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

TWINNING CITIES AGREEMENTS

FACTSHEET ON MAIN ENERGY EFFICIENCY AND RENEWABLE ENERGY STRATEGIES, TARGETS AND SUCCESS CASES

A.3.2.2. REACHING TWINNING AGREEMENTS AND IMPLEMENT STUDY TOURS FOR CITIES' OFFICERS

MED ENER

RCREEE
Regional Center for Renewable Energy and Energy Efficiency
المركز الإقليمي للطاقة المتجددة وكفاءة الطاقة

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LIST OF ABBREVIATIONS

ACTE	Alliance des Communes pour la Transition Energétique (Tunisia)
BOT	Build-Operate-Transfer
CBC	Cross-Border Cooperation
CES-MED	Cleaner Energy Saving Mediterranean Cities
CO_2	Carbon Dioxide
CoM	Covenant of Mayors
CCUS	Carbon Capture, Utilization, and Storage
DHW	Domestic Hot Water
EE	Energy Efficiency
ENA	Energy and Environment Agency of Arrábida
ENP	European Neighbourhood Policy
ENPI	European Neighbourhood and Partnership Instrument
ENPI-CBCMED	Mediterranean Sea Basin Programme
EPBD	European Energy Performance of Buildings Directive
ESCO	Energy Service Company
EPC	Energy Performance Certificate
EPC	Energy Performance Contract
EV	Electric Vehicle
EU	European Union
EUCF	European City Facility
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit

LIST OF ABBREVIATIONS

LoRaWAN	Long Range Wide Area Network
MENA	Middle East and North Africa
NECP	National Energy and Climate Plan
NEEAP	National Energy Efficiency Action Plan
NREAP	National Renewable Energy Action Plan
NGO	Non-governmental Organization
nZEB	Nearly Zero-Energy Building
PEB	Positive Energy Building
PEC	Palestinian Energy and Environment Center
PENRA	Palestinian Energy and Natural Resources Authority
PV	Photovoltaic
RE	Renewable Energy
RRP	Recovery and Resilience Plan
RRF	EU Recovery and Resilience Facility
RSS NERC	Royal Scientific Society / National Energy Research Center
SEACAP	Sustainable Energy Access and Climate Action Plan
SEAP	Sustainable Energy Action Plan
SECAP	Sustainable Energy and Climate Action Plan

ABOUT THE PROJECT

The meetMED II project aims at contributing to enhancing energy security of beneficiary countries while fostering their transition to a low carbon economy, thereby contributing to more stable, efficient, competitive and climate-resilient socioeconomic contexts. Having concluded its second phase (2021-2025) it aims at strengthening the implementation of energy efficiency (EE) measures and improving countries' energy mix while focusing on the building and appliances' sectors through a multiscale, multi-partner and inclusive approach at local and regional levels, thereby fostering regional cooperation.

Due to a rapid demographic growth and urbanization of the meetMED target countries, the building sector is one the largest energy-consuming sectors, responsible from 20% up to 35% of the total energy consumption. To reduce this consumption, countries have been implementing measures to improve regulatory and institutional frameworks. However, energy consumption levels in the buildings sector depends not only on the implementation of measures at national level, but also on actions carried out at local level. The role of local authorities in the energy transition is extremely important, from their contribution to increase energy efficiency and sustainable energy production to their important connection to the citizen. Improving energy efficiency in the buildings sector is key to achieve the target of reducing energy consumption and consequently reducing GHG emissions in this sector. On a local level, local authorities have a key role in this domain, not only by setting an example with the implementation of EE improvement measures in municipal buildings but also in promoting and supporting the energy upgrade of private buildings. Furthermore, municipalities can often lead by example and pave the way by developing and/or supporting pilot projects and testing innovative solutions therefore promoting their public acceptance, replication and raising awareness for the importance of EE measures, both technical and behavioural.

This meetMED activity has therefore set out to establish north-south twinning cities agreements with the overarching goal of promoting know-how and experience exchange on the buildings sector, among the 14 participating municipalities which were partnered into 5 twinnings. Within this broad topic, these partnerships have addressed more specific and locally relevant topics such as deployment of renewable energy (RE) systems with a focus on solar energy, district/urban rehabilitation, building renovation, water-energy nexus innovative projects, public engagement and awareness raising, among others. This factsheet intends to shine a light on how these municipalities are taking on the mission of making their buildings more efficient, in line with national and local strategies and policies and related targets, by showcasing success cases, projects and initiatives, as well as good practices, which were the main focus of the exchanges and particularly of the study tours that took place over the course of the project. It is also important to highlight how this activity underscored the importance of multi-level cooperation, as the meetMED partner national energy agencies provided key technical support to the municipalities not only over the course of this project, but also in the development and implementation of many of the projects featured on this document.

As this project brought together a very diverse group of cities, with very distinct characteristics, resource access, challenges and circumstances amongst them, the cases featured on this factsheet also reflect that diversity. Considering this, it should be noted that two cities, in particular, participated in this activity under extremely difficult circumstances, the Palestinian municipalities of Jenin and Tulkarm which, along with their partner city of Gozo in Malta, haven chosen instead to use this factsheet to highlight their overall EE and RE related policies and targets and what measures are being implemented to achieve those targets in the wider context of their local development, climate and energy transition plans.

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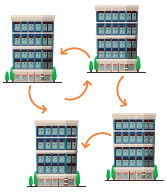

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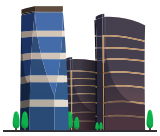

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SAN LUCIDO & MOUKHTARA & GREVENA TWINNING

NATIONAL STRATEGIES & POLICIES | ITALY

The July 2024 update of **Italy's National Energy and Climate Plan (NECP)** highlights the need to accelerate the rate of energy retrofitting in the building sector, which is essential to achieve national targets for reducing both primary and final energy consumption.
The **National Strategy for the Energy Retrofit of the Building Stock**, published in 2021 in line with the 2018 revision of the European Energy Performance of Buildings Directive (EPBD), established milestones for 2030, 2040, and 2050. It also identified the supporting measures required to meet these targets and provided an indicative assessment of the financial resources needed for its implementation.
Over the years, a range of incentive schemes has been introduced to promote building renovation and energy efficiency. These include tax deductions (Ecobonus, Superecobonus, Bonus Casa), the **Conto Termico**, which supports small-scale energy efficiency measures and renewable heat generation for private individuals and public administrations, as well as the **National Energy Efficiency Fund**, established to finance interventions by enterprises (including energy service companies, ESCOs) and public administrations on buildings, facilities and production processes.

LOCAL STRATEGIES AND POLICIES | SAN LUCIDO

San Lucido's efforts to promote energy efficiency began in 2015 when the municipality's **Sustainable Energy Action Plan (SEAP)** was drawn up, which included **4 areas of action:**

- Efficient services for the community
- Energy efficient San Lucido
- Renewable sources
- Awareness and prevention

In line with the energy efficiency and renewable energy related measures foreseen in the SEAP, as well as with the aforementioned 2021 National Strategy for the Energy Retrofit of the Building Stock which required energy diagnoses for all buildings set to undergo renovations, the Municipality of San Lucido conducted an energy diagnosis of all its municipal buildings. The next step was the identification of a series of measures whose implementation aimed to transform the buildings into nearly zero-energy buildings (nZEB), namely the installation of thermal insulation, the replacement of windows and doors, but above all the installation of photovoltaic (PV) systems. To date, all the identified actions have been implemented, whereas **80% of the actions foreseen in the SEAP have been implemented** and should all be completed until 2030. The SEAP is currently being reviewed and updated into a Sustainable Energy and Climate Action Plan (SECAP), within the framework of the European City Facility (EUCF) funding obtained by the municipality.

NATIONAL STRATEGIES & POLICIES | LEBANON

In 2011, the Council of Ministers of **Lebanon** approved the **National Energy Efficiency Action Plan (NEEAP) 2011-2015 for Lebanon,** which included 14 initiatives summarizing all national objectives, programmes and policies in the energy efficiency and renewable energy sectors. For the period 2016-2020, the NEEAP II was adopted with energy efficiency measures being the foremost priority, dedicated to primary energy consumption savings and end-use measures, targeting mainly the building, industry, agriculture and public sectors. A third NEEAP was envisaged for 2021-2025, but to this day has not been finalised due to the deep economic, financial and political crisis the country has been plunged into since 2019.

It's also worth mentioning that in 2010, the Ministry of Energy and Water published its updated **Policy Paper for the Electricity Sector**, which put forward 10 initiatives including the need to manage the demand for electricity, in order to reduce consumption. It also laid down the foundations for the creation of what would become, the **National Energy Efficiency and Renewable Energy Action**, a financing mechanism that enabled the private sector to obtain subsidized loans for energy efficiency and renewable energy projects, through commercial banks in Lebanon. By June 2020, more than 1000 projects had been approved, worth over 600 million USD. Since then, its activity has been interrupted due to the collapse of the country's banking sector caused by the aforementioned crisis.

LOCAL STRATEGIES & POLICIES | MOUKHTARA

The municipality of **Moukhtara** adhered to the Covenant of Mayors Mediterranean in 2014-2015 and is committed to reduce its greenhouse gas (GHG) emissions by at least 25% until 2030. Moukhtara's **Sustainable Energy Access & Climate Action Plan (SEACAP)**, approved in 2023, was developed in line with Lebanon's National Renewable Energy Action Plan (NREAP) and National Energy Efficiency Action Plan (NEEAP). As part of its SEACAP, the municipality has developed the **Renewable Energy for Moukhtara Village Scenario (REMVS)** whose objectives are:

- Providing access to affordable, reliable, sustainable and modern energy for all Moukhtara citizens;
- Lowering GHG emissions;
- Providing access to safe roads by installing solar streetlights;
- Enhancing the municipality's services by providing clean power to all municipal buildings;
- Improving the energy efficiency of municipal buildings by installing efficient electrical appliances.

