Funded by the European Union

2018

ENERGY EFFICIENCY AND ENERGY PRICES: A PEACEFUL SOLUTION TO THE JIGSAW

Cover Image : © Jordan Tourism Board

REPORT

6th MEDENER INTERNATIONAL CONFERENCE on ENERGY TRANSITION in the MEDITERRANEAN REGION

MED ENER

meetM

About meetMED

The Mitigation Enabling Energy Transition in the Mediterranean region (meetMED) project is an EU-funded project, developed by MEDENER and RCREEE to support regional cooperation - particularly in the framework of the Renewable Energy and Energy Efficiency Platform of the Union for the Mediterranean (UfM) - and to build technical capacity for energy transition in Southern and Eastern Mediterranean (SEM) countries.
meetMED has been officially launched in May 2018 at the headquarters of the Union for the Mediterranean (UfM) in Barcelona, Spain and it will last until April 2020.

Funded by the
European Union

This publication was produced with the financial support of the European Union. Its contents are the sole responsibility of MEDENER and do not necessarily reflect the views of the European Union.

ENERGY EFFICIENCY AND ENERGY PRICES: A PEACEFUL SOLUTION TO THE JIGSAW

Foreword by MEDENER President

Whether under the French Presidency, the Tunisian or the current Italian one, energy transition has been at the core of MEDENER activities since 2010. Thus, this has been the focus of the MEDENER International Conferences ever since.

The first MEDENER International Conference on Energy Transition in the Euro-Mediterranean Region took place in Tunis in 2013, followed by the second one in Marseille, the third one in Naples, the fourth one in Algiers, the fifth one in Lisbon and the more recent one in Amman in 2018.

Each of those events provided the opportunity to examine and debate on crucial features of energy transition, particularly thanks to the wide participation of experts from the Northern and Southern shore of the Mediterranean, who exchanged their best practices. In this framework, the activities carried out by the Association perfectly fit also the guiding principles characterising the EU foreign policy in the last years: multilateralism, sustainable security and cooperative autonomy.

Nowadays, multilateralism is struggling but multilateral international institutions still represent the best instruments to elaborate more inclusive and more sustainable solutions at the international level. Furthermore, multilateralism allows all the stakeholders to coordinate and better define the appropriate steps to take in order to address the most pressing challenges of our times.

We, at MEDENER, keep believing in multilateralism as the most needed response to the major crosscutting challenges affecting the Mediterranean region: climate change and migration. In fact, these global phenomena cannot be tackled appropriately through national responses, no matter how big or powerful a State can be. In the Mediterranean region, no Nation State can and will fight the seeds of world competition all alone, due to – among others - a lack of adequate human and financial resources.

In fact, the European Union – through its foreign policy- is standing as a benchmark for cooperative autonomy, by building its own strategic autonomy in a variety of sectors while cooperating more and more closely with its partners. In this sense, the European Union is still believing in international agreements and in their binding force as the best way to guarantee peace and stability for everybody.

By pursuing its objectives and establishing a strict cooperation with the Regional Centre for Renewable Energy and Energy Efficiency (RCREEE) based in Cairo, MEDENER has created a critical mass in terms of sectorial skills in the energy sector as well as of economic and financial resources, which has given the Association a greater negotiating power with the international financial institutions. As such, MEDENER has worked to make each of its member agencies strategically stronger through a productive cooperation based on a constant exchange of best practices. Its members mutually reinforce each other when facing the critical climatic, energetic and migratory challenges, which are becoming more and more complicated to grasp all alone.

This year, the 6th MEDENER International Conference has provided a close-up insight in one of the most classic and debated topics related to energy efficiency: energy prices and energy efficiency measures, particularly with respect to end users and families. Specific attention has been given to some countries in the Southern shore of the Mediterranean, where prices are often tariffs and strongly supported by the State.

Energy efficiency is the result of technological operations, which allow consumers to benefit of the same comforts and obtain the same services by using less energy. It has strong economic implications

in as much as an efficient energy system entails higher costs incurred than the ones in a traditional competitive system or - technically speaking - the baseline.
Based on the products available on the market, how much are we willing to spend to achieve the highest level of energy efficiency? There is only one way to answer this question: we should increase our expenditures until it is affordable for us, thus until the amount of energy saved along the life cycle of high efficiency components equals or exceeds the value of the extra cost required for their purchase.
Concerning the above-mentioned affordability of highly efficient devices, we must consider that this would not be attractive whenever energy tariffs are strongly supported by the State and that affordability will only be detectable beyond the end of the life cycle of energy efficient devices. Therefore, in this context, a different approach may be needed.

Dario Chello
MEDENER President

1. Welcome address

Walid SHAHIN - Director, NERC Jordan

Ladies and Gentlemen,

It gives great pleasure and an honour to have this opportunity to welcome you all and express my thanks to Mediterranean Association of National Agencies for Energy Management (MEDENER) for all their efforts in organizing this conference. Especially, I would like to thank our guests who travelled from around the Mediterranean to be with us wishing you a pleasant stay in Jordan.

I am also very pleased to welcome our keynote speakers, and see so many distinguished guests from international organizations, both public and private. This is a sign of the relevance and genuine interests among relevant stakeholders of the issue of energy efficiency.

Ladies and Gentlemen,

It is obvious that energy efficiency needs to be central in energy policies around the world since it offers a powerful and cost-effective tool for achieving a sustainable energy future. Improvements in energy efficiency can reduce the need for investment in energy infrastructure, cut fuel cost, increase competitiveness, improve energy security and improve consumer welfare all at the same time and as the world transitions to clean energy, efficiency can make the transition cheaper, faster and more beneficial across all sectors of our economies.

The world's biggest untapped source of energy may be the energy that we waste. Energy, in terms of oil and gas, is of course a primary commodity like any other. However, energy provides a critical input to virtually all aspects of our daily lives. It is the best opportunity to reduce greenhouse gas emissions, enhance economic development and yet energy efficiency is far from fulfilling its potential. Globally, two-thirds of the economic potential remains untapped according to the Energy Efficiency Market Report by the International Energy Agency (IEA). An entire 70% of the world's energy use takes place outside of any efficiency performance requirements. For example, two-thirds of energy consumption from buildings being built today have no codes or standards applied to it. A mere one-third of National Determined Contributions (NDCs) includes energy efficiency-related targets, despite IEA's analysis that shows it is the single largest action in the optimal pathway to a decarbonized energy system.

Regulatory measures on buildings are key to an effective promotion of energy efficiency. In addition to the need for a much greater enforcement of building codes, a comprehensive review and update to include most recent technologies ensuring that at least minimum standards in energy efficiency are met, should be applied not only to the newly constructed buildings but also to the existing ones.

The Royal Scientific Society (RSS) was perhaps the first institute in Jordan to identify the huge problem that the country would have faced with respect to energy and the huge potential of renewables, and specifically solar energy. For this reason, back in the early eighties RSS established the Renewable Energy Research Centre, which evolved into the National Energy and Research Centre (NERC). The Centre can be acknowledged for the many accomplishments

in the RE and EE fields that we are witnessing today. The Royal Scientific Society also continues to contribute through developing, promoting and implementing RE and EE.

According to studies conducted by NERC and the Ministry of Energy and Mineral Resources (MEMR), it is estimated that more than 20% of Jordan's energy consumption can be reduced through improved energy efficiency; thus, energy efficiency is a key element of Jordan's energy strategy. According to the energy strategy 2007-2020, Jordan aims to reach the target of 20% improvement in energy efficiency by the year 2020. However, this strategy has to be operationalized through short and mid-term action plans with concrete and feasible EE measures.

In 2018, the MEMR prepared the second National Energy Efficiency Action Plan (NEEAP) for the Hashemite Kingdom of Jordan for the period 2017-2020, then adopted by the Cabinet. The second NEEAP has set a target of 17.5% reduction in energy consumption by 2020. It comprised several EE actions with an estimated total investment cost of around 696 million JD (994 million USD) and will generate an annual saving for the user of about 329 million USD per year by 2020. In this case, the average payback period of the NEEAP from the point of view of the users will be around 2.5 years, which represents a good profitability. The average cost of the saved kWh can be estimated to be around 0.088 JD/kWh (0.126 $/kWh).

Before that, in 2004, the MEMR has formulated the "National Energy Efficiency strategy" aiming at "clearly defining the course of action which will achieve sustainable economic development and reduce harm to the environment". Such course of action is stated to be based on a series of key policies, defined as follows:

a) Tariff policy: Achieving proper energy pricing by removing subsidies on petroleum products and electricity and applying an energy pricing structure based on actual cost;
b) Legislation: Endorsing obligatory and targeted legislation to increase the demand for high-efficiency equipment and services. Specific tools include fiscal and customs measures, technical standards, building codes and thermal insulation requirements, as well as traffic optimization;
c) Awareness and training programs: Carrying out activities that strengthen the main policies by providing training to key stakeholders and targeted groups, and by increasing the public's awareness on more sustainable energy consumption patterns;
d) Financial policies: Establishing proper tools to finance projects and programs improving energy consumption efficiency, including the establishment of a "special fund for financing energy conservation projects with a shared capital between the government and donor institutions to provide soft loans for these projects".

Ladies and Gentlemen,

This Conference will draw on international experience and existing commitments to identify key practical steps to improve energy efficiency in our region and will elaborate clear steps towards strengthening national and regional cooperation through practical action.

It aims also to identify opportunities and challenges to EE policies, measures, and their practical implementation, with special focus on the link between EE and energy prices. It is

our hope that the Conference fosters greater synergies between the different regional EE initiatives and to present a comprehensive overview of EE prospects in the region.
To conclude, I would like to thank you all for coming and sharing your ideas and visions. I look forward to the outcome of this Conference and wish you successful deliberations.
Thank you.

2. Introductory remarks

❖ Mr Fawaz Al-Karmi - Assistant Secretary General for Scientific and Technological Affairs, Higher Council for Science and Technology

Dear colleagues, ladies and gentlemen,
I would like to express my appreciation for the great efforts done by the organizers of this important Conference. I would also like to thank the sponsors and all the participants, from outside Jordan and from the local institutions involved in EE issues.
In many cases, people do not differentiate between RE and EE and use them interchangeably. They are indeed different. EE is a demand driven activity, while RE is a supply driven activity. They compete in forming the total energy mix in any country. I must admit that Jordan has taken giant strides in RE policies, regulations and projects. However, in Jordan EE is still in its infancy and needs a great push by all parties involved in the energy sector.
In 2009-2010, I participated in a study to assess EE potential in Jordan. The study concluded that, based on electricity demand forecast, at the time a 1% reduction in annual energy consumption for a period of 10 years would result in a total of 2052 GWH savings and 347 MW peak demand reduction. These savings lead to a Net Present Value (NPV) of benefits reaching JD 266 million over the ten-years period.
In 2014-2015 I participated in a national load survey study to identify candidate Demand Side Management (DSM) end users appropriate for the household consumers in Jordan.
The study was conducted in collaboration with the three distribution companies and concluded that EE programs have a good potential by replacing:

- Incandescent lamps with LED.
- Electric/gas water heaters with Solar Water Heaters.
- Older refrigerators with new efficient models.
- Older washing machines with new efficient models.

