
- **OHK Consultants :** Support for access to Tarsheed certification

Budget

EUR 3 MILLION

> The former "La Viennoise" hotel, built in 1896, has suffered significant damage due to lack of maintenance. Renovated, it is now **used for both office and leisure purposes**. The company Al-Ismaelia, which specialises in the renovation and promotion of old buildings, has 23 residences and acquired "La Viennoise" in 2013.

> At the same time, the OHK consultancy is supporting the project developer in adhering to a **voluntary label adapted to the Egyptian context** for the energy renovation of historic buildings, inspired in particular by the Austrian Klima-activ certification and LEED.

> Work is being undertaken in 2016 in collaboration with renovation specialists, energy performance experts and OHK.

> In 2018, the building was re-commissioned and successfully obtained the **Egyptian 'Tarsheed' energy certification**.

CONDITIONS FOR SUCCESS

The renovation of old buildings while improving their energy performance cannot be done without :

> The interest of **private operators** for this type of investment, which is not immediately profitable;

> The availability of **cutting-edge expertise** both in the preservation of old buildings and in energy efficiency.

Picture 7: La Viennoise Hotel, Tarsheed Gold, Cairo, Egypt

Conclusion

The survey reveals that consideration of thermal and energy performance issues remains largely insufficient in all the countries studied. Even today, the vast majority of new buildings - including public buildings - do not comply with the minimum energy performance standards set out in national regulations. Eco-construction and energy renovation of buildings are very marginal and limited to a few isolated pilot experiments.

However, several tools and devices aimed at promoting energy efficiency in buildings at the local level have been developed in the partner countries, by national authorities or at the level of municipalities. These experiences, presented in the paragraphs above, deserve to be promoted, disseminated and scaled up.

The mobilisation of national energy agencies is essential to promote the adoption of these devices for the following reasons:

- **To adapt these tools to the local context of each country.** The tools and experiences presented have been developed within specific context and therefore need to be adapted to each country in order to be replicated. However, the financial, technical and human resources available to municipalities are too limited to realise this adaptation. Thanks to their in-depth knowledge of their country's context, national agencies have all the necessary knowledge to identify the adaptation needs of each tool. They can mobilise state resources, and even get support from international cooperation, to cover the investment cost of adjusting the chosen tools.
- **To provide the technical support necessary for the replication of a tool.** In the absence of support, it is unlikely that a municipality will be able to identify the right tool for its needs on its own and train itself to use it. Support for municipalities from national agencies is therefore necessary to provide to help the municipalities to adopt one of the proposed tools. This support can include technical and regulatory training, the provision of specialised expertise, support in defining a financing scheme or support in implementing and monitoring the project.
- **To disseminate the tools and feedback**. As national bodies, the energy agencies are in a privileged position to capitalise on the experiences from the deployment of the selected tools, to identify future optimisation needs and to disseminate the lessons learnt to more municipalities and provide them with the support they need to get involved.

This report examined the key conditions for success associated with each of the tools presented. These conditions should be respected in order to promote the effectiveness of the tools when they are adopted by the municipalities. In particular, the following elements are prerequisites for any adaptation and replication of the tool by the municipalities and must be respected:

- **Ensure that the national agencies have strategic ownership of the system**. Based on their in-depth knowledge of the national context and the needs of their municipalities, the national agencies can develop a portfolio of tools for the municipalities. Agency experts are trained to master these tools and to support municipalities in their adoption and use. A national strategy for disseminating these tools is developed and translated into an operational action plan, implemented and monitored by the agencies.

- **Communicate effectively on the proposed tools.** A communication strategy is developed and implemented by the agencies in order to make cities aware of the tools available and to encourage them to adopt them.
- **Provide technical support to municipalities for the adoption of the tools**. A support system must be set up to provide technical expertise, training, implementation support and monitoring to municipalities willing to adopt a tool.
- **Provide for the necessary funding mechanisms for the adoption of the tools**. These mechanisms should cover all or part of the cost of setting up and running the tool by a municipality. The level of subsidy should be sufficient to make the investment attractive. Funding can be provided by agencies through national funding mechanisms or through international cooperation.
- **Ensure political support within the municipalities.** A formal commitment by elected municipal officials to adopt and implement the chosen tools is crucial. This political will facilitate the involvement of municipal teams and contributes to the long-term operation of the tool.

This publication is a deliverable of the meetMED (Mitigation Enabling Energy Transition in the Mediterranean region) project, funded by the European Commission and implemented by the MEDENER network of Euro-Mediterranean energy agencies and RCREEE, the Regional Centre for Renewable Energy and Energy Efficiency. Following the success of its first phase (2018-2020), meetMED has entered a second phase in 2021 with the objective of improving the energy security of the beneficiary countries (Algeria, Egypt, Jordan, Lebanon, Libya, Morocco, Palestine and Tunisia) while promoting their transition towards a low-carbon economy. The activities implemented aim to strengthen the deployment of energy efficiency measures and improve the energy mix of the target countries by focusing on the building and household appliances sector through a multi-scale, multi-stakeholder and inclusive approach at both local and regional levels, supported by regional cooperation.

In line with their climate commitments, the countries around the Mediterranean, attach great importance to reducing their energy consumption, particularly in energy-intensive sectors such as building and construction. In this sense, the contribution of local and regional authorities is essential: they manage and promote construction projects at the local level and are able to mobilise territorial actors. In order to support local authorities in improving the energy efficiency of their assets and promoting sustainable and energy efficient construction in their territory, the partner countries have developed various tools, mechanisms and dedicated approaches.

This report provides a non-exhaustive overview of the measures and initiatives taken by the agencies, particularly in the South and East Mediterranean countries, to support local authorities in the area of energy efficiency and thermal comfort in buildings. It highlights the conditions of success of these tools and mechanisms in order to share their experience and disseminate the good practices.

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