As part of the REMVS, the following actions have been developed and achieved:

- Installation of PV systems in 90% of the households with a target to reach 100% very soon;
- Installation of solar thermal systems in 60% of the households;
- Installation of PV systems in the municipality's Social House and water filtration plant.

Yet to be achieved targets include the installation of PV systems in the sewage treatment plant and other municipal buildings, as well as the installation of 185 solar streetlamps, among other measures.

NATIONAL STRATEGIES & POLICIES | GREECE

Greece's National Energy and Climate Plan (NECP) defines energy efficiency targets and a wide range of measures to be implemented across all sectors. In the building sector, the government is strengthening building codes and has launched investment schemes. The first version of the European Directive on the Energy Performance of Buildings (EPBD) was transposed and enacted into law in 2008, which resulted in the creation of the **Regulation on Energy Performance in the Building Sector (KENAK)** in 2010, making energy performance certificates (EPC) a legal requirement for property sales and rentals.
Through its National Recovery and Resilience Plan, devised under the EU Recovery and Resilience Facility, financial schemes were set up with the goal of providing financial support to improve energy efficiency, namely by promoting building energy retrofits, including the deployment of PV self-consumption systems and renewable energy systems for DHW production. With this purpose, two programmes in particular stand out. On one had, the ongoing **"ELECTRA"** programme (2020-2026) seeks to improve the energy efficiency of public buildings through interventions related to heating, cooling, ventilation, and lighting, aiming for energy efficiency level B after interventions. On the other hand, when it comes to improving the energy efficiency of residential buildings, the **"Savings at Home"** programme (2018-2022) provided interest-free loans and grants for the installation of renewable energy systems and for energy efficiency measures.

LOCAL STRATEGIES & POLICIES | GREVENA

The municipality of **Grevena**, with the aim of aligning with the EU's targets to reduce CO_2 emissions, focuses on **3 main axes:**

- Improving citizens' quality of life.
- Strengthening social cohesion and entrepreneurship.
- Reaching zero carbon emissions using innovative RE systems.

To this end, its **Sustainable Energy Action Plan (SEAP)** clearly sets out to increase energy efficiency and to promote the use of renewable energy, focusing on the use of shallow geothermal energy, with the goal of reaching energy consumption savings of 70%. Also, it is the first municipality in Greece with an approved Sustainable Urban Mobility Plan (SUMP).

Grevena claims the title of the first **"Green City of Geothermal Energy"** in Greece since, in just five years, the municipality has managed to have all six municipal buildings in the city centre equipped with heating and cooling systems powered by shallow geothermal energy, using geothermal heat pumps.
Currently the installed geothermal capacity is 0,5 MW and when all the projects are completed, it will reach 2 MW.

Although a small municipality, Grevena boasts geothermal projects that greatly surpass its size. According to existing data, when the geothermal systems of all municipal buildings are fully operational, based on the population, it will correspond to **200 W of geothermal energy per resident,** a quantitative element that ranks the municipality among the first in Europe.

SOLAR ENERGY (SELF-CONSUMPTION)

SUCCESSFUL CASE STUDIES – SAN LUCIDO

THE SUN AT SCHOOL

Results

As the energy generated by the PV system fully meets the schools' needs, the municipality has managed to **completely eliminate energy costs** in the points of delivery where they have installed the systems through the Exchange on Site (national law that regulates the compensation for the energy sold to the grid produced by self-consumption systems).

Total installed power (kWp) (A)	60
Investment (€) (B)	90.000
Annual energy generated (kWh) (C)	85.000
Cost of Wp (€/kWp) (B/A)	1.500
Cost of generated kWh energy (€/kWh) (B/C)	1,06

Description

Three PV systems of 20 kWp each have been installed on the roofs of the elementary and middle schools, as well as on the Little Theatre which supplies electricity to the gym and kitchen of the elementary school, as well as the nursery.

Main Objectives and Features

Reduce energy consumption and costs while also educating children on the use and advantages of renewable energy. Every year a conference is organized to present to the school community all of the previous year's achieved benefits, both in terms of energy and financial savings.

Challenges and Difficulties Encountered

Initially, when the old boilers were replaced by electric heat pumps powered by the PV panels, there was skepticism as parents thought that heat pumps could not guarantee the same performance and therefore the same comfort for the students.

Project Benefits

The **annual financial savings of around 30.000 EUR/year** have allowed the municipality to make several investments to improve the school, namely, a municipal canteen was created, as well as a library for the students and the gym has been improved to be more energy efficient.

Potential for learning and/or replication

With these interventions having been done in schools, the younger generations are first row witnesses to the positive impact and importance of renewable energy, which has a ripple effect throughout the community. From a technical perspective on the other hand, the interventions done to these buildings are easily replicable in other buildings, both by neighboring municipalities and by private citizens.

SOLAR ENERGY (SELF-CONSUMPTION)

SUCCESSFUL CASE STUDIES – SAN LUCIDO

POSITIVE ENERGY DISTRICT

Description

The municipality has created a small Positive Energy District in which two PV systems and a solar thermal system were installed to serve the municipal nursery, the council houses, as well as the sports hall and field.

Main Objectives and Features

The project had a dual financial and social purpose, to completely eliminate energy costs and revive a formerly degraded and underused area of the municipality that includes several facilities important for the community.

Results

The two main objectives were successfully accomplished as not only the **facilities have become energetically autonomous** but the whole area has gained a new life serving the community, especially the younger generations who not only benefit from using the sports facilities but also have been made aware of the benefits brought about by the actions implemented.

Total installed power (kWp) (A)	70
Investment (€) (B)	100.000
Annual energy generated (kWh) (C)	135.000
Cost of Wp (€/kWp) (B/A)	1.428,57
Cost of generated kWh energy (€/kWh) (B/C)	0,74

Challenges and Difficulties Encountered

Since there are users with different needs participating in different activities taking place in the several buildings that comprise this district, there were initially difficulties in making some members of the community understand the importance of the project. Furthermore, securing the necessary funding was a major challenge. In the end ministerial funds were secured to fully fund the solar thermal system and 65% of the investment in the PV systems, the remaining 35% came from an energy performance contract (EPC) with an energy service company (ESCO).

Project Benefits

The benefits from this project are not only environmental and financial but also social as the actions implemented allowed to **bring a new life to the district's facilities** which had fallen into disrepair.

Potential for learning and/or replication

The success of the project has led the municipality to use the surplus in energy production to provide electricity to the public lighting system (thanks to the use of storage batteries) as well as to an electrical vehicle (EV) charging station which is owned by the municipality. The sale of excess electricity generated and the payments for the use of the EV charging station provide the municipality a small income.

SOLAR ENERGY (SELF-CONSUMPTION)

SUCCESSFUL CASE STUDIES – MOUKHTARA

MOUKHTARA'S SOCIAL HOUSE (MUNICIPAL BUILDING)

Results

The results have met the expectations set by the technical team. One year after completion, the system was working perfectly and as a result the municipality was able to **lower its energy bill by 85%**, as well as **reduce CO_2 emissions.**

Total installed power (kWp) (A)	15
Investment (€) (B)	14.000
Annual energy generated (kWh) (C)	5400
Cost of generated kWh energy (€/kWh) (B/C)	0,38

Description

The Municipality developed the *Report on Solar Green Energy Power Production for Greener Municipality Buildings* which laid out a plan for the implementation of solar energy systems in Moukhtara's municipal buildings.

Main Objectives and Features

This project aimed to both reduce the municipality's high electricity bills as well as its CO_2 emissions by making use of green energy and assuring the energy autonomy of the municipality. It also meant to serve as a small-scale pilot project in public buildings.

Challenges and Difficulties Encountered

In recent years solar energy solutions have drawn more attention and became a very sought after solution due to the inefficiency and unreliability of the national electricity supply system.
For this project in particular, the main challenge was securing the financing, which in the end was provided by the non-governmental organisation (NGO) Ananda Marga Universal Relief Team (AMURT).

Project Benefits

The main benefit is the guaranteed **24-hour power supply to the building,** eliminating the instability caused by constant power outages as the public utility Electricity of Lebanon (EDL) only provides 4 hours of power supply a day.

Potential for learning and/or replication

The positive impact of this experience, which served as a pilot project as aforementioned, lead to the installation of a similar system in the municipality's water filtration room, as can be seen on the next page.

SOLAR ENERGY (SELF-CONSUMPTION)

SUCCESSFUL CASE STUDIES – MOUKHTARA

MOUKHTARA'S WATER FILTRATION ROOM

Description

Installation of a PV system to power the equipment of the municipality's water filtration room which assures a constant supply of drinking water to the population of Moukhtara.

Main Objectives and Features

To guarantee **a 24-hour electricity supply** needed to power the pumps that enable water filtration. To really assure uninterrupted electricity supply, the system includes backup batteries.

Results

The municipality now has a **reliable and fully functioning system** providing drinking water to the whole community. It has also enabled the municipality to collect additional revenue on the water subscription bills.

Total installed power (kWp) (A)	25
Investment (€) (B)	23.000
Annual energy generated (kWh) (C)	9125
Cost of generated kWh energy (€/kWh) (B/C)	0,39

Challenges and Difficulties Encountered

No major challenges or difficulties were encountered, as several people from the community were very eager to support the project and donate the necessary funds to implement it.

Project Benefits

There is a clear environmental benefit with the **reduction of the municipality's CO_2 emissions** as, before the completion of this project, a diesel generator had to be used as a backup to assure a continuous power supply to the plant, given the limited 4-hour a day supply from the grid.

Potential for learning and/or replication

The system installed can be easily replicable in other villages facing the same issue.