These studies and their conclusions have resulted in the adoption of an action plan for EE programs in Jordan by the MEMR. Furthermore, the Jordan Renewable Energy and Energy Efficiency Fund (JREEEF) has started programs in the most effective actions.
I wish this Conference achieves its objectives and I wish all participants a fruitful discussion.
Thank you.

❖ **Ms Sirpa Tulla –** Head of Economic, Infrastructure and Trade Facilitation Section, EU Delegation to Jordan

Excellences,

Dear Colleagues and Guests,

I am honoured to be here with you today to participate in this important gathering, at times when all the efforts within the globe should be enhanced to maximise the applications of energy efficiency across all sectors.

EU commitment to green energy development

The European Union values the strategic partnership with the Mediterranean stakeholders on energy, notably with Jordan as it is part of the Euro-Mediterranean network and as it plays a major role due to its geo-political position in the region.

Our Conference today is a clear reflection on this partnership, and the EU support to MEDENER is a good example of know-how exchange to ensure green energy development.

In these challenging times for Jordan and the region to ensure energy security, the EU stands ready to help its partners in their efforts to develop green energy initiatives, and - equally important - to benefit local communities in this context.

We are ready to share our experience in line with the EU initiative: 20-20-20 in the year 2020 (20% renewable energy in the total energy mix, 20% decrease in energy consumption through EE techniques, 20% additional decrease in green-house gases emissions), a target which we have already exceeded, and now aims to reach 50% in renewables and 40% in energy efficiency by 2030.

Furthermore, the EU recognises the need to work on environment friendly sources of energy, in order to combat climate change and negative environmental effects. This is very important, especially after the commitments made by most of the partners, including the EU member states, at COP 21 that ratified unanimously the Paris Agreement in 2015, and after the confirmations at COP 22 in Marrakesh in 2016 and at COP 23 in Bonn in 2017.

In complement to this, developing the green energy sector including the EE component, will enhance the investments in this field, create jobs, help fight poverty and achieve sustainable development goals we all work for.

EU bilateral cooperation with Jordan

The EU is very happy with Jordan's proactive role to continue to lead on green energy development, on both renewable energy development as it managed to inject more than 500 Megawatt within the grid so far, and the update and implementation of the energy efficiency national action plan NEEAP, linking different sectors to achieve the objective of the energy sector strategy.

The EU are pleased to partner with Jordan to achieve the green energy objectives, by the support to the update and implementation of the National Energy Efficiency Action Plan, and the development of the National Renewable Energy Action Plan, and equally important providing technical assistance to enhance green energy in different sectors such as water, buildings, transport, municipal development and many others.

Today, the EU has a group of bilateral projects and programmes, with more than € 160 Million to support green energy in Jordan, as well as different EU funded regional programmes, such as MEDENER, that also supports Jordan's energy development efforts. The EU foresees that this support is a key cornerstone to take Jordan towards achieving its Green Economy Plan and Leadership.

Conclusion:

Having said this, I would like to thank MEDENER and NERC on such important conference to enhance green energy applications across different sectors. Such exchange of experience is a model to be followed in other sectors at large.

We are happy to be working together to guide Jordan and the Mediterranean partners towards a green future and take part in the development of the region.

I also take this opportunity to thank you all for your participation, devotion and commitment to a topic that will help us all realise a greener future.

Thank you all.

3. Overview of the challenges

❖ **Mr Leonidas KIOUSSIS** - Senior Expert, International relations & Enlargement, DG Energy, European Commission

Ladies and Gentlemen,

On behalf of the European Commission, I would like to thank the Jordanian National Energy and Research Centre (NERC) and the meetMED project for organizing and for inviting us to this very topical Conference on Energy Transition in the Euro-Mediterranean Region and for focusing the discussion on energy efficiency and its interplay with energy prices.

In the following ten minutes of my speech, I will inform you about how we address this issue in the EU and I will share with you some thoughts on how we (could) cooperate with our Southern Mediterranean partner countries on this domain.

Today, we are at the crossroads of a global energy transition, which is transforming the way we consume and produce energy, while we are working to make our economies more competitive, more sustainable, and more resilient.

Accelerating the transition to a low-carbon competitive economy is both a tremendous opportunity and an urgent necessity not only for Europe but also for the South Mediterranean region, where increasing demographics (+105 million by 2040) and the fast-growing energy demand in an increasingly constrained context - both in terms of energy availability and environmental impacts of conventional energy sources uses - makes the need for accelerating this transition more than vital.

In this context, MEDENER and OME, based on the 2030-2050 visions of ADEME and the prospective tools of OME, have decided to jointly investigate a Mediterranean Energy Transition Scenario, which provided very thoughtful insights. Also, a study of the International Energy Agency (IEA), League of Arab States, and Regional Centre for Renewable Energy and Energy Efficiency (RCREEE) provided recommendations for a regional energy efficiency policy taking into account barriers, opportunities and needs such as:

- Rapid growth in energy demand;
- Low capacity for enforcing regulatory policies;
- Highly subsidised energy prices;
- Institutional coordination issues;
- Low private sector capacity for identifying and developing;
- Few EE projects;
- Energy price volatility and supply disruption issues in some energy-importing countries;
- Lack of manufacturing, servicing and testing capacity for EE products;
- Demanding climatic conditions;
- Sparse funding for EE activities and investments.

Dear colleagues,

Switching to a low-energy system means rethinking the entire energy landscape: from buildings, to transport, industry and power. It means integrating energy supply and demand across the board, through smart technologies, rigorous planning and holistic decision-making. The EU committed to cut CO2 emissions by at least 40% by 2030, decarbonise and support our energy system, change the way we consume and produce energy, while delivering on jobs and growth for all European citizens.

On 30 November 2016, the European Commission presented the "Clean Energy for All Europeans" package.

The proposals have three main goals:

- putting energy efficiency first;
- achieving global leadership in renewable energies; and
- providing a fair deal for consumers.

"Energy Efficiency First" is not just a slogan, but the most cost-effective way to support the transition to a low carbon economy and to help consumers reduce their energy bills. It is also a way to create investment opportunities, growth and local jobs. Indeed, energy efficiency brings exceptional multiplier benefits to the economy, strengthening competitiveness, helping to reduce energy dependence, contributing to GDP growth and job creation, increasing health conditions in households, combating energy poverty and reducing the level of GHG emissions.

With regards to energy efficiency, a comprehensive regulatory framework is already in place in the European Union: indeed, the Energy Performance of Buildings Directive (EPBD), together with the relevant measures under the Energy Efficiency Directive (EED) and the Eco-design and Energy Labelling legislation, provides a stable driver for stakeholders and investment decisions.

The Energy Efficiency Directive includes an at least 32.5% headline target for energy efficiency to be achieved collectively by the EU in 2030, with a possible upwards revision clause by 2023.

With regards to buildings, these are one of the most crucial elements of our policies, as the potential of the construction sector to contribute to our environmental and energy efficiency goals is enormous.

Currently, about 35% of the EU's buildings are over 50 years old and almost 75% of the buildings in Europe were built before energy performance standards existed, thus being not energy efficient at all.
Considering the low renovation rate (around 1% per year on average), the EU needs to create the conditions for fast and energy efficient renovation of its building stock, taking advantage of all technologies and progress available such as ICT, smart-building technologies and e-mobility.
A key objective of the proposal is to use buildings as leverage for e-vehicles infrastructure. E-vehicles have a critical role to play in a more sustainable, resilient and decarbonised economy. The EPBD would be an effective tool to stimulate the deployment of the recharging infrastructure in buildings' car parks. New non-residential buildings with more than ten parking spaces and non-residential buildings with more than ten parking spaces undergoing major renovation will have to equip one parking space per ten for electro-mobility. This will apply to all non-residential with more than ten parking spaces buildings as of 2025.
We estimate 8 million electric vehicles by 2030 and the proposed recharging point every 10 parking spaces would lead to the deployment of 3.11 million of the necessary charging points. Boosting the rate, quality and effectiveness of the renovation of the existing building stock is the biggest challenge for the coming decades.
The recent revision of the Energy Performance of Buildings Directive includes an ambitious package of measures aiming to:

- Increase building renovation and support decarbonisation of existing building stock;
- Link more effectively EE improvements and financial support; and
- Modernise the Directive in light of technological developments, such as electromobility uptake and smart building technologies.

In order to implement properly the regulatory framework, more financing should be made available and key barriers should be addressed.
Our impact analysis estimated that the revised EPBD will have positive effects, creating a renovation market worth € 80 to 120 billion – with well over 200 000 more jobs retained or created by 2030. Even if public financing can effectively steer investments into the desired directions, it is necessary to mobilise private financing and making the best from our limited public funds.
For that reason, the Commission also launched a specific initiative on financing called the "Smart Finance for Smart Buildings Initiative".
Attracting investment and unlocking private financing on the necessary scale is indeed particularly important to secure our energy transition.
Private investment is crucial for the stimulation of renovation of buildings in the EU. The new Smart Finance for Smart Buildings (SFSB) initiative further promotes investments for energy efficiency and renewable energy in buildings.
This initiative will achieve 3 goals:

a) Encourage the more effective use of public funds, particularly throughout financial instruments and investment platforms: As public finance alone is not enough to make the clean energy transition happen, the SFSB initiative aims to facilitate the deployment of financial instruments across Europe;
b) Help project developers bring good project ideas to maturity with more project development assistance and aggregation mechanisms. Project Development Assistance (PDA) facilities has been set up to help promoters:
    i. ELENA, managed by the European Investment Bank (EIB), supports private and public promoters to develop and launch large-scale bankable sustainable energy investments (above € 30 million), including in sustainable transport. ELENA covers up to 90% of project development costs.
    ii. PDA H2020, which helps public and private promoters develop model sustainable energy projects, focusing on small and medium-sized energy investments of at least € 7.5 million and up to € 50 million, covering up to 100% of eligible project development costs.
c) Make EE investments more trusted and attractive for project promoters, financiers and investors by providing them access to market evidence and performance track record available from the De-risking Energy Efficiency Platform (DEEP) and by developing a commonly accepted framework for underwriting investments in this area. DEEP is a pan-EU open-source database containing detailed information and analysis of over 10,000 industrial and buildings-related EE projects. It builds performance track records and helps project developers, financiers, and investors better assess the risks and benefits of EE investments across Europe.