GEOTHERMAL ENERGY

SUCCESSFUL CASE STUDIES – GREVENA

MUNICIPAL INDOOR SPORTS CENTRE

Results

The geothermal system has led to an almost **70% reduction in energy consumption** during the winter season, compared to conventional systems. The building's energy footprint has been minimized through the installation of energy-efficient windows and insulation, significantly improving overall comfort for both athletes and the audience.

Total installed power (kWp) (A)	350
Investment (€) (B)	200.000
Annual energy generated (kWh) (C)	175.000
Cost of Wp (€/kWp) (B/A)	628,57
Cost of generated kWh energy (€/kWh) (B/C)	1,26

Description

The energy upgrade of this facility was carried out between 2020 and 2021, transforming it into a green building with sustainable energy solutions. It had a **total budget of 1.075.000 EUR** with funding from the Ministry of Interior's FiloDimos Program and the municipality's own funds.

Main Objectives and Features

The project included improvement measures such as advanced insulation, energy-efficient windows, and the installation of a shallow geothermal energy system for heating and cooling, making it the first public sports centre in Northern Greece to use geothermal energy for both purposes.

Challenges and Difficulties Encountered

One of the main challenges was to make sure the system was able to meet the building's heating needs, given the extreme winter weather conditions in the area, which translates into high energy consumption for heating and related costs. Additionally, integrating the geothermal system into the existing infrastructure required precise planning and execution.

Project Benefits

Main benefits include a **more comfortable environment for users**, besides the substantial energy savings and full compliance with energy-saving regulations. Furthermore, the use of renewable energy contributes to **reducing the facility's environmental footprint**.

Potential for learning and/or replication

This project can serve as a model for other public buildings, demonstrating how renewable energy systems like geothermal can be effectively implemented in regions with harsh weather conditions to achieve long-term sustainability.

GEOTHERMAL ENERGY

SUCCESSFUL CASE STUDIES – GREVENA

MUNICIPAL INDOOR SWIMMING POOL

Results

The combination of all the installed systems promises a significant reduction in operational costs, with **energy consumption savings expected to reach up to 70%.** The integration of geothermal energy and other renewable sources will transform the swimming pool into a low-energy, environmentally friendly facility that can operate sustainably.

Total installed power (kWp) (A)	580
Investment (€) (B)	300.000
Annual energy generated (kWh) (C)	1.160.000
Cost of Wp (€/kWp) (B/A)	517,24
Cost of generated kWh energy (€/kWh) (B/C)	0,26

Project Benefits

The project means **lower operational costs** as well as **a decrease of the pool's environmental impact**, reducing CO_2 emissions and boosting sustainability in the process.

Description

The energy upgrade of the municipal indoor swimming pool was carried out between late 2022 and 2024, significantly reducing its energy consumption and environmental footprint by integrating different renewable energy sources. The project had **a budget of 3.000.000 EUR** with funding from the NSRF* and the Regional Authority.

Main Objectives and Features

Different systems were installed and interventions done to ensure the building's improved efficiency and comfort:

- Geothermal heating-cooling system
- Solar collectors
- Natural gas boilers
- Dehumidification mechanism w/ energy recovery
- Building Management System
- New roof insulation
- External thermal insulation of the walls
- New energy efficient windows
- Underfloor heating
- Upgraded pipe connections and replacement of pumps – geothermal heat pump w/ heat recovery
- Replacement of lighting fixtures with new LED ones

Challenges and Difficulties Encountered

The main challenge lied in the complex energy needs of swimming pools, such as maintaining water temperatures and high humidity levels, which cause damages to equipment and the building. Integrating renewable energy sources while ensuring the system's reliability and cost-effectiveness in a harsh, humid environment requires innovative engineering solutions.

Potential for learning and/or replication

This project serves as a model for integrating different renewable energy sources and systems in energy intensive facilities, providing valuable insights that can be applied to other swimming pools or other buildings with similar characteristics.

* National Strategic Reference Framework 2021-2027

LISBOA & SAHAB & AL-KARAK TWINNING

NATIONAL STRATEGIES & POLICIES | PORTUGAL

Portugal's National Energy and Climate Plan (PNEC 2030) is the country's main energy and climate policy instrument. Acknowledging the inevitability of the energy transition due to the climate crisis, it aims to achieve energy and climate targets for 2030, aligning with the goal of carbon neutrality by 2050.
For the building sector, currently responsible for 33% of the country's energy consumption, PNEC 2030 establishes specific lines of action with a view to reducing its carbon intensity and promoting the energy renovation of the building stock, with a focus on the objective of implementing the concept of nearly zero-energy buildings (nZEB) in the construction of new buildings and in the upgrade of existing ones. The National Recovery and Resilience Plan (RRP), devised under the EU Recovery and Resiliency Facility and first approved in 2021, included a "Energy Efficiency in Buildings" dimension aiming to rehabilitate and improve buildings' energy efficiency. In the same year, and also within the framework of the RRP, the Portuguese government approved the **Long-Term Strategy for Building Renovation.** It aims to upgrade the national building stock until 2050, in order to improve its energy performance and progressive decarbonization, contributing also to mitigate energy poverty.

LOCAL STRATEGIES & POLICIES | LISBOA

As an **EU Mission City** "100 smart and climate neutral cities by 2030", **Lisboa** is undergoing an energy transition process supported on a number of **strategic pillars, namely:**

- Improved energy performance of buildings and city infrastructures, including public lighting;
- Mitigation of energy poverty: increase thermal performance of buildings, reduce energy needs, increase the comfort, well-being, literacy and environmental health of its inhabitants;
- Fairness and inclusiveness, ensuring universal access to clean and affordable energy (local renewable energy production);
- Resilience and adaptation to a changing climate.

The Lisboa City Climate Contract 2030 (CCC2030) assumes that climate neutrality implies an 80% reduction in GHG emissions compared to the reference year 2002, with the corresponding residual emissions being tackled by:

01
Emissions removal by implementing carbon capture, utilization and storage (CCUS) projects.

02
Carbon sinks (the city's green infrastructure).

03
Emissions compensation by making use of the official carbon markets.

NATIONAL STRATEGIES & POLICIES | JORDAN

Jordan has long recognized energy efficiency as a national priority, embedding it as a cornerstone of its energy strategy to reduce consumption, strengthen energy security, and mitigate climate change. Building on the National Energy Strategy, the country has implemented three successive National Energy Efficiency Action Plans (NEEAPs), each setting out targeted measures across key sectors, including buildings, industry, and transportation. These plans collectively aim to improve overall energy performance and achieve substantial cumulative savings compared to business-as-usual scenarios. The latest NEEAP, for the 2024-2026 period, aims to achieve a 4,33% reduction in final energy use compared to 2018 levels.

The Renewable Energy and Energy Efficiency Law (2012) established the legal foundation for advancing both renewable energy and efficiency measures. It introduced enabling mechanisms such as tax incentives and streamlined licensing procedures, particularly encouraging private-sector participation in residential and commercial projects.

In 2013, the Jordan National Building Council, operating under the Ministry of Public Works and Housing, issued the Jordan Green Building Guide to promote sustainable construction practices. The guide, later updated in 2019, emphasizes enhancing thermal performance, reducing energy demand, and integrating renewable energy systems into both new and existing buildings, thereby aligning the construction sector with Jordan's broader sustainability and efficiency objectives. Furthermore, Jordan has adopted a broad range of mandatory building codes covering different aspects of a building's energy consumption, from thermal insulation, to HVAC systems, lighting, and solar energy applications.

LOCAL STRATEGIES & POLICIES | SAHAB

Sahab municipality, as part of its commitment to the Global Covenant of Mayors and the Paris Agreement, has developed a Sustainable Energy Action Plan (SEAP). This plan aims to achieve a 20% reduction in CO_2 emissions by 2030, focusing on energy efficiency and renewable energy in the building sector.

This ambitious goal reflects the municipality's alignment with national and global climate strategies. It will be achieved through a combination of innovative measures targeting key sectors including buildings, transportation and waste management. Key actions include:

- Retrofitting public buildings to improve thermal insulation and energy performance;
- Promoting rooftop solar energy installations for residential and commercial buildings;
- Conducting awareness campaigns to enhance energy literacy among residents.

Through its Energy-Efficient Public Lighting Program, the municipality has replaced traditional street lighting with LED technology, achieving significant energy savings and reducing electricity costs for the municipality, with the additional advantage of also reducing CO_2 emissions.

Engagement with local communities is also a key aspect of the municipality's strategy. It actively involves residents and local businesses in its energy transition efforts by:

- Offering incentives for adopting energy-efficient appliances and practices;
- Hosting workshops on green building practices and energy management;
- Partnering with local non-profits to address energy poverty by improving the thermal comfort of low-income households.

LOCAL STRATEGIES & POLICIES | AL-KARAK

Karak municipality has developed its **Sustainable Energy and Climate Action Plan (SECAP)** whose ultimate targets are to **reduce CO_2 emissions** by 14% until 2020, and **by 40% until 2030.** These targets are to be achieved through the development and implementation of projects in the **4 following areas:**

The municipality's SECAP, designed with support from the Royal Scientific Society / National Energy Research Center (RSS NERC) is aligned with national and local development plans. Furthermore, the municipality has signed the Covenant of Mayors letter and is starting the registration process, in line with its intent to transform Karak into a sustainable city through developing and implementing short and long-term actions and strategies.

The local council of Karak has been working for the past few years in developing **planning tools to facilitate the prescription and implementation of comprehensive projects,** while inviting the **stakeholders to be partners** in the sustainable energy building process.

ENERGY EFFICIENCY & RENEWABLE ENERGY IN BUILDINGS

SUCCESSFUL CASE STUDIES – LISBOA

AFFORDABLE RENT PROGRAM MUNICIPAL BUILDINGS

Results

Out of the 476 housing units, 128 have been inhabited since July 2022, and 152 will soon be allocated. Since 2021, 2221 apartments have been delivered to Lisboa residents, of which 913 are low-income.

Pilot Building (Allotment #4) – Energy Efficiency class: A/B – NZEB	
Heating [kWh/m2.year]	12 – 30
Cooling [kWh/m2.year]	9
DHW [kWh/m2.year]	25 – 40
Renewable energy share [%]	>75
Solar PV [kWp]	36,1
Solar PV [MWh/year]	56

Description

The project is part of a municipal housing complex, which includes **476 built from scratch high performance, energy-efficient apartments** – nZEB compliant – for affordable rental, as well as the creation of green spaces, local businesses and support equipment for families, embracing the concept of the 15-minute city.

Main Objectives and Features

The overarching goal of the program is to create a significant supply of municipal housing for affordable rental. On the energy efficiency front, this project constitutes an example of high energy performance in buildings, with local **renewable energy production through PV's** that supply electricity for climatization, domestic hot water (DHW) and common areas (lifts and lighting). The buildings are all-electric and natural gas-free, in a country where natural gas is still widely-used for heating and cooking purposes. The creation of energy communities will be a next step in the short term.

Challenges and Difficulties Encountered

Solving the housing shortage in an energy-efficient and rent-affordable way demands a consistent, diversified and customized approach with targeted policies for different cases. Since 2021, Lisboa has adopted an innovative multi-dimensional approach, putting short-term solutions and long-term investments in place.

Project Benefits

- **Improvement of comfort and energy performance** of buildings and requalification of the surrounding public space.
- Re-establishment of **affordable living conditions** in Lisboa for locals, allowing younger generations to stay in the city centre.

Potential for learning and/or replication

The city has seen early success with its strategy to revamp affordable living for locals. Key principles adopted include creating supportive policy frameworks, leveraging public-private cooperation and enhancing innovation and technology. This is a process of continuous learning that the municipality intends to continue to apply and fine-tune.

WATER EFFICIENCY & REUSE

SUCCESSFUL CASE STUDIES – LISBOA

SUSTAINABLE IRRIGATION WITH ÁGUA+ AT PUBLIC PARK

Description

Parque Tejo, a large urban green space located in East Lisboa is the backdrop of a model sustainable irrigation project which uses wastewater received and treated at the neighbouring Beirolas Water Factory, called **Água+, as a replacement to potable water.** The Water Factory also addressed energy efficiency concerns with a **cogeneration system and 520 PV modules,** for a respective 580 kW and 283 kWP total power installed.

Results

The green areas of Parque Tejo reach an area of 295.000 m^2 and **300.000 m3/year of Água+** are used for its irrigation, which fully meet the park's irrigation needs. This sustainable irrigation project is an example of the municipality's focus on circularity as it allows for **the consumption reduction of raw materials by reusing treated wastewater.** Furthermore, due to both its cogeneration and PV systems, in 2023 the Factory recorded an **energy self-sufficiency of 39%.**

Main Objectives and Features

To reduce the use of drinking water consumption. The municipality uses 3,9 million m^3 of drinking water per year, from which around 75% are used for activities such as irrigation of green areas and washing of streets, containers, collectors, vehicles and garages, which do not require potable water.

Challenges and Difficulties Encountered

The main challenge in the implementation of this project was the rigorous process in terms of environmental safety and public health, which required an extensive study and analysis before the attribution by the Portuguese Environmental Agency of a production license to Águas do Tejo Atlântico, who owns the plant, and a usage license to the municipality.

Project Benefits

- **Greater efficiency** and control in water usage;
- Diversification of non-drinking water sources;
- Contribution to **Lisboa's resiliency to water scarcity.**

Potential for learning and/or replication

According to **Lisboa's Strategic Water Reuse Plan**, by 2025 the municipality estimates saving 3 million m^3 of drinking water, around 75% of current consumption, through different types of actions including similar projects.

ENERGY EFFICIENCY & RENEWABLE ENERGY IN BUILDINGS

SUCCESSFUL CASE STUDIES – SAHAB

GREEN NEIGHBORHOOD DEVELOPMENT

Description

The project, carried out between 2015 and 2017, consisted in the energy retrofitting of several municipal buildings, namely the 3 local mosques, 3 public schools and the municipality's main building. This action allowed the municipality to be considered as a pilot for local authorities in the European Neighbourhood Policy (ENP) southern partner countries by addressing energy related local sustainable development challenges.

Main Objectives and Features

The interventions sought to improve energy efficiency through the installation of thermal insulation, LED lighting, and PV panels. These measures aimed to reduce energy consumption and associated CO_2 emissions while enhancing thermal comfort for occupants.

Total installed power (kWp) (A)	78.4
Investment (€) (B)	800.000
Annual energy generated (kWh) (C)	122,300
Cost of wp (€/kWh) (B/A)	10,204.08
Cost of generated kWh energy (€/kWh) (B/C)	6.54

Results

Since the conclusion of the project in 2017, the **energy savings achieved until 2024** account for **77.887,6 kwh,** which means a **CO_2 emission reduction of 47.100,70 kg.**
This will largely contribute for the municipality to reach its CO_2 emissions reduction targets.

Challenges and Difficulties Encountered

One of the main challenges encountered was ensuring the proper installation and maintenance of the new energy systems, which required capacity building and training for local staff. Furthermore, extensive outreach and education campaigns were carried out to raise community awareness and understanding on the benefits of energy efficiency initiatives.

Project Benefits

Financial, environmental and social benefits were derived from this project, as it resulted in **lower energy bills and operational costs, reduced CO_2 emissions** and an **improvement of the buildings' functionality and user experience.**

Potential for learning and/or replication

At the municipality's level, the success of the implemented measures mean they can be scaled up to encompass residential, commercial and industrial buildings across Sahab. On a wider local level, this experience provides a replicable model for other local authorities in Jordan and the MENA region as it demonstrates the feasibility and clear benefits of these measures and the need to integrate renewable energies and energy efficiency into their strategies.

ENERGY EFFICIENCY & RENEWABLE ENERGY IN BUILDINGS AND PUBLIC SPACES

SUCCESSFUL CASE STUDIES – SAHAB

MAKING SAHAB CITY GREEN

Description

The project consisted in the implementation of a series of measures in several municipal infrastructures to make them more energy efficient. A big focus was the upgrading or new installation of **efficient LED lighting systems**, namely on Sahab's main street, all 7 municipal buildings, the main public garden and Sahab's bus stops. Furthermore, in the municipal buildings, further improvements were done with the installation of **light sensors and solar water heaters.**

Main Objectives and Features

The project enabled Sahab to position itself as a model municipality through the implementation of energy efficiency demonstration pilots, while also aiming to:

- Build the capacities of employees of the municipality in the field of sustainable energy;
- Raising awareness of the general public and relevant stakeholders.

Total # installed street LED lamps	50
Total # installed water heaters	5
Total # installed LED lamps in public buildings	1000
Investment (€)	100.000

Results

Besides the **energy and financial savings** brought on by the reduced energy consumption, it also yielded environmental and social benefits with a reduction of CO_2 emissions and a **better quality of life for the Sahab community** who can now enjoy better lit and safer public spaces.

Challenges and Difficulties Encountered

On a technical level it was necessary to adapt existing electrical and plumbing systems in the buildings and the public garden to accommodate the new equipment, as well as provide training and capacity building to the municipal staff to maintain and operate it. Also, awareness raising actions with clear communication of the benefits were carried out to gain public and internal stakeholder support for this shift to sustainable technologies.

Project Benefits

The financial savings resulting from lower operational costs and reduced energy consumption, enabled the **reallocation of funds for other municipal needs.** The project also contributed to **strengthened technical expertise and operational capacity** among municipal staff for managing and maintaining the new energy-efficient systems.

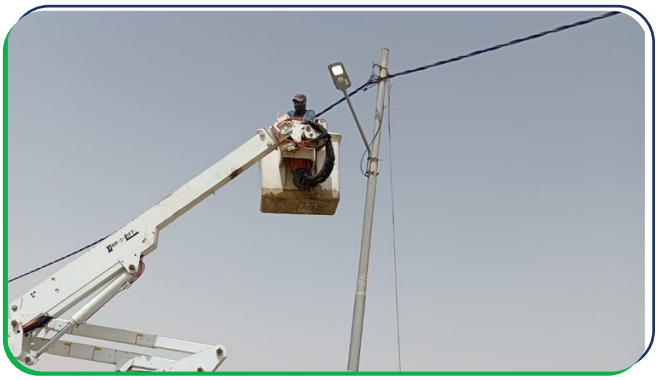
Potential for learning and/or replication

The positive social, financial and technical results of this project in Sahab set an example for other municipalities across Jordan and the MENA region, while demonstrating the feasibility and clear benefits of these types of measures. Also, it makes the case for other municipalities developing policies and strategies that prioritize sustainability by integrating renewable energy and energy efficiency principles.

ENERGY EFFICIENCY IN PUBLIC SPACES

SUCCESSFUL CASE STUDIES – AL-KARAK

UPGRADE OF PUBLIC STREET LIGHTING SYSTEM



Results

The project will mean **a 50% reduction of the municipality's energy costs.** This will in turn contribute to the improvement of the municipality's financial situation and allow the **reallocation of funds for other municipal needs** which will mean more and better municipal services to the community.

Description

This project was part of a national programme which aimed to replace all traditional lighting units, in all municipalities across Jordan, with energy efficient LED technology.
The share of the Greater Karak Municipality in the project amounted to 25.000 lighting units, worth 3 million JOD.