The Energy Efficiency Financial Institutions Group (EEFIG) Underwriting Toolkit, a guide to value and risk appraisal for EE financing, was launched in June 2017. It aims to help financial institutions scale up the deployment of capital into energy efficiency. It also helps promoters develop bankable projects and can be used by public authorities to better assess EE projects that receive public funding.

The EU and its Mediterranean Partners

As you can see, the EU has one of the most sophisticated policy frameworks on energy and climate. We are not only willing to lead by example; but we also want to support our key partners in advancing their clean energy transition. The EU and its Member States are the biggest contributors of energy and climate finance to developing countries. At least 20% of the EU budget dedicated to external funding is spent on energy and climate action to help our allies to achieve sustainable development.

Our objective is to share our experience, knowledge and best practice on setting up a sustainable energy system for the future; to assist the Mediterranean Partners to create a regulatory framework that is flexible enough to adapt to the challenges of the future, and to foster a stable business environment with opportunities for the private sector. These are the objectives of our enhanced energy partnership.

The Union for the Mediterranean Platform on Renewable Energy and Energy Efficiency

The overall objective of the UfM Renewable Energy and Energy Efficiency Platform is to support the development of a RE/EE legislative and institutional environment, to enable investments in RE/EE technologies and practices in UfM Members, addressing their respective challenges, through the engagement of relevant stakeholders and the fostering of market transformations in the Region.
The Platform's objectives are for its participants to work together more inclusively and comprehensively, inter alia, on:

- Capacity-building: strengthening institutional capacity and industrial expertise;
- Exchanging best practice on (legal and regulatory frameworks to create favourable conditions for profitable investments in EE sectors);
- Identifying policies allowing EE to contribute to economic growth at the national level in UfM Members;
- Identifying appropriate policy measures to promote industrial cooperation and to allow investments in EE projects in UfM Members;
- Engaging the private sector and key financial institutions in demonstrating business models and providing innovative financial mechanisms for up-scaling investments in EE;
- Creating cross-regional knowledge base on consistent and harmonised approaches for data collection, establishing common indicators and data collection capacity for measuring EE performance;
- Developing national EE plans, by enforcing building energy codes, defining minimum energy performance standards for appliances and energy-using products, and establishing funding mechanisms for EE investments and energy storage solutions;
- Promoting the energy transition of cities and towns from the region, by proposing approaches and practices that provide practical answers to current challenges and are in line with a long-term vision of a low energy city with a high quality of life for the people in the Euro-Mediterranean region as well as by raising awareness of local populations on the needs for resource efficiency is definitely a key factor of progress.

meetMED will support the implementation of the UfM Renewable Energy and Energy Efficiency Platform. Particularly, the meetMED project team will start by an in-depth stocktaking of existing data and studies that we shall build on. Therefore, collaboration with all other actors in the region will be crucial, and I hereby call on an intense partnership.
Allow me to mention the EU4CLIMATE technical assistance project that will be launched in the coming month and will act in a very complementary manner with meetMED, in particular on the support provided to municipalities in the preparation and implementation of their Sustainable Energy and Climate Action Plans (SECAPs).

Funding

To accompany energy reforms of our Southern partner countries - in particular energy efficiency and the increase of electricity supply from renewables - the EU provides support. Bilateral and regional projects fully integrate this new trend in their work programs. In total, for more than 10 years, € 480 million grants are being implemented to support energy

efficiency and renewable energy deployment at national and local levels, in addition to some € 380 million grants that have leveraged more than € 4 billion loans through the Neighbourhood Investment Facility. But as challenges unfortunately increase, we must adapt, become more creative in order to better respond to the needs. Therefore, the Commission is now launching its new instrument: the EU's External Investment Plan (EIP).

This new European initiative aims at fostering local private investment (as well as foreign direct investment) and enhancing access to capital. A new proposed guarantee scheme - and its inherent de-risking patterns - shall play a great role to that end. It is worth mentioning the very high interest - that we see as a promising sign - expressed by IFI's on 2 out of the 5 sectors addressed by the EIP: namely, sustainable energy and sustainable cities.

I hope that this meeting and the other to follow will build on our past experiences and the acquired knowledge and contribute significantly to the extremely important goal of further promoting EE solutions in the region as part of the energy transition process.

Thank you for your attention.

❖ **Maged MAHMOUD**, Technical Director, RCREEE

The Regional Centre for Renewable Energy and Energy Efficiency (RCREEE) is a regional intergovernmental organization with diplomatic status, which is based in Cairo, Egypt. It has 17 Arab Member States and it is the strategic partner for the Arab countries driving the energy transition for the prosperity of all our people.

Energy efficiency can be a powerful and cost-effective tool to boost transition to clean energy across all sectors of our economies. Despite representing the best opportunity to reduce GHG emissions and enhance economic development, energy efficiency is far from fulfilling its potential. The 6th MEDENER International Conference in Amman wants to stress the central role of energy prices as the main bottleneck for EE and RE investments wherever electricity prices are very low, and as one of the main prerequisites for energy policy to work effectively. Can we talk about a dichotomy between energy prices and energy efficiency policies? Are we close to economic decoupling? How significant are the implied subsidies?

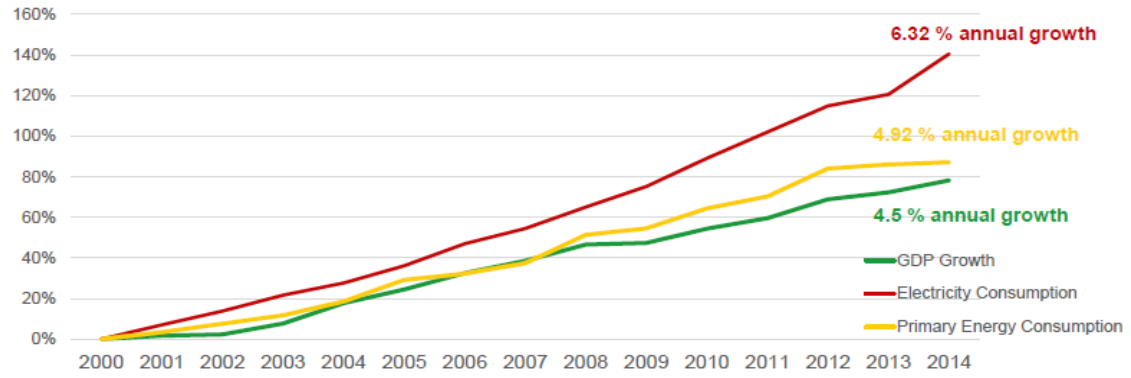
Nevertheless, prices remain the inflexible attribute to address consumers' choices and behaviours.

A deeper analysis

Economic decoupling is an indicator of resource productivity – the ability to "do more with less". At the state level, it refers to an economy's ability to grow (increased GDP) without generating an equivalent increase in the use of natural resources (such as energy, materials, water and land). Thus, the same level of economic prosperity is maintained, while the impact on the environment and natural resources is reduced.

The figure below does not indicate any sign of decoupling between economic growth and energy or electricity consumption in the Arab region. Conversely, these figures show that the Arab region is facing rapid growth in electricity consumption, with a 6.32% annual growth in

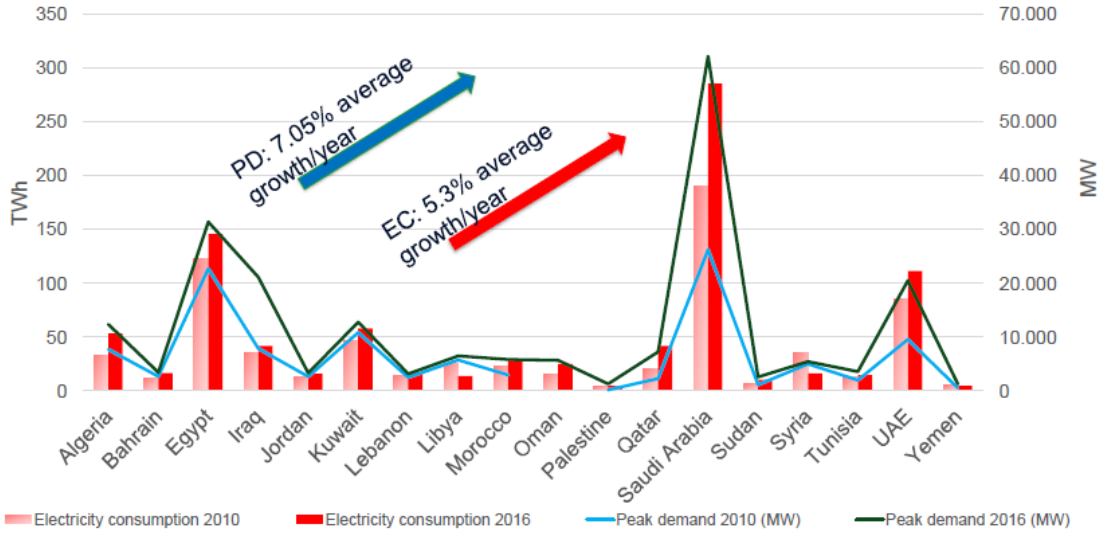
2014, compared to an annual growth rate of 4.92% and 4.5% of primary energy consumption and GDP respectively.
Furthermore, electricity consumption has grown by almost 89% over the last decade, which



Source: AFEX 2017, RCREEE

is 37% more than GDP growth during the same period. This indicates poor practices in energy efficiency, especially in the residential sector, as it is responsible for 41% of total electricity consumption in the region. Achieving economic decoupling is essential, especially in the fossil fuel dependent Arab region, in order to reduce each country's carbon footprint and environmental impact, as well as to decrease the region's dependency on energy related exports for economic growth. In order to achieve energy security, while maintaining economic development with lower carbon footprints, the region must invest more in renewable energy and energy efficiency practices and technologies. As most of the Arab region is still part of the developing world, other variables such as population growth, electrification rates and energy access, standard of living, and infrastructure are still growing at a fast rate and driving a similar growth in electricity consumption, without prompting a significant growth in GDP.