Main Objectives and Features

Street lighting in Karak consumed 5.872 MWh of electricity/year, which meant an annual cost of almost 700.000 JOD. This project will bring about both financial and energy savings as a result of the reduced energy consumption of the new, energy efficient, LED lighting units.
To date, within the boundaries of the Greater Karak Municipality, **80% of the project has been completed.**

Challenges and Difficulties Encountered

High Initial Investment: Significant upfront costs for upgrading to energy-efficient lighting technologies.
Logistical Coordination: Managing the installation of a large number of lamps and control systems.
Procurement Delays: Delays in sourcing and delivering the necessary materials and equipment.

Project Benefits

Besides the above mentioned **financial savings** which had a positive impact on the municipality's budget, the energy savings resulted in a **considerable reduction of CO_2 emissions** which means an obvious positive environmental impact.

Potential for learning and/or replication

The project provides a scalable model for improving energy efficiency and reducing costs, using energy-efficient lighting systems. It serves as an example for other municipalities in Jordan, demonstrating the feasibility and benefits of similar initiatives.

RENEWABLE ENERGY FOR LOCAL COMMUNITIES

SUCCESSFUL CASE STUDIES – AL-KARAK

NEXUS PILOT PROJECT

Results

The energy and subsequent financial savings will mean a **50% reduction of the municipality's energy costs.** These savings will allow the municipality to pay for the project, in what is considered a pioneering model of public-private cooperation.
It also brought other financial benefits with the creation of **70 temporary and 12 permanent jobs**.

Total installed power (MWp)	4,5
Investment (€)	3,7 million
Emissions reduction (tn CO_2)	4.460

Challenges and Difficulties Encountered

Limited Awareness: Lack of community understanding and support for the project's goals.
Shortage of Skilled Labor: To ensure proper operation and maintenance, a 15-year contract was signed with SamGreenPower.
Government Bureaucracy: Lengthy procedures and delays in obtaining approvals and permits from official institutions.

Description

The NEXUS Pilot Project will make use of a 480.000 m^2 area to build a series of infrastructures intending to make it a green model, namely a **4,5 MW PV plant,** a wastewater treatment plant, a compost factory, a plant nursery and an industrial wood farm. Almost all facilities have been completed and are operational, except for the industrial wood farm which is currently under development.

Main Objectives and Features

The PV plant was built in two phases, made possible via a build-operate-transfer model (BOT) and fully funded by private developer SamGreenPower. It was first completed and connected to the grid in 2019, with an installed capacity of 3,5 MW, and it was expanded by an additional 1 MW in 2024. The different facilities that make up this project will operate in an integrated way. The PV plant supplies electricity to several municipal facilities, including the ones on site, and in turn the treated wastewater is used for the nursery's irrigation, in the compost factory and will eventually be used in the industrial wood farm. Organic waste from the nursery (and other sources) is recycled through the compost factory which produces organic fertilizers meant both for agricultural use and to be used in the nursery, whose purpose is to not only provide the municipality with plants and trees to be used in public green areas, but also to the local citizens, who are therefore encouraged to partake in the municipality's efforts to expand its green areas by also creating and maintaining their own.

Project Benefits

Besides the **positive environmental impact** as a result of the CO_2 emissions avoided by the production of solar renewable energy, it will also have an added positive impact on the community with the **creation of a training facility,** supervised by the developer and the municipality, which will provide training to university students, and local technicians.

Potential for learning and/or replication

The project offers a scalable BOT model, demonstrates effective public-private collaboration, promotes energy efficiency, showcases phased implementation, and provides insights for engaging communities in green initiatives.

PALMELA & TATA & MÁLAGA TWINNING

NATIONAL STRATEGIES & POLICIES | PORTUGAL

Portugal's National Energy and Climate Plan (PNEC 2030) is the country's main energy and climate policy instrument. Acknowledging the inevitability of the energy transition due to the climate crisis, it aims to achieve energy and climate targets for 2030, aligning with the goal of carbon neutrality by 2050.
For the building sector, currently responsible for 33% of the country's energy consumption, PNEC 2030 establishes specific lines of action with a view to reducing its carbon intensity and promoting the energy renovation of the building stock, with a focus on the objective of implementing the concept of nearly zero-energy buildings (nZEB) in the construction of new buildings and in the upgrade of existing ones. The National Recovery and Resilience Plan (RRP), devised under the EU Recovery and Resiliency Facility and first approved in 2021, included a "Energy Efficiency in Buildings" dimension aiming to rehabilitate and improve buildings' energy efficiency. In the same year, and also within the framework of the RRP, the Portuguese government approved the **Long-Term Strategy for Building Renovation.** It aims to upgrade the national building stock until 2050, in order to improve its energy performance and progressive decarbonization, contributing also to mitigate energy poverty.

LOCAL STRATEGIES & POLICIES | PALMELA

The **PLAAC Arrábida - Local Climate Change Adaptation Plan,** covering the municipalities of Palmela, Setúbal, and Sesimbra, focuses on creating local adaptation strategies in these areas, enhancing their resilience to climate change. It aims to be an essential tool to help reduce climate risk in the territory, minimizing potential impacts and promoting local climate resilience and adaptation. The following objectives are intended to be achieved:

- Increasing knowledge, awareness, and capacity on climate change topics;
- Involving the local community and key stakeholders;
- Creating support tools for the population;
- Proposing adaptation measures and integrating results into local planning (urban space planning, uses and morphologies of urban areas, buildings and public spaces, new legal and regulatory principles and provisions regarding land use and occupation), contributing to increased territorial resilience.

Palmela is progressing towards becoming a smart city by adopting innovative technologies to improve its citizens' quality of life, increase efficiency, and address urban and environmental challenges. As part of this effort, the municipality has developed an energy efficiency project which implemented a platform that **monitors streetlights using a LoRa WAN network,** gathering data from sensors and actuators across the area.

NATIONAL STRATEGIES & POLICIES | MOROCCO

In 2008, **Morocco** launched for the first time its **National Priority Action Plan (PNAP)**, aimed at ensuring the balance between electricity supply and demand. This plan introduced several urgent measures, including the widespread use of compact fluorescent lamps (CFLs), the implementation of incentive-based pricing mechanisms, the adoption of the GMT+1 time zone, as well as awareness-raising campaigns on energy efficiency.
A year later, in 2009, the Kingdom adopted its **National Energy Strategy**, which established energy efficiency as a national priority. In 2015, the **National Energy Efficiency Strategy** was developed, setting the target of achieving **20% energy savings by 2030**, through a more rational and optimized use of energy across all economic and social sectors.
The building sector, the main energy consumer in **Morocco,** accounted for nearly 37% of final energy consumption in 2022, with a sustained annual growth trend. The integration of renewable energy and energy efficiency technologies in this sector thus represents one of the key levers to address the Kingdom's energy challenges and contribute to achieving its climate change mitigation objectives.
In this context, and in order to provide the country with an appropriate institutional and regulatory framework, the **Thermal Regulation Code for Construction in Morocco** was introduced in 2014 to regulate and improve energy performance in the building sector.

LOCAL STRATEGIES & POLICIES | TATA

At the local level, the Province of **Tata** and the Tata Municipality have been working to rationalize energy consumption and develop an **energy efficiency plan for buildings** through different measures such as:

- Installation of PV systems in public administrative buildings, as well as solar water heaters;
- Promotion of bioclimatic architecture with the construction of several public spaces using ancient techniques and local materials (eg.: stone, earth and wood) which make these structures sustainable and energy efficient as they can withstand climate fluctuations;
- Project to replace traditional public lighting system with LED technology;
- Information and awareness campaigns on energy efficiency, the use of renewable energies and good practices to reduce energy consumption.

Awareness raising is a key part of the municipality's strategies and policies when it comes to promoting energy efficiency. With that in mind, the **Energy Information Centre**, one of Tata's most innovative projects and a bioclimatic public building, has become a hub for the local community. A project developed with the support and funding of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), it is a space that aims to serve the general public with the goal of promoting energy literacy in Tata.

NATIONAL STRATEGIES & POLICIES | SPAIN

First published in 2014 and revised in 2020, **Spain's Long-Term Strategy for Energy Renovation in the Building Sector,** establishes a roadmap with intervention scenarios, measures and progress indicators for the energy rehabilitation of the building stock, residential and non-residential, public and private, with the aim of transforming it into a highly energy-efficient and decarbonised stock until 2050.
At regional level, the 2022 approved **Andalusia Energy Strategy 2030** promotes the transition to an efficient, sustainable, safe and carbon-neutral energy model, taking advantage of the renewable resources available in the region while also fostering economic growth and job creation. It sets out 6 main objectives that prioritize, among others, the increase of renewable energy generation, reduction of primary and final energy consumption and the energy rehabilitation of buildings.

LOCAL STRATEGIES & POLICIES | MÁLAGA

At the local level, the **Málaga 2030 Strategic Plan** establishes energy efficiency and renewable energy as priority goals. The energy transition towards renewable energy sources to decarbonise the city relies not only on expanding and enhancing its energy infrastructure and technology, to be able to provide modern and sustainable energy services, but also on raising awareness among the population for the benefits of renewable energy, specifically **PV systems and green hydrogen**, the two main focuses of the municipality. With that in mind, **5 main action areas and challenges** have been identified:

- Solar energy generation through self consumption and energy communities;
- Production and storage of green hydrogen;
- Improvement of distribution networks;
- Reduction of consumption in public and private buildings;
- Creation of new bioclimatic buildings and application of the Smart City concept.

Below are a few of the municipality's main RE and EE projects of interest:

- Energy upgrade of public buildings, including the deployment of PV systems;
- Transition to electric vehicles;
- Installation of LED street lighting and building sensors;
- Calculation of the carbon footprint and carbon neutrality by 2050;
- Planning the city's energy demand based on time slots;
- Electrification of waste collection and street cleaning vehicles.