Electricity Consumption and Peak Demand, 2010-2015



Source: AFEX 2017, RCREEE

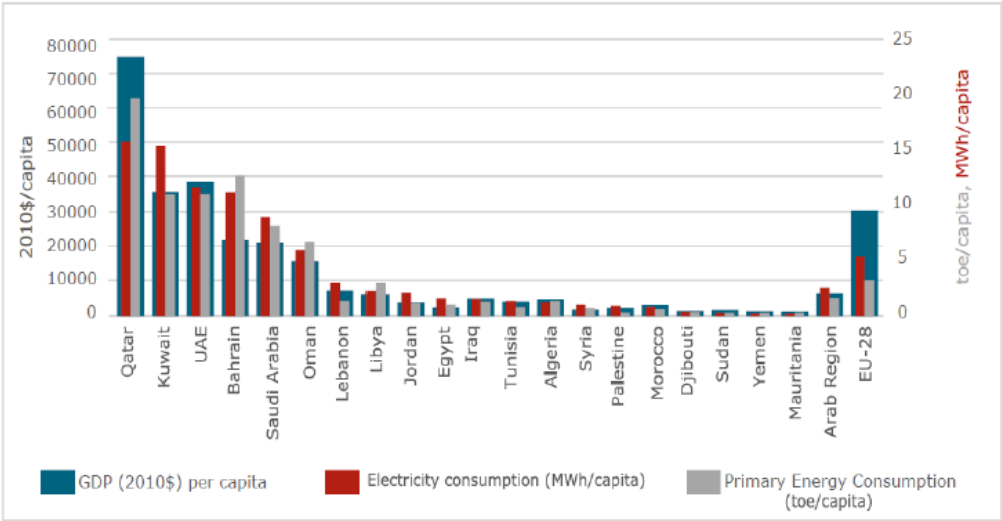
The residential sector is still the most subsidised sector in the region: Electricity prices in the residential sector have mainly stayed the same with increases occurring mostly in Egypt, Syria, and for expatriates in Bahrain. Nonetheless, we notice a significant increase in electricity

prices for both the industrial and commercial sectors in the region in the past two years, which indicates that most Arab states have undertaken reform steps to reduce energy sector subsidies.

Focusing now on the Southern shore of the Mediterranean, it must be noted that the Arab region is still struggling to adhere to the international community's common emission reduction commitments: The region mainly relies on fossil fuels for primary and final energy consumption, despite many governmental initiatives aiming to reduce energy related environmental impacts. Furthermore, the high level of energy subsidies implemented in the region, greatly hinders any incentive on the consumers' side to reduce their energy consumption and invest in energy efficient technologies.[1]

As the graph below demonstrates, countries with the lowest energy prices and highest incomes per capita have the highest primary energy and electricity consumption per capita. Thus, energy prices, together with income per capita and climatic conditions, are the main cause for energy and electricity consumption per capita. As such, increasing energy prices by reallocating and reforming the energy subsidy system might help promote EE practices.[2]

Per Capita Primary Energy Consumption, Electricity Consumption and GDP



Source: AFEX 2017, RCREEE

Nonetheless, energy subsidies remain a significant barrier for end user EE investments in the Arab region, as the region holds 43% of proven oil reserves and 29% of proven gas reserves.[3] Most Arab countries, however, are adopting strategies and reforms to reduce energy subsidies in order to achieve energy security and reduce budget deficits, due to the recent plunges in oil prices (reaching $26/ barrel in February 2016) and the decrease in electricity prices from renewable sources. Pre-tax energy subsidies in the Arab region, which account for 31% of energy subsidies in the world in 2013, have dropped from $168 billion in 2013 to almost $92 billion in 2015 (IMF, 2015).

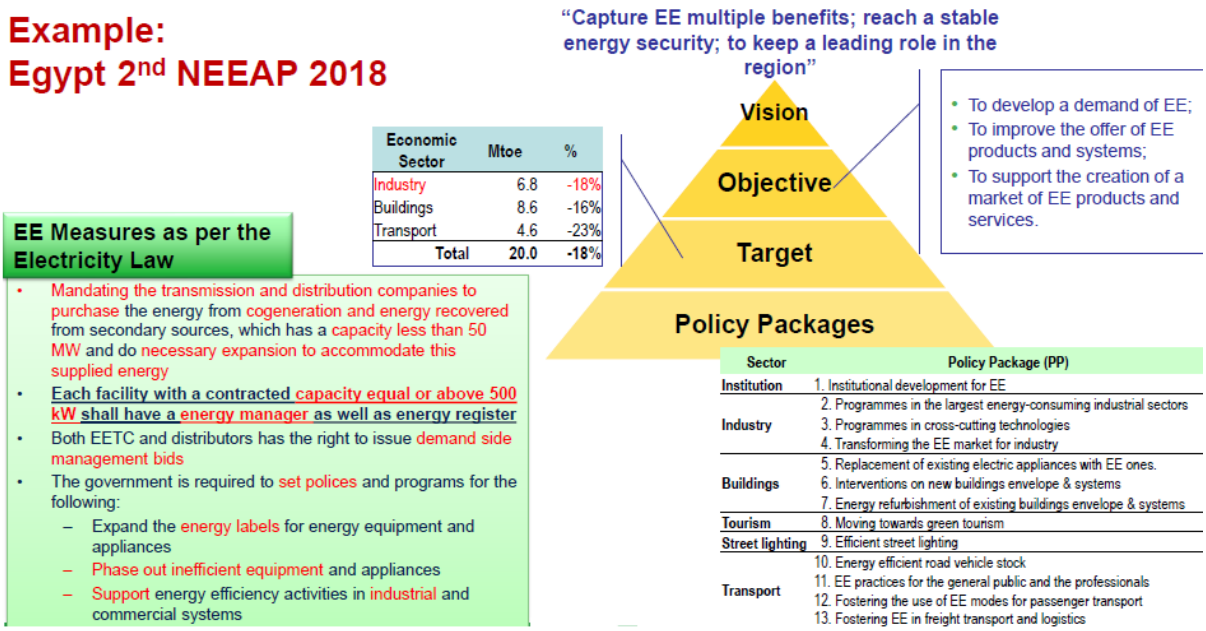
The general trend in regional electricity subsidy reforms is to increase electricity tariffs and electricity prices for residential and non-residential consumers. Investing in energy efficiency further improves social welfare through the development of a new market, creating badly-

[1] RCREEE, Arab Future Energy Index (AFEX)- Energy Efficiency, 2017, p.1.
[2] *Ibidem, p.18.*
[3] *Ibidem,* p. 22.

needed jobs in the region. In 2017, 11 countries have undertaken energy subsidy reforms in the MENA region, namely Morocco, Tunisia, Egypt, Sudan, Jordan, Syria, Yemen, Oman, Qatar, U.A.E and Bahrein. By investing more in the promotion of end user energy efficiency, national governments improve social welfare by lowering citizens' expenses on energy commodities.
A simple widespread solution to achieve energy efficiency is the implementation of properly designed and targeted conservation and demand management programmes concerning the national level adopted by several Arab states, such as Saudi Arabia, Morocco, Kuwait, and Tunisia. However, being it a replicable model, many other countries have preferred to implement National Energy Efficiency Action Plans (NEEAPs), based on the Arab Energy Efficiency Guidelines issued by the Arab Ministerial Council for Electricity (AMCE) in 2010.
The Guidelines request:

- Effective involvement of state/public sector in EE activities;
- Governance of EE sector should be established;
- Availability of incentives to encourage the implementation of EE improvement projects;
- Ensure accuracy of energy savings calculations, based on clear methodology and robust data;
- Utility sector is responsible for providing data and operates according to good practices to achieve energy efficiency in their systems;
- Professional training and capacity building.

Other implemented solutions include developing thermal insulation codes, mandatory energy labels on appliances and equipment, energy audits, rebates and coupons, minimum energy efficiency standards (MEPS), awareness campaigns, EE funding programs, tax relief on EE equipment, and various other incentives.
In the MENA region, 18 NEEAPs have been put in place and are currently at different stages of their implementation. By setting targets guiding the development of national EE policies, they contain common measures, which include: setting indicative targets for EE; developing EE legislation related to buildings, industry and transport; creating EE funds, fiscal and financial incentives; spreading solar water heaters; elaborating labels, standards and indicators for minimum energy performance; and banning importation of inefficient lamps and equipment.



In order to financially sustain these changes, Sustainable Energy Public Funds have been already created in Morocco (EDF), Algeria (FNMEERC), Tunisia (FTE), Egypt (GEFF), Palestine (Revolving Fund), Lebanon (NEEREA), Jordan (JREEEF) and United Arab Emirates (DGF) and electricity prices have been increased in Egypt, Jordan, Morocco, Yemen, Sudan, Tunisia and Syria. Furthermore, specialised EE agencies and units have been established for instance in Morocco (AMEE), Algeria (APRUE), Tunisia (ANME), Libya (REAOL), Egypt (EE and climate change unit), Jordan (EE Department at the Ministry of Energy and Mineral Resources, Lebanon (ICEC), Palestine (PEA) and Syria (NERC). Despite different significant reforms across the region, electricity and fuel prices remain well below the global average in most Arab countries.

Overall, although the countries on the Southern shore of the Mediterranean have witnessed an unprecedented wave of energy subsidy reforms, Arab countries still need to further develop and implement EE regulations, initiatives and programs especially for the transportation sector, as this latter is responsible for around 30% of final energy consumption in the region. In addition, EE agencies in the Arab region are commonly dispersed amongst different ministries and institutions, thus hindering the enforcement of effective policies. Other pressing challenges concern the widespread lack of awareness about the benefits of promoting and investing in RE and EE measures as well as the low priority conferred to the introduction of a transparent subsidy reform plan in the energy intensive industrial sectors, such as food, packaging, glass, fertilizers and pharmaceutical industries.

More precisely, on the one hand, support mechanisms to promote RES could become impracticable, whenever incentives exceed the costs of the commodities faced by the consumers. On the other hand, energy efficiency remains difficult to foster inasmuch as end-users have no incentives to invest in EE measures or to change consumption behaviours. Thus, achieving economic decoupling[4] at national level will be essential, as this would imply maintaining the same level of economic growth and achieving energy security, while reducing the national carbon footprint. The future will be based on smart solutions incorporating energy, IT and communication technologies.

[4] *Ibidem,* p. 19.

❖ **Dario CHELLO –** President, MEDENER

Despite the wide consensus on the Paris Agreement and the great efforts announced by governments all over the world through their ambitious nationally determined contributions (NDCs) in response to the threat of climate change, more recent studies demonstrate that more needs to be done to keeping a global temperature rise below 2°C above pre-industrial levels and even further to 1.5°C. To fulfil and bring forward the commitments established in Paris, the European Union fosters many initiatives in the energy sector for advancing the cooperation between the Northern and Southern shores of the Mediterranean under the European Neighbourhood Policy (ENP). Overall, the EU and its Member States are the biggest contributors of energy and climate finance to developing countries.

In this context, the European Commission is financing programmes and projects aimed at assisting national and local authorities in the Southern Neighbourhood to enhance strategic planning towards low carbon development and climate resilience.

The Mitigation Enabling Energy Transition in the Mediterranean region (meetMED) project is one of these programs. meetMED is an EU-funded project developed by MEDENER and RCREEE to support regional cooperation - particularly in the framework of the Renewable Energy and Energy Efficiency Platform of the Union for the Mediterranean (UfM) - and to build technical capacity for energy transition in Southern and Eastern Mediterranean (SEM) countries. Partner institutions are either the energy agencies in the network of the MEDENER association or the energy governmental departments in the network of RCREEE.

The 6th MEDENER International Conference on Energy Transition in the Euro-Mediterranean Region is an integral part of the activities of the meetMED project. It focuses on energy efficiency and energy prices: The decreasing costs associated with the use of RE and EE measures make them advantageous economic opportunities, thus theoretically leading to an increase of the investments in clean energy and a wider access to it but this is not always the case. Electricity prices are a prerequisite for an effective energy policy and, at the same time, the main bottleneck for energy efficiency and renewable energy investments where electricity prices are very low. This is the case in many countries on the Southern shore of the Mediterranean, which are the beneficiary countries of the meetMED project, where energy prices are strongly supported by the state and where distribution and sales companies complain of a significant amount of unpaid bills every year. The beneficiary countries of the meetMED project are Algeria, Egypt, Jordan, Lebanon, Libya, Morocco, Palestine and Tunisia.

As part of the meetMED activities, the 6th MEDENER conference is an opportunity to address the challenge of implementing RE and EE policies in SEM countries as well as of mobilising RE and EE investment opportunities and jobs. Through events and publications, the meetMED Project is meant to facilitate decision-making by public authorities and to provide a solid technical background and policy guidance. Furthermore, it aims at creating links among - and capitalising on - existing instruments of international and regional cooperation in the field RE and EE.

With respect to energy efficiency, the Action envisages the creation of two specific task forces within the Regional Expert Network (REN), aimed at tackling the implementation of EE and RE measures in the building sector and appliances, which are intensive energy consumer areas. Besides, a database on existing measures to implement regulations on RE and EE will be soon compiled: a network of national experts is making available appropriate tools, based on a set of RE, EE and climate indicators shared at the regional level, in order to monitor the national action plans on EE (NEEAPs) and RE (NREAPs) and to benchmark policies at the regional level. The Project entails also the development of transnational technical and vocational training packages, among which one will be focused on the integration of EE and RES in buildings. With respect to EE, this will include information concerning both the structural components of the building and its electromechanical equipment and behavioural aspects. Moreover, the Project is mapping EE market potential areas with higher impact on local economy and job creation for some representative SEM countries. Finally, it aims at elaborating also a regional tool measuring the impact of investments in EE and RE projects on job creation and local economic growth.
Thank you.

4. KEYNOTE SPEECHES

Energy Prices and Energy Efficiency: the EU and the Jordanian experience

❖ **Alberto POTOTSCHNIG** - Director, Agency for the Cooperation of Energy Regulators (ACER)

The EU has committed to ambitious EE targets, namely 20% by 2020 and 32.5% by 2030. Nowadays, the problem of the world is decarbonising the economy: thus, we clearly understand the need for a target on GHG emissions or on RE but why do we need a target for EE? Back in 2005, the European Commission issued the green paper "Doing more with less", where they claimed that - at the time - a 20% target of energy efficiency can be obtained at negative cost, as the EE would pay back itself. In a market economy, why do we need targets for EE, if it seems to be convenient to invest in EE measures? Because, this "automatic" payback is not happening for some reasons. The European Union has taken the issue seriously for several years now and it has committed to 1.5% reduction in industrial energy consumption to achieve the 20% overall target. The EU promotes energy efficiency through a combination of administrative measures, price signals and market-based instruments. Particularly, the EU member states must perform EE renovations to at least 3% of buildings owned and occupied by central governments every year and prepare National Energy Efficiency Action Plans (NEEAPs) every three years. The EU also committed to an annual reduction of 1.5% in national energy sales and to the protection of consumers by granting them easy and free access to data on real-time and historical energy consumption. There are two main pillars of no market-based instruments for improving the energy performance of our economies: one is energy labelling and the other eco-design.
On the one side, the EU adopted minimum EE standards and labelling for a variety of products as well as guidelines on good practices in EE published by the Commission and mandatory EE certificates accompanying the sale and rental of buildings. Large companies in the region must conduct energy audits at least every four years and the roll-out of almost 200 million smart

meters for electricity and 45 million for gas has been planned. On the other side, the EU legislation on eco design eliminates the least performing products from the market by aiming to make products more energy efficient and it supports industrial competitiveness and innovation by promoting better environmental performance of products. In addition, consumers' responsible choice is assisted by a system of energy labelling, where products are currently labelled on a scale from A+++ (most efficient) to G (least efficient). From 2021, products will be grouped in five categories (refrigerators, dishwashers, washing machines, TVs and lamps) and gradually relabelled from A to G (with the current A+++ becoming B). In order to better protect consumers' rights, manufacturers will upload information about their products onto a registration database - accessible and searchable – before placing these products on the European market.

Buildings represent another major strand for the EU policies. In fact, buildings are responsible for approximately 40% of energy consumption and 36% of CO2 emissions in the EU, due to the fact that about 35% of them are more than fifty years old and almost 75% are energy inefficient. Despite this, only 0.4–1.2% of the building stock – depending on which country they are in – is renovated each year.

Therefore, more renovation of existing buildings has the potential to deliver significant energy savings, potentially reducing the EU's total energy consumption by 5-6% and lowering CO2 emissions by about 5%.

The building sector is currently regulated by the Energy Performance of Buildings Directive, adopted in 2010, and by the Energy Efficiency Directive, adopted in 2012.

According to the legal framework in place:

- All new buildings must be nearly zero-energy buildings by 31 December 2020 (public buildings by 31 December 2018);
- At least 3% of the total floor area of buildings owned/occupied by central government shall undergo energy efficient renovation every year;
- EU governments should only purchase highly energy efficient buildings;
- Energy performance certificates must be issued when a building is sold or rented, and they must also be included in all advertisements for the sale or rental of buildings;
- Member States must establish inspection schemes for heating and air conditioning systems or put in place measures with equivalent effect;
- Member States must set cost-optimal minimum energy performance requirements for new buildings, for the major renovation of existing buildings, and for the replacement or retrofit of building elements (heating and cooling systems, roofs, walls …);
- Member States must draw up lists of national financial measures to improve the energy efficiency of buildings;
- Member States must draw up long-term national building renovation strategies (possibly as part of their NEEAPs).

The current regulatory framework has been amended by the Clean Energy Package, whose transposition is due by 10 March 2020. According to the provisions on EE contained in the Package presented by the EU Commission on 30 November 2016:

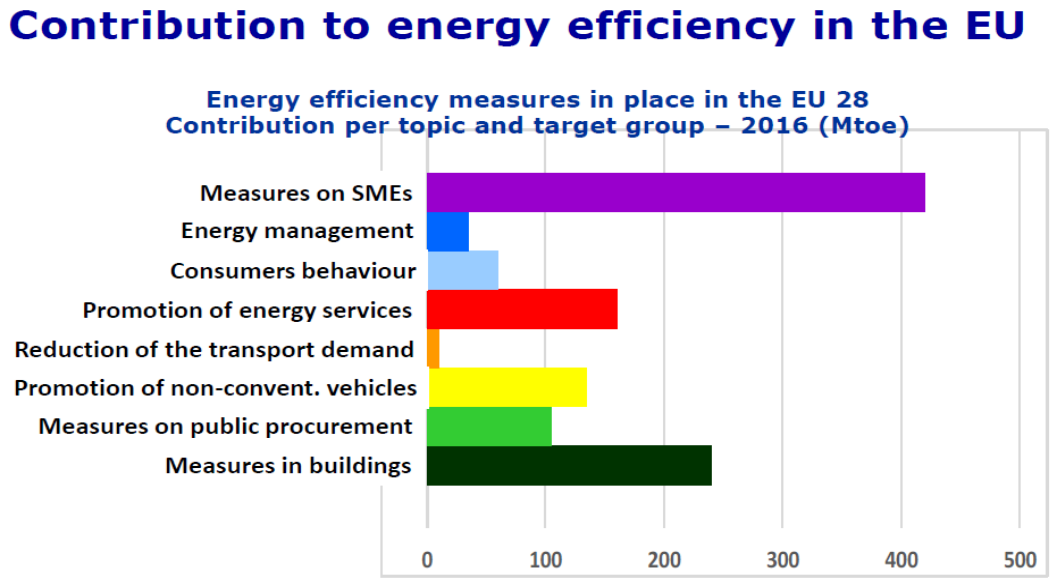
- Member States will have to establish stronger long-term renovation strategies, aiming at decarbonising the national building stocks by 2050, including a solid financial component;

- A common European scheme for rating the smart readiness of buildings, optional for Member States, will be introduced;
- Smart technologies will be further promoted, for instance through requirements on the installation of building automation and control systems and on devices that regulate temperature at room level;
- E-mobility will be supported by introducing minimum requirements for car parks over a certain size and other minimum infrastructure for smaller buildings;
- Member States will have to express their national energy performance requirements in ways that allow cross-national comparisons;
- Health and well-being of building users will be promoted, for instance through an increased consideration of air quality and ventilation.

Over the last years, significant EE improvements have been made in the European Union. Namely:

- Approximately 480 energy savings measures recoded to fulfil EE objectives;
- Energy intensity in EU industry decreased by 16% between 2005 and 2014;
- New buildings consume half of the energy they did in the 1980s;
- More efficient appliances are expected to save consumers €100 billion annually – about €465 per household – on their energy bills by 2020;
- The share of refrigerators in the highest EE labelling classes (A and above) increased from less than 5% in 1995 to more than 90% in 2010.