ENERGY EFFICIENCY & RENEWABLE ENERGY IN BUILDINGS

SUCCESSFUL CASE STUDIES – PALMELA

MUNICIPAL SWIMMING POOL ENERGY UPGRADE

Description

Opened since 1999, the public swimming pool of Pinhal Novo is a multifunctional facility which includes two swimming pools, a gym and several support areas. In 2022 it underwent a series of interventions to implement several energy efficiency measures identified by the regional energy and environment agency, ENA - Energy and Environment Agency of Arrábida.

Main Objectives and Features

The main objective being the improvement of the building's energy efficiency, the following measures were implemented:

- Isothermal cover on the pools' surfaces
- New and more efficient Air Handling Units
- New electric pumping groups
- Mobile shading system
- Solar filter on south oriented window
- PV system installation

Total installed power (kWp) (A)	73,2
Investment (€) (B)	508.840,10
Annual energy saved (kWh) (C)	388.394
Annual saved cost (€) (D)	5840,56
Annual emissions avoided (tCO_2eq)	65,5

Results

The interventions carried out improved the operating conditions of the facility which resulted in **a reduction and optimisation of the energy consumed** and ensured **improved indoor air quality,** namely by avoiding water condensation within the structure.

Challenges and Difficulties Encountered

Once all measures were implemented it became apparent that the introduction of new systems required a change in the routines of the operations and maintenance staff. This change was met with some resistance, specifically when it came to new tasks such as the use of the isothermal cover which has to be manually handled and is therefore very time consuming for the staff. Another challenge has been optimising the operation of the new systems.

Project Benefits

Besides the **improvement of the building's operating conditions,** it resulted in a very significant reduction in energy consumption and a **reduced impact of energy cost variations.**

Potential for learning and/or replication

Besides the already achieved **energy consumption reduction of 24,6%** in 2023, there is great potential for further reduction by combining the electrification of consumption with an increase of the PV system production capacity.

ENERGY EFFICIENCY AWARENESS RAISING

SUCCESSFUL CASE STUDIES – PALMELA

WEBSITE "PALMELA + EFICIÊNCIA ENERGÉTICA"

https://www.palmelaeficienciaenergetica.pt/

Description

The "Palmela +Eficiência Energética" website was launched in March 2024 with the primary goal of **raising awareness among the general community and school population** about the importance of using energy intelligently and sustainably.

Main Objectives and Features

The project's main objective is to assist Palmela in transitioning into a greener and more efficient future by engaging the entire community in creating a more sustainable municipality and ensure a better environment for future generations.
It aims to provide useful and up-to-date information along with practical tips and educational resources that will deepen knowledge on the topic, promote energy savings and consequently reduce the environmental impact of energy consumption in the municipality.

Furthermore, it also aims to show how the municipality is leading by example, showcasing and communicating the energy efficiency measures already implemented in its buildings and across its territory.

Project Benefits

As it's still too early to assess the project's results, this section will focus on its intended benefits, with the main one being that **information is easily available at any time,** targeting two different audiences:

- **General public:** the goal is to communicate data, insights and practical ways to adopt energy efficient actions and behaviours.
- **Children and teenagers:** the focus is on integrating educational resources and interactive challenges that encourage behaviour and thinking change regarding awareness, the development of energy efficiency and savings strategies, as well as raising awareness about the environmental impact of energy consumption. Additionally, it highlights the importance of preserving natural resources and promoting renewable energy sources.

Potential for learning and/or replication

Given the early stages of the project it's still to soon to derive any lessons learned from the experience. However, there's already a clear potential for replication, especially as similar digital platforms can be easily created and the adaptable nature of the content allows it to be tailored to the realities and priorities of different municipalities and regions. Furthermore, the initiative's resources and benefits can be shared via local partnerships, namely by engaging schools, institutions and communities for broader impact.

ENERGY EFFICIENCY & RENEWABLE ENERGY IN BUILDINGS & AWARENESS RAISING

SUCCESSFUL CASE STUDIES – TATA

ENERGY INFORMATION CENTRE

Results

To this day, **over 5000 people have visited the centre** and participated in its activities, which results in greater literacy and awareness of the local community on the topics of energy, sustainability and climate action.

Total installed power of PV system (kWp) (A)	5
Investment (€) (B)	5500
Annual energy generated (kWh) (C)	4000 - 7000

Description

The Energy Information Centre's main mission is the promotion of awareness and education around energy efficiency and the use of renewable energies to reduce energy consumption and, in the process, promote adaptation to climate change. With the purpose of being a model for what it promotes, it is a **bioclimatic building** constructed with local and sustainable materials, with a PV system and a solar water heater. It is managed by the Energy Efficiency Cooperative under a partnership with the Municipality of Tata.

Main Objectives and Features

- Promotion of awareness raising among the general community on energy efficiency and renewable energy;
- Organization of caravans to help residents understand their electricity bill and reduce its cost;
- Promotion of waste recycling and local crafts namely through the use of recycled fabrics in the creation of local products (eg.: hats, baskets, etc.);
- Promotion of permaculture agriculture in the centre's outdoor space.

Challenges and Difficulties Encountered

Once the project was finished and in operation, three main challenges have been identified:

- Training of facilitators and energy advisors;
- Setting up specific awareness-raising and education activities around energy efficiency and energy consumption reduction and the lack of necessary funding for those actions;
- Mobilizing locals to come and visit the centre and partake in its activities.

Project Benefits

The centre not only serves its purpose of **raising awareness and promoting energy literacy** but has also become a **social hub for the community.** The are plans to open a café in the premises, which will further dynamize the space and financially support the cooperative that manages the centre.

Potential for learning and/or replication

As mentioned above, given that one of the identified challenges is bringing the local community to the centre and involve them in its activities, it is key to reach other target audiences to get them involved and support the dissemination of the centre's work, namely schools, local businesses, vocational training centres and public administration entities.

SOLAR ENERGY (SELF-CONSUMPTION)

SUCCESSFUL CASE STUDIES – MÁLAGA

PV SELF-CONSUMPTION IN MUNICIPAL BUILDINGS

Results

With 2,2 MW of PV energy installed, the systems are capable of generating approximately 3,145 MWh, which results in a **CO_2 emissions reduction of around 1.800 tons per year.**

Total installed power (kWp) (A)	580
Investment (€) (B)	300.000
Annual energy generated (kWh) (C)	1.160.000
Cost of Wp (€/kWp) (B/A)	517,24
Cost of generated kWh energy (€/kWh) (B/C)	0,26

Description

In recent years, Málaga has been developing a project to deploy **PV systems for self-consumption** on the roof of public buildings and other facilities. So far, **70 have been installed** with plans to continue and branch out to collective consumption.

Main Objectives and Features

The project's main objective was to provide clean energy for self-consumption to most municipal buildings, achieving in the process energy and financial savings along with environmental benefits.

Challenges and Difficulties Encountered

The main difficulties encountered in the development of the project have been, on one hand, obtaining the necessary funds for the installation of the PV systems and, on the other hand, complying with all urban and technical regulations.

Project Benefits

Besides the reduction of CO_2 emissions, the **energy costs of the buildings have been cut down by approximately 30%.**

Potential for learning and/or replication

Studies are currently being conducted to assess the feasibility of installing PV pannels on 100 more municipal roofs and sharing consumption with other buildings. The creation of a support and advisory office for the creation of energy communities in the city is also underway.

ENERGY EFFICIENCY IN BUILDINGS

SUCCESSFUL CASE STUDIES – MÁLAGA

MUNICIPAL RESIDENTIAL BUILDING ENERGY UPGRADE

Results

The interventions carried out have not only resulted in a **30% reduction of the building's energy consumption,** but also meant an significant improvement of its **energy rating from E to C.**

Challenges and Difficulties Encountered

As the residents of the building remained living there throughout the renovation period, it was quite challenging carrying out these interventions while trying to minimize disruption to their everyday lives.

Description

In order to improve the energy efficiency of an affordable rent municipal residential building with 51 housing units, the following interventions were done over the course of 2023 and 2024:

- Replacement of old windows for new energy efficient ones
- Installation of a micro-cogeneration plant
- Replacement of old boilers with more efficient ones

Main Objectives and Features

From a technical and financial point of view, the project aimed to reduce electricity consumption both in the building's common areas and for the production of hot water in each unit. This allowed eventual excess production to be injected into the grid, resulting in a financial compensation which meant an additional economic benefit. On top of this, it also sought to provide the residents with improved thermal comfort in their homes, both in winter and summer.

Project Benefits

Besides the obvious **energy and financial savings**, feedback from the building's residents has been very positive regarding the **improvement of their homes' thermal comfort.**

Potential for learning and/or replication

The municipality is currently building several new affordable rent municipal buildings, which will provide 476 new housing units. Based on the experience with the rehabilitation of the building featured here, further improvements and features are being incorporate into these new units.

GRENOBLE & SFAX TWINNING

NATIONAL STRATEGIES & POLICIES | FRANCE

France's National Energy and Climate Plan (NECP), last updated in 2024, sets the target of reducing the final energy consumption by 30% until 2030 (compared to 2012 levels) making energy efficiency a key aspect of the country's quest towards carbon neutrality in 2050. When it comes to improving energy efficiency in the building sector, the existence of a building code has proven to be a key measure. Its latest update (RE2020) aims not only to reduce energy consumption but also sets goals over the entire lifecycle of a building, in terms of its emissions and environmental impact. Furthermore, the energy upgrade of the building stock is one of the priority action areas of the National Recovery and Resilience Plan **"France Relance"**, with 6,7 billion EUR allocated for that purpose. Within this context, amongst the several schemes and incentives set up to promote energy efficiency over the years, one in particular stands out. **"MaPrimeRénov"** is the government's main financial scheme supporting building energy upgrades, first launched in 2020, extended in 2021 and still ongoing albeit in a more restrictive model. It provides financial support to partially cover energy efficiency improvements carried out by homeowners (including co-owners in collective buildings). In the services sector, the **"Éco Énergie Tertiaire"** is a regulatory obligation that requires a gradual reduction of energy consumption in service buildings which aims to reach a final target of a 60% reduction in final energy consumption by 2050.

LOCAL STRATEGIES & POLICIES | GRENOBLE

Grenoble is strongly committed to improved energy performance, having been the first local authority in France to adopt a climate plan addressing this topic, back in 2005.
More recently, Grenoble has set ambitious and realistic goals through its **Local Climate Air and Energy Plan 2023** which aims to **reduce energy use by 50% until 2024, compared to 2012 levels.** This local goal was set by the Grenoble-Alpes Métropole, and the city of Grenoble applies it to its own competencies by targeting municipal buildings. To meet this ambitious goal, Grenoble has set **3 major lines of action**:

Energy Efficiency: With each new building constructed or existing one that undergoes renovations, the conception is carefully studied to make it as energy efficient as possible. Therefore, investing in energy efficiency retrofits is a key part of Grenoble's policy. Furthermore, the municipality is implementing a strong policy to limit the impact of the building sector on greenhouse gas, natural resources and biodiversity;

Renewable Energy: More and more municipal buildings are connected to the district heating network whose share of renewable and recovered energy is 82%. Various solar PV projects are also being developed, namely distributed generation, with the first individual and collective self-consumption projects being rolled out starting in 2024.

Education & Behaviour Change: Significant changes in the energy consumption of the municipality won't be achieved if consumers are not educated on the subject. Therefore, educating its 4000 public servants about energy sufficiency through workshops and other information and communication actions is also at the heart of Grenoble policy.

NATIONAL STRATEGIES & POLICIES | TUNISIA

Tunisia is highly dependent on natural gas, with nearly 96% of its electricity generated from this source, more than 50% of which is imported. In this context, Tunisia has set out an ambitious energy transition strategy aimed at achieving several key targets by 2030: a 30% reduction in energy intensity, the production of 35% of electricity from renewable energy sources, and a 45% reduction in carbon intensity, compared to 2010 levels. These goals are key to strengthening the resilience of Tunisia's economy to external disruptions, such as rising fossil fuel prices. They will also help reduce the fiscal deficit by reducing imports and energy-related subsidies, while paving the way for the creation of new green jobs, thereby boosting economic growth.
The flagship energy management programme in the buildings sector is the energy audit, conducted both during the building's planning and construction phase and upon its completion. A framework for this programme is provided by regulatory measures such as the thermal regulation of buildings and the energy certification of household appliances. Furthermore, Tunisia's National Agency for Energy Management (ANME) carries out actions to support service sector companies in the study and implementation of cogeneration projects, provides assistance in the process of certification in Energy Management System according to the ISO50001 standard, as well as the labelling of buildings according to the EcoBât Tunisian Label.

LOCAL STRATEGIES & POLICIES | SFAX

In 2023 the municipality of Sfax approved its SECAP which was developed with support from GIZ as part of the EU funded project Mobilité Active et Intelligente à Sfax, led by the municipality and implemented in partnership with MedCities and the Municipality of Chihia. The municipality's engagement in different international cooperation initiatives and projects has been crucial in supporting and funding their local climate action initiatives. In 2016 it became signatory of the Covenant of Mayors, with a commitment to reduce GHG emissions by 20% until 2020, which was not achieved. Subsequently, within their SECAP a new target has been set to reduce GHG emissions by 31% until 2030 against a 2019 baseline. In the energy domain, the municipality has conducted numerous studies and pilots, namely concerning energy planning, urban mobility, modernisation of the public lighting system, waste management and sustainable construction, having carried out the following key actions, among others:

- Total upgrade of the public lighting system with LED technology;
- Energy audits conducted in all municipal buildings and creation of action plans with the goal of improving their energy efficiency;
- Deployment of a PV plant at the municipal farm "Bechka" with the aim of supplying RE to several municipal buildings.

Sfax is one of fourteen Tunisian communes engaged in the ACTE (Alliance des Communes pour la Transition Energétique) programme. Launched in 2025 and implemented by ANME, this initiative positions local authorities as key actors of the energy transition. Its main goal is the reinforcing of their capabilities to plan, design, implement and monitor local energy policies, with a focus on six areas: construction and urban management, municipal buildings and infra-structure, diversification of energy sources, urban mobility, internal organisation and governance and cooperation and communication.

ENERGY EFFICIENCY & RENEWABLE ENERGY IN BUILDINGS

SUCCESSFUL CASE STUDIES – GRENOBLE

ANNE SYLVESTRE SCHOOL – ZAC FLAUBERT

Results

The school opened its doors in September 2024, welcoming the local children. The PV panels have been operational since July 2024 and have already **produced 133 MWh of electricity.**

Challenges and Difficulties Encountered

As the soil of the school's site was initially contaminated by previous activities, soil remediation was required, which impacted the project timeline. Contaminated soil was excavated and replaced with clean, high-quality soil to ensure the site's safety for the children.

Description

The development of the new eco-friendly *Flaubert* neighbourhood, which included new residential buildings, created the need for a new school for the children living in the area. This brand new school, which accommodates up to 16 classes, features an environmentally conscious design and innovative use of sustainable materials.

Main Objectives and Features

The primary goals of this project, besides providing an educational space for children, were to achieve exceptional energy performance and promote biodiversity. Half of the roof is covered with **238 PV panels,** while the other half features a green roof. To optimize thermal comfort, a **groundwater geothermal system** was installed, and the building's orientation and **bioclimatic design** help regulate the interior temperature. This project also incorporates rainwater management and soil de-waterproofing initiatives. Additionally, the creation of green playgrounds and an educational garden aims to foster environmental awareness among the students.

Project Benefits

Besides the benefits derived from the **minimized ecological impact** of the new building, the project provided the students with a high-quality school environment both in material and educational terms, as the **children's environmental awareness** is promoted.

Potential for learning and/or replication

This project serves as a prime example of how ambitious and sustainable public buildings, particularly schools, can be designed and developed with careful attention to environmental and energy efficiency considerations.

ENERGY EFFICIENCY IN BUILDINGS & AWARENESS RAISING

SUCCESSFUL CASE STUDIES – GRENOBLE

OBJECTIVE -5 % FOR GRENOBLE'S SOCIOCULTURAL ASSOCIATIONS

Grenoble's Energy Sufficiency Mascot

Results

The 18 associations involved in this project in 2023 have, on average, **reduced their electricity consumption by 9,9%.** The results are even more impressive concerning the heating, with a reduction of 15,4 % (helped by a warmer winter) during the first year.

Main Objectives and Features

The main goal was to make the associations aware of their energy consumption and its consequent environmental impact. Furthermore, the project also set out to show how, with simple actions, they are able to reduce their energy consumption by using the electrical equipment around them in a more conscious way.

Description

All sociocultural associations hosted in municipal buildings were asked to reduce their annual energy consumption by 5 %. Helped by the municipal teams in charge of the topic of energy sufficiency, the associations learned about the eco gestures they could implement to reduce their energy consumption. As associations are exempted from paying their energy bills, a rule was put into place that requires them to pay the difference between their objective and their annual consumption, in case they fail to save the 5%. However, there is also an incentive as, if they are able to save more than 5%, they receive the corresponding financial gains.

Challenges and Difficulties Encountered

On a behavioural level, the main difficulty was convincing the associations about the benefits of implementing this new rule. The initial reaction was of some resistance with the associations claiming that it would be too complicated to achieve the 5% savings.
Technically, obtaining energy consumption data, calculating the necessary savings and then monitoring monthly consumption was quite challenging and time consuming.

Project Benefits

With the main benefit being the decrease of energy consumption, it brings along with it cost reductions for the municipality and a positive environmental impact. Furthermore, it was successful in **raising awareness for the topic of energy sufficiency** and **changing behaviours** among municipal staff and users.

Potential for learning and/or replication

This project confirmed the municipality's view that a large part of the effort to reduce energy consumption lies in the hands of users. Therefore, Grenoble must continue investing in the education of the municipal staff and its citizens.

ENERGY EFFICIENCY & RENEWABLE ENERGY IN BUILDINGS

SUCCESSFUL CASE STUDIES – SFAX

RESIDENTIAL ENERGY UPGRADE PILOTS

Results

The results far exceeded the project's initial objective to reach a 20% reduction of the primary energy consumption and CO_2 emissions, as well as achieve 20% of the energy consumed generated from renewable sources. In the end, **primary energy consumption dropped by 71,81%, CO_2 emissions by 58,02% and a 32,5% RE share** was reached.

Description

This project was implemented within the context of ENPI-CBCMED, the multilateral cross-border cooperation "Mediterranean Sea Basin Programme" and it entailed the energy upgrade of 2 residential pilots:
#1 Residence of a member of the municipal staff;
#2 Two apartments in a private residential building located in central Sfax.

Main Objectives and Features

The interventions aimed at improving the energy efficiency and thermal comfort of the 3 units and included the thermal insulation of the envelope, the replacement of the old windows by new energy-efficient ones and the integration of aluminium blinds, the installation of energy efficient air conditioners and refrigerators, as well as of a home automation system and the replacement of all lamps by LED ones. Finally, thermal solar and PV systems were also installed.

Challenges and Difficulties Encountered

Besides the technical difficulties posed by the old age of the buildings, institutionally it was identified the need to raise awareness among the municipal staff on the importance of water and energy efficiency and promote their engagement in related activities. Finally, mobilizing funding for these kinds of projects remains a major challenge, meaning the support from programmes such as ENPI-CBCMED is key to make the case for their feasibility and relevance.