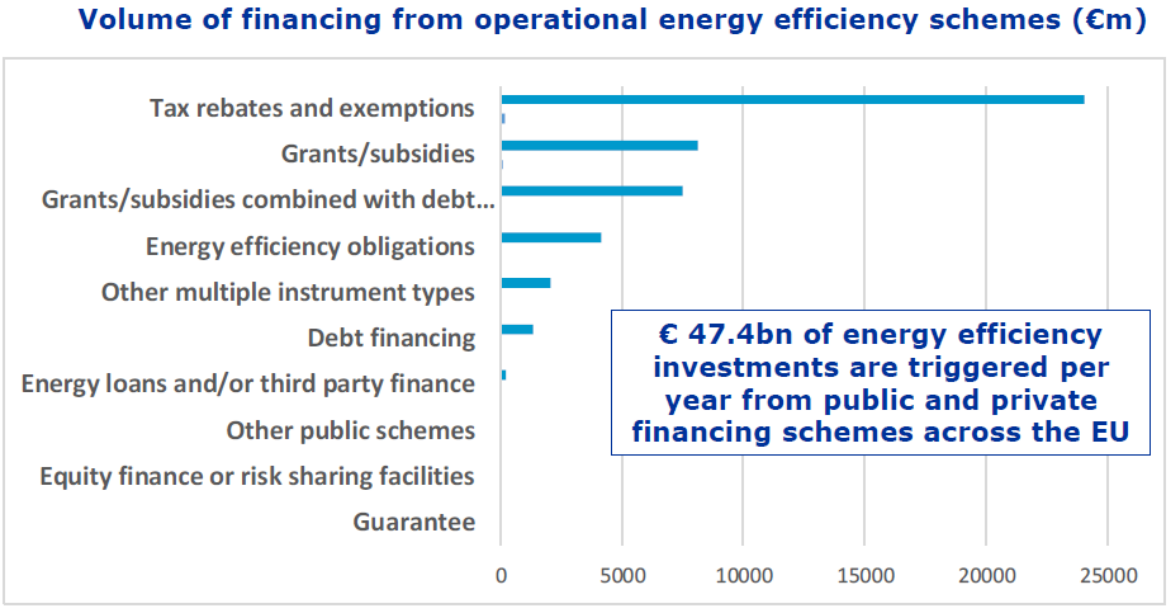
As shown by the graph below, significant improvements have been made especially thanks to the implementation of measures on SMEs and buildings as well as to the promotion of energy services.



SOURCE: Data from MURE database

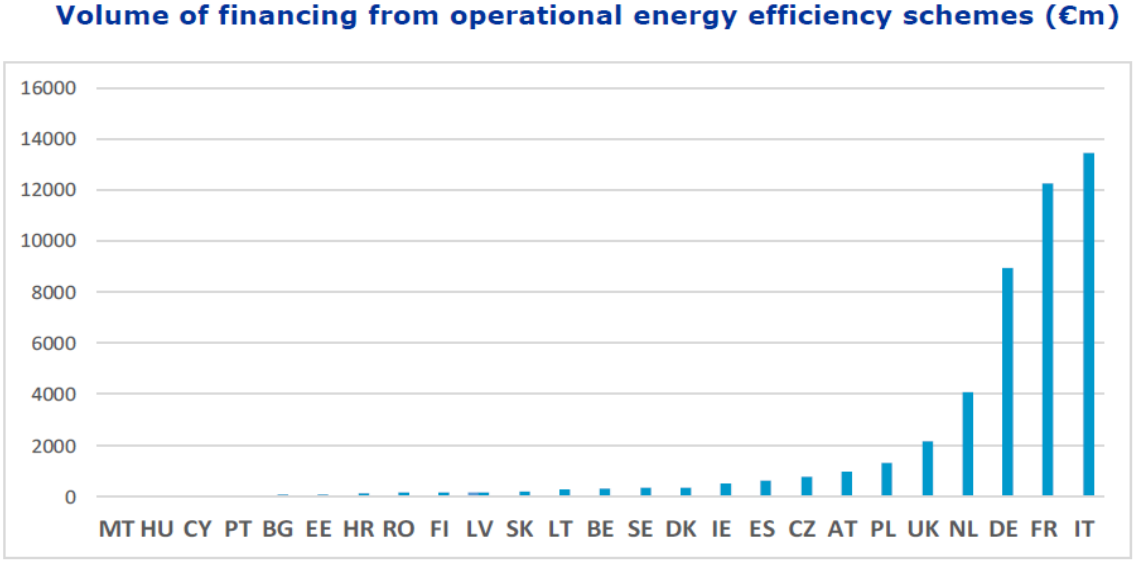
Even though EE is market viable, if we look at what instruments are used where we do not have problems of pricing reflecting the costs, the most commonly-used EE financing schemes in the EU are grants and subsidies, debt financing, as well as tax rebates and exemptions.

Around €47.4 billion of EE investments are triggered per year from public and private financing schemes across the EU.



Source: European Commission (2018)

Italy has the highest volume of financing from operational EE schemes, followed by France and Germany.



Source: European Commission (2018)

Energy efficiency obligations require energy suppliers and/or distributors to deliver a specified amount of end-use energy savings within a defined period. Energy efficiency obligations typically involve a financial contribution from the obligated parties to the overall investment cost of EE technologies/improvements. Energy supplier obligations or any certificates issued for meeting the obligations may be traded.

Thanks to directive 2012/27/EU on energy efficiency, EU Member States must put in place the so-called EE Obligation Schemes (EEOSs), which require energy companies to achieve energy savings at the level of 1.5% of their annual energy sales to final consumers by

implementing EE measures. Alternatively, other policy measures are accepted inasmuch as energy savings are stimulated.

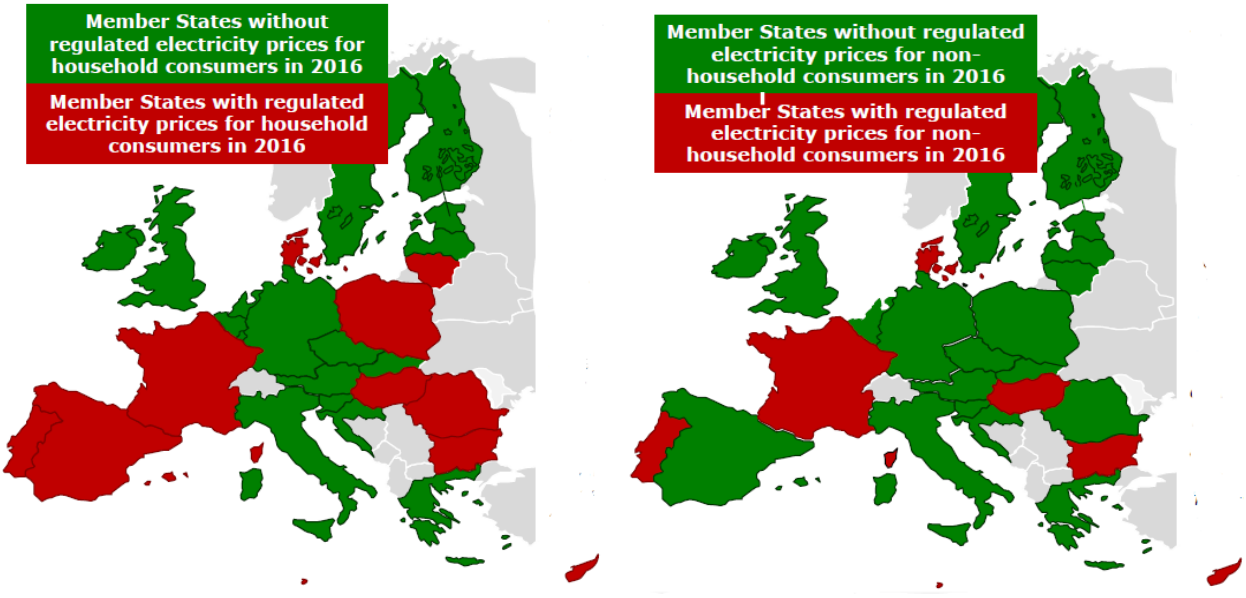
Italy is a positive example of EEOSs. Since 2004, the Italian government has established the Energy Efficiency (White) Certificates (EECs), which are tradable certificates attesting energy saving in final energy use. EECs are issued in respect to energy savings delivered by admissible EE projects, for the full duration of the projects, as defined in legislation (typically 0 years). They can be used by electricity and gas Distribution System Operators (DSOs) to fulfil their EE obligations. EECs are traded on the platform provided by the Energy Market Operator. More than 14 000 projects were completed, and 5 million EECs issued, resulting in €600 million in investment for one year (2013).

France is another successful example of EEOSs. Indeed, the French Energy Saving Certificates brought the EEOS closer to the consumers by offering incentives, such as low interest loans for investments in energy saving measures and rebates. In addition, a number of hypermarkets and DIY stores granted rebates to their customers via '*prime énergie*' vouchers, which were exchanged against invoices for energy performance works. From 2011 to 2014, 1 million energy efficient individual boilers, 480 000 wood burning/biomass stoves and collective boilers in 400 000 apartments were installed in France. It is estimated that the scheme triggered some €3 billion worth of investment between 2014 and 2017.

As the Italian and French examples demonstrate, the combination of EEOSs and alternative measures has been a key driver for enhanced EE actions resulting in tangible energy savings, economic, social and environmental benefits as well as for developing new business models for suppliers and the delivery of cost-efficient EE services at competitive prices. The successful implementation of EEOSs depends on targeting end-users and on synergies with other schemes. The engagement and acceptance of the consumer is key to delivering energy savings by behavioural change. Energy consumption data can help consumers change their behaviour and become more energy efficient.

The EU is currently phasing out regulated end-user prices for electricity household and non-household customers. Most of the Member States have already phased out regulated end-user prices for electricity household and non-household customers, meaning that all households and, in some cases, small enterprises have "the right to be supplied with electricity of a specified quality within their territory at reasonable, transparent and non-discriminatory prices".[5]

[5] Directive 2009/72/EC, art. 3 par. 3.