Project Benefits

Besides the aforementioned benefits in terms of the **buildings' improved energy efficiency,** it will also allow residents to **reduce their electricity bill** as well as live more comfortably. Furthermore, with the purpose of raising awareness among citizens for the benefits of energy efficiency retrofits, several result **dissemination actions** were carried out by the project's partners, with participation of the municipal staff.

Potential for learning and/or replication

The very good results of these pilot projects will set a blueprint for similar interventions being carried out in other buildings, both in Sfax as well as in other municipalities.

RENEWABLE ENERGY FOR LOCAL COMMUNITIES

SUCCESSFUL CASES – SFAX

BECHKA MUNICIPAL FARM

Description

A municipal property of 2450 ha located in the outskirts of Sfax is the backdrop for two innovative renewable energy and water efficiency projects that are being developed as part of the municipality's energy transition strategy, which aims to reduce GHG emissions and lower energy costs. Besides these projects, there are plans to develop an ecotourism project by converting the Palais El Hana, located within the property, into a Guest House.

Results

The PV plant will have an **estimated capacity of 581,36 MWh per year** which will mean a GHG emission reduction of 8301,8 tones of CO_2 also per year. Its production is expected to **cover 50% of the consumption needs of the 9 municipal buildings** to which it will supply electricity.

Main Objectives and Features

Two main projects are currently being developed in the property:

- Pilot project to install a PV plant for self-consumption which will supply electricity to several municipal buildings.
- Digging of two semi-deep wells with the installation of submersible pumps for each, which will feed a drip irrigation system.

Challenges and Difficulties Encountered

The two main challenges were technical and logistical, the first being the impact climate change has had on the property's soil, changing its characteristics, which resulted in increased costs. The second was the lack of energy infrastructure, given that most of the property was solely used for traditional agricultural activities. To be noted also some difficulty with administrative and legal aspects, as well as with securing the necessary funding given that this is a pilot project.

Project Benefits

The wells, equipped with solar energy powered pumps, will feed a drip irrigation system that will supply water to around 2200 olive trees across 30 ha, resulting in a **70% reduction in water consumption.**

Potential for learning and/or replication

Above all, this project has brought several learning opportunities for the technical teams especially in terms of the information that needs to the collected about a construction site, as well as the environmental aspects to be considered before the project design phase so that eventual obstacles (climate, geological, etc.) can be identified early on. When it comes to the replication, being a pilot project, it will aim to inspire and expand investment opportunities in RE.

GOZO & JENIN & TULKARM TWINNING

ENERGY EFFICIENCY & RENEWABLE ENERGY TARGETS - GOZO

NATIONAL LEVEL

OVERALL EE & RE TARGETS

Malta's energy efficiency strategy is part of the National Energy and Climate Plan (NECP) for the 2021-2030 period.

Energy Efficiency: Primary and final energy consumption of 964 ktoe and 803 ktoe respectively by 2030 – meaning a 13% reduction of the final energy consumption by 2030 compared to the 2020 reference scenario.

Renewable Energy: Achieve 24,5% share of RE in final energy consumption by 2030.

BUILDING SECTOR EE & RE TARGETS

The national strategy for energy efficiency in buildings is part of the Long-Term Renovation Strategy which sets targets for decarbonisation of the building stock by 2050. To reach this target, this framework stipulates that all new buildings are now required to be nZEB and Zero Energy from 2030-2035 onwards, while also calling for the renovation of existing buildings over the 2021-2050 period. Paving the way to the ultimate goal, it is expected a 32% incorporation of RE sources in the building sector energy consumption until 2030 and an emissions reduction of around 65% until 2040.

TOP-DOWN APPROACH

Local Government has limited powers and responsibilities when it comes to regulation of the building, transport and energy sectors in the Maltese context. National strategies apply to the island of Gozo and the Maltese Government is committed to make Gozo the first climate neutral region in the country. Local government plays an important role in the dissemination of information and creating public awareness, which are part of the national strategy.

LOCAL LEVEL

OVERALL EE & RE TARGETS

Gozo launched its Regional Development Strategy in 2023, which includes provisions for urban planning, namely promoting green buildings and local climate action.

As a local climate action plan is currently being developed, there are no local targets yet and therefore national targets apply.

BUILDING SECTOR EE & RE TARGETS

Strategic goals and targets for both RE and EE in buildings are set at the national level. Local strategies are limited in scope and tend towards strategic objectives directed at buildings owned or administered by local authorities. As such, the following measures are implemented locally to promote EE:

- Awareness raising campaigns to promote energy saving, waste management and green practices;
- Renovations on local council buildings and other properties administered by local authorities;
- Installation of EV charging stations in local authorities buildings to promote electric mobility.

ENERGY EFFICIENCY & RENEWABLE ENERGY TARGETS - JENIN

NATIONAL LEVEL

OVERALL EE & RE TARGETS

The Palestinian Energy and Natural Resources Authority (PENRA) has established **Palestine's National Energy Efficiency Action Plan (NEEAP) and Renewable Energy Strategy.**

Energy Efficiency: Reduce overall energy consumption by 3% until 2025.

Renewable Energy: Achieve 5% of the total energy mix from renewable sources by 2025.

BUILDING SECTOR EE & RE TARGETS

The national strategy includes provisions for energy efficiency and renewable energy in the building sector, including public and residential buildings, with a focus on improving thermal insulation standards, adopting solar water heating systems, and promoting energy-efficient lighting and appliances. Some of the main measures and programmes include:

- Implementation of the Net Metering policy to support solar PV installations – Long-term measure ongoing since ~2017;
- Mandatory application of the Palestinian Green Building Code for new constructions – Implemented gradually since 2019;
- Financial incentives for energy-efficient household appliances and lighting – Planned in phases, renewed per fiscal cycle (2–3 years).

MULTILEVEL APPROACH

There is a top-down approach, where the national energy policies and targets set by PENRA are reflected in local actions, particularly through the development of SEAPs by the municipalities. However, there are also bottom-up elements, as local energy assessments and needs inform national planning through coordination with the Palestinian Energy and Environment Center (PEC).

LOCAL LEVEL

OVERALL EE & RE TARGETS

Jenin's Local Development Plan 2023–2026 emphasizes sustainable energy and climate action, focusing on reducing consumption and promoting renewable energy.

Energy Efficiency: Reduce energy consumption in municipal operations and public infrastructure by 10% as well as grid energy losses from 27% to 15% until 2030.

Renewable Energy: Achieve the deployment of PV systems in 10% of all municipal buildings until 2030.

BUILDING SECTOR EE & RE TARGETS

Jenin's Local Development Plan 2023–2026 prioritizes energy efficiency in public buildings but also in other areas such as street lighting and water pumping. To promote EE in buildings, the following 3 measures are to be implemented locally:

- Baseline energy audits for municipal buildings have been prioritized, paving the way for targeted efficiency improvements;
- Installation of PV systems and implementation of energy-efficient retrofits such as LED lighting and insulation in municipal buildings;
- Solar electrification of public schools, with interventions already completed in 11 schools and the goal to cover all schools by 2030.

ENERGY EFFICIENCY & RENEWABLE ENERGY TARGETS - TULKARM

NATIONAL LEVEL

OVERALL EE & RE TARGETS

The Palestinian Energy and Natural Resources Authority (PENRA) has established **Palestine's National Energy Efficiency Action Plan (NEEAP) and Renewable Energy Strategy.**

Energy Efficiency: Reduce overall energy consumption by 3% until 2025.

Renewable Energy: Achieve 5% of the total energy mix from renewable sources by 2025.

BUILDING SECTOR EE & RE TARGETS

The national strategy includes provisions for energy efficiency and renewable energy in the building sector, including public and residential buildings, with a focus on improving thermal insulation standards, adopting solar water heating systems, and promoting energy-efficient lighting and appliances. Main measures and programmes include:

- Implementation of the Net Metering policy to support solar PV installations – Long-term measure ongoing since ~2017;
- Mandatory application of the Palestinian Green Building Code for new constructions – Implemented gradually since 2019;
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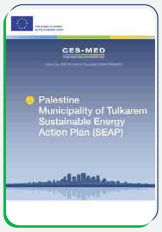
MULTILEVEL APPROACH

There is a top-down approach, where the national energy policies and targets set by PENRA are reflected in local actions, particularly through the development of SEAPs by the municipalities. However, there are also bottom-up elements, as local energy assessments and needs inform national planning through coordination with the Palestinian Energy and Environment Center (PEC).

LOCAL LEVEL

OVERALL EE & RE TARGETS

Tulkarm has adopted local energy efficiency and renewable energy goals in alignment with national strategies, having developed a **SEAP** with support from the EU-funded CES-MED Project. Originally designed with 2020 as the target year, the municipality has informally extended its operational relevance to 2030, due to implementation delays and contextual challenges on the ground, aligning it with more recent planning cycles.



Energy Efficiency: Reduce municipal electricity consumption by 15% until 2030.

Renewable Energy: Achieve a 10% RE share in municipal operations until 2023 (provisional target, not included in SEAP).

BUILDING SECTOR EE & RE TARGETS

By 2030, the municipality aims to achieve a 10-15% electricity consumption reduction and increase the share of RE to 20% in all municipal buildings. Efforts to improve EE are not limited to the building sector with a focus being put also on street lighting and water pumping systems. To promote EE in buildings, the following 3 measures are to be implemented locally:

- Implementation of energy audits followed by retrofitting program for municipal and educational buildings (planned for 2022–2030 depending on funding);
- Installation of PV systems on municipal buildings (2016 – ongoing);
- Financial incentives in partnership with donors to support installation of energy-efficient appliances and lighting in public facilities.

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