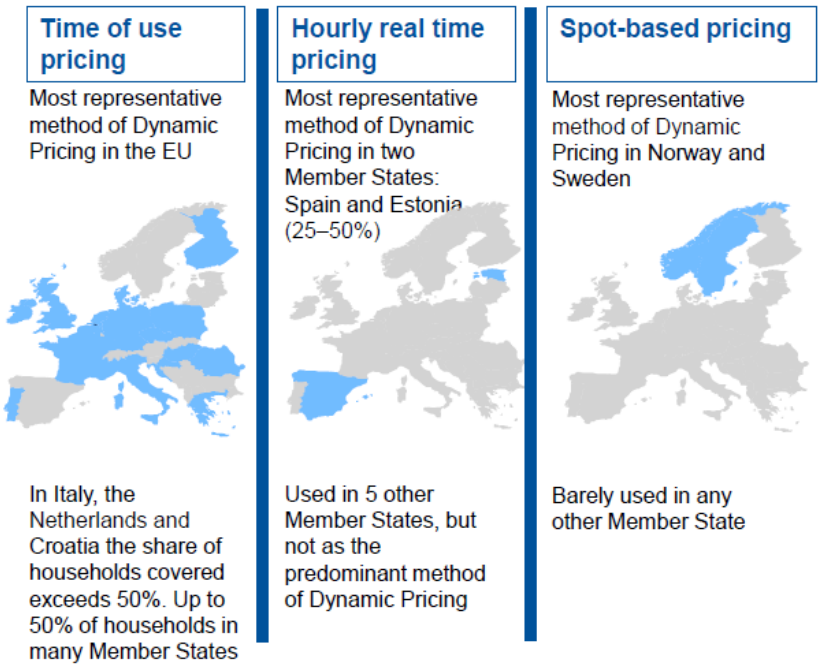


Source: CEER, Retail Markets Monitoring Report (2017)

In the EU Commission's proposal to recast the EE Directive 2009/72/EC, price remains a key element to regulate energy supply, inasmuch as Member States are responsible for ensuring effective competition between electricity suppliers and for intervening in price setting for the supply of electricity for energy poor or vulnerable household customers only during five years after the potential entry into force of the new legislation.

Under the current EU policy framework, an efficient level of energy consumption and energy efficiency is promoted thanks to prices reflecting the full cost of delivering energy to final consumers (not just generation and supply of energy but also networks renewable support, taxes and VAT).

Dynamic Pricing for the supply of electricity to household consumers - 2015



Prices reflecting the full cost of delivering energy to final consumers promote an efficient level of energy consumption and energy efficiency. Currently, energy prices paid by final consumers include a large share of components not related to the cost of delivery. Also, in some Member States, final prices do not move in line with wholesale energy prices.

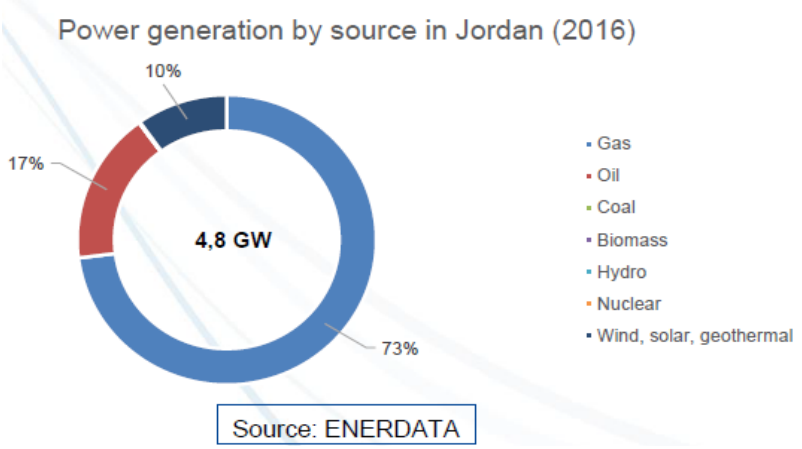
In all Member states where dynamic network pricing exists for the supply of

Source: ACER

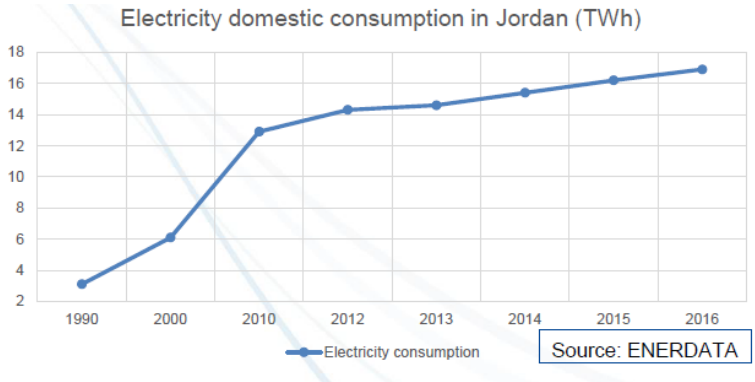
electricity, time of use is the predominant method of dynamic pricing.
In conclusion, from a European perspective final energy prices may definitely represent a problem for competition in the energy retail market and for the demand/response shifting, which will increasingly be needed to deal with the increasing share of RES-based generation. Nonetheless, it remains still uncertain if prices may represent a problem for energy efficiency, as there are significant externalities, which are not reflected in energy prices for energy consumers.

❖ ***Wijdan AL RABADI*** - *Vice President of MEDREG and Deputy Chairman of Energy and Mineral Regulatory Commission (EMRC)*

The main objectives of the Jordanian energy policy are reducing energy supply costs and the national dependence on imported oil. At this regard, some measures have been taken starting from the 1990s: Deregulation of the electricity sector started in the late 1990s; the creation of a national regulator - the Electricity Regulatory Commission- in 2002; and, after a few years, the launch of the Energy Master Plan to boost EE investments at national level. Since 2012, the Jordanian government has set its RE targets at 10% of the energy mix by 2020 and at 25% by 2030, originating manly from wind, solar and waste energy. In 2014, the Energy and Minerals Regulatory Commission (EMRC), which regulates electricity, gas, mining and nuclear resources, as well as renewable energy, oil and petroleum in Jordan, has been created by law.



By analysing specifically the Jordanian Energy Sector, with respect to power generation it can be noted that the country's electricity capacity reached the level of 4.8 GW at end of 2016, that electricity production has more than doubled since 2004, from 8.4 TWh to 19.7 TWh in 2016 and that the share of gas in total production increased rapidly until 2009 (from 50% in 2004 to 90%) but dropped significantly from 2010 to 2015, due to imports constraints.
Regarding energy consumption instead, Jordanian overall consumption (8.5 Mtoe in 2016) increased by 4% per year between 2000 and 2015 and decreased in 2016 (-2.2%). Oil is the country's main energy source, with 57% of total consumption, whilst gas accounts for 36%. Furthermore, electricity consumption reached 16,9 TWh in 2016 where households accounted for 44%, industry for 23% and services for 17% and it increased at an average rate of 23,2% in the last two decades. Finally, energy consumption



has grown at an average rate of 3.4% per year since 2000. Oil products are the main source for final consumers (67% in 2016), followed by electricity (24%) and coal (6%).
Despite this, because of its multiple benefits, energy efficiency has become the "first fuel" fostering economic and social development. Therefore, Jordan has started to implement EE measures aimed at achieving 20% savings in all sectors by 2020. The last of the two energy saving plans started to be implemented in April 2018 and foresees savings equal to 2000 GW between 2018 and 2020, thanks also to the establishment of the Jordan Renewable Energy and Energy Efficiency Fund (JREEF), responsible for mobilising investments in both RE and EE fields.
In 2016, power generation in Jordan had already reached the 10% target of RE in the energy mix previously set, particularly through the implementation of targeted legislation, by controlling RE electricity generating companies and by issuing licences and permits. As a matter of fact, since 2016 the Energy and Minerals Regulatory Commission (EMRC) issued new regulations for the sale of electrical power generated from renewable energy source systems (NET measurement) without limiting the highest total RES systems attached to the medium-and low-pressure networks for distribution companies. Furthermore, a new system of licenses for the design, supply, installation, operation, maintenance and inspection of RES systems has been issued together with a mechanism for calculating the rate of purchasing electric power from RES (benchmark) and the standard model of the Connection Agreement for wind energy projects.
Concerning the grant of new licenses and permits, Jordan took concrete actions to regulate the access to licenses for physical people in carrying out the supply, installation and operation of renewable energy systems. In addition, exemptions are expected for those companies and eligible people in the case of direct offers under the Renewable Energy Act. Finally, connection agreements for the Wind/Noise and the Wind/Storm energy projects as well as the Energy Purchase Agreement and the Convention on transport network connectivity for solar energy projects have been recently approved by the government.
With respect to control and inspection procedures, many electricity distribution companies and 12 electric power generation companies have been put under control as well as their stations under construction. The Authority keeps monitoring licensed companies to generate electricity from renewable energy systems under the conditions set out in the license.

5. Session 1: Energy Efficiency for households and transport

❖ ***Muhieddin TAWALBEH*** *- Head of Energy Efficiency & Solar Thermal Division, NERC Jordan*

The case study presented is "Accelerating 0-emission building sector ambitions in the MENA region", which is a two-years project implemented by NERC Jordan in cooperation with the German company ECOFYS and financed by the International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) in light of the national commitments deriving from the Paris agreement and in response to the Jordanian energy consumption trends.
In Jordan, primary energy consumption mainly derives from oil (56,6%), followed by natural gas (35%) and solar energy (5%). Energy is consumed primarily by the transportation sector (49%) and the residential sector (23%), whilst the industrial and commercial sectors account for only the 14% of energy consumed each. Thus, according to figures in 2017, the building

sector - including commercial, public and residential buildings - consumes more than 60% of the total national consumption of electricity. Considering these figures, the Jordanian legal system has produced several codes related to EE in buildings, namely: The EE buildings code, the solar energy code, the thermal insulation code and the green building manual.

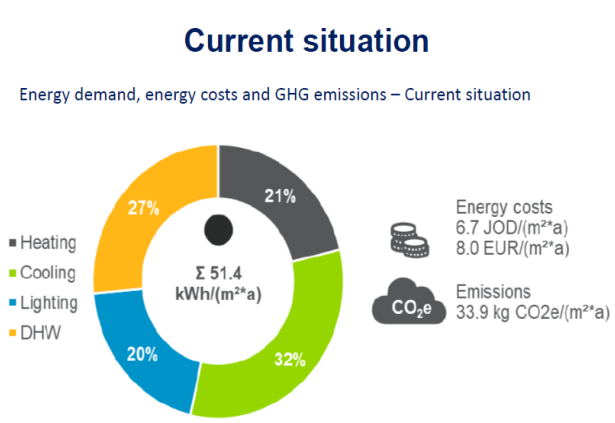
With respect specifically to the presented project, it must be noted that the project focuses on improving EE in buildings through the uptake of highly energy efficient and/or renewable energy-based heating and cooling systems in new multi-family residential buildings. The main objective has been put on cost-benefits and the development of packages of measures based on their pay back period. These should ensure transparent solutions, which can be selected by the project team.

Measure	Baseline
Roof insulation (U-Value)	0.55 W/m²K
Wall insulation (U-Value)	0.57 W/m²K
Floor insulation (U-Value)	0.8 W/m²K
Windows (U-Value; G-Value)	5.7 W/m²K; 0.85
Window fraction	Ø 11%
Shading	no
Air tightness	0.25 1/h
Heat supply	reversible split unit - COP 2.5
Cold supply	reversible split unit - COP 2.5
Hot water	electric instantaneous
Ventilation systems	Natural ventilation
Lighting systems	CFL
Renewable energy	No
Set temperature cooling/heating	24°C/ 21°C

The different measures have been divided in gold, silver and bronze ones according to their payback time: respectively, less than 15, 5 and 2 years.

Implemented measures demonstrated overall that investing in EE solutions is cost-efficient in terms of a decreased energy demand, despite their different pay-back timing. These measures include:

- the use of types of windows reducing transmission;
- the reduction of window fractions and air leakages;
- shading;
- the use of highly efficient and cost optimal cooling systems;
- shifting from CFL to LED light bulbs;
- installation of single or combined solar thermal and PV solutions;
- adjusting set temperature for cooling by increasing it by 1K;
- lower set temperatures for heating than the current baseline of 21°C.



By implementing the Bronze package, which includes improved heat and cold supply efficiencies, LED lighting and adapted set temperatures, it has been demonstrated that energy costs will drop from the current 8 EUR/(m²*a) to 5.6 EUR/(m²*a) while cutting CO2 emissions for 10 kg CO2e/(m²*a) - from the current 33.9 kg CO2e/(m²*a) to 23.9 kg CO2e/(m²*a).

Results from the implementation of the Silver package, which incorporates more efficient windows, static shading, further improved heat and cold supply efficiencies, LED lighting and adapted set temperatures, show that

energy costs will drop from the current 8 EUR/(m²*a) to 2 EUR/(m²*a) while cutting CO2 emissions from the current 33.9 kg CO2e/(m²*a) to 8 kg CO2e/(m²*a).
The results associated to the employment of the measures forming part of the Gold Package - more high-performance windows, automated shading, highly efficient heat and cold supply efficiencies, LED lighting, adapted set temperatures and onsite solar heat and power generation – are major. In fact, if widely implemented, these measures would make energy costs and emissions drop respectively to 1.8 EUR/(m²*a) and 7.5 kg CO2e/(m²*a).

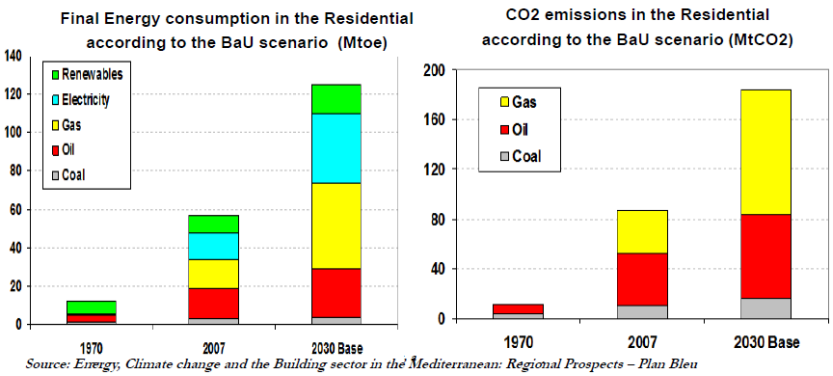
❖ *Adel MOURTADA - Expert Senior Energy & Climate change, ALMEE*

The case study presented concerns EE for households in the Mediterranean region with a special focus on Lebanon.

Building sector perspectives in the Mediterranean Region

Demographic trends and urbanization phenomena deeply influence the demand in the residential sector. Population in the Southern and Eastern Mediterranean countries (SEMCs) is expected to reach 360 million people by 2030. This demographic boom, associated with exodus from rural areas, will definitely imply a huge increase in the demand for housing in the urban areas.

Final Energy consumption in the Residential according to the BaU scenario (Mtoe) in the SEMCs

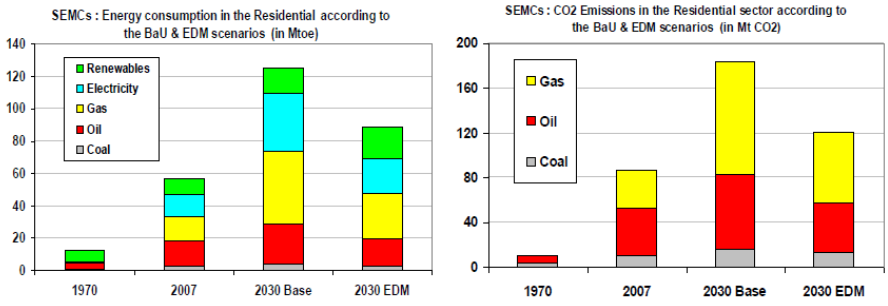


Source: Energy, Climate change and the Building sector in the Mediterranean: Regional Prospects – Plan Bleu

Migration from rural to urban areas is expected to lead to an overall increase in energy demand, resulting in an increase of energy consumption especially in the residential, transportation and power production sectors.
In a business-as-usual (BaU) scenario, the trends in the use of EE technologies and RE in buildings as well as the improvement of EE in new domestic devices are taken into consideration. According to the BaU scenario, by 2030 energy consumption for the residential sector will increase by 4% per year, thus reaching about 185 Mt CO2 emissions.
An alternative future scenario is the "Energy Demand Management" scenario (EDM) or "Demand Side Management" scenario (DSM), which entails:

- a widespread efficient insulation of the envelop in new buildings;
- the gradual elimination of traditional incandescent light bulbs;
- thermal retrofitting of buildings;
- huge dissemination of energy efficient domestic devices;
- the dissemination of solar thermal water heaters (SWH).

Reduction of the energy and CO2 emissions in the Residential in SEMCs (EDM Scenario)



Source: Energy, Climate change and the Building sector in the Mediterranean: Regional Prospects – Plan Bleu

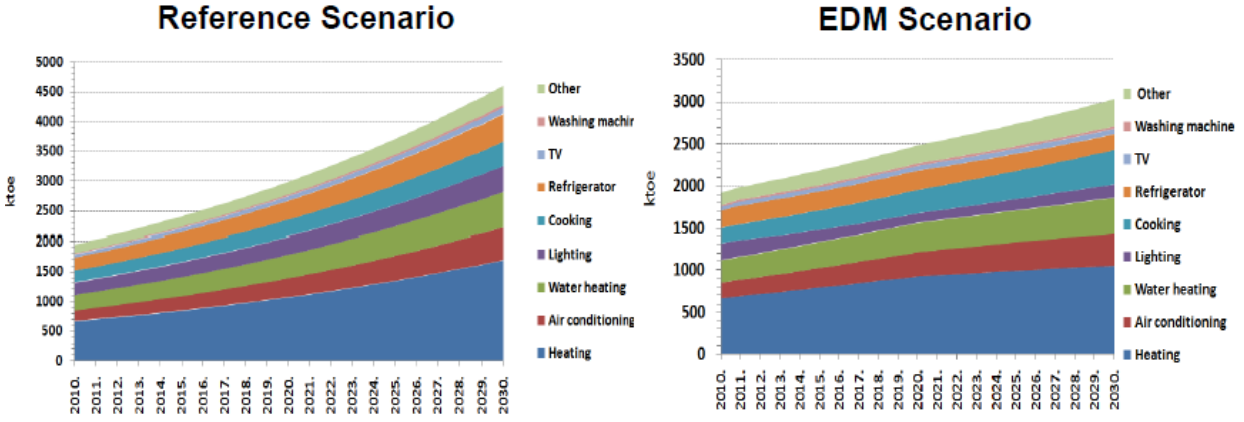
Since these measures are more - or less - efficient depending on the geographical areas of intervention, EE solutions shall be prioritised according to the specific SEM country. In the EDM scenario, energy consumption in the residential sector will be reduced by about 28% by 2030, same as CO2 emissions that will be reduced by about 1/3. If the measures envisaged in the EDM scenario are implemented in SEMCs and are in line with experts' predictions, €262 billion will be necessary for reaching the previous mentioned energy targets.[6]

Building Sector's Perspective in Lebanon

In the perspective of an "Energy Demand Management" scenario (EDM), annual savings in final energy consumption in the Lebanese residential sector are estimated at 1.5 Mtoe.

By looking at the concrete results of the National Energy Efficiency Action Plan (NEEAP) for Lebanon (2011-2015), more needs certainly to be done to achieve the targets set on EE, as most of them were no or partially achieved. For instance, conversely to the objectives of the NEEAP 2011 - 2015, the import of incandescent lamps to Lebanon was not banned, no legislation was adopted on energy conservation, a Lebanese Centre on Energy Conservation was not institutionalised, decentralised PV installed capacity remained low and the Energy Building Code was not adopted.

Final Energy consumption in Lebanon, by use in the residential sector (Reference and EDM scenarios)

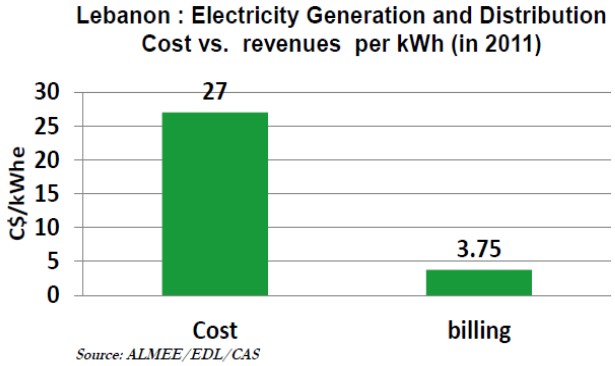


Source: ALMEE/Plan Bleu

[6] Source: Plan Bleu.

Some positive results were accomplished with respect to awareness and capacity building and to financing mechanisms and incentives. Regarding the latter, NEEREA and Kalafat financing mechanisms were activated to finance projects, which shall foster energy savings for 7GWh/year.

Main barriers to EE & RE in Lebanon: Electricity subsidies, High Generation Cost and Technical & non Technical losses



In Lebanon, main barriers to the spread of EE and RE measures are electricity subsidies, high generation costs as well as technical and non-technical losses.

Subsidies for electricity represent 50% of the annual growth of the public debt and in 2017 the overall subsidies for the electricity sector amounted for $ 38 billion (46% of the total debt of Lebanon).

A well-featured supporting program for implementing the EDM scenario in SEMCs is a relevant mix of several measures:

a) Regulation tools, such as
   - Implementing energy regulation on domestic devices (Labels, MEPS);
   - Generalizing and implementing thermal regulation (Energy Building Code).

b) Incentive tools - improvement of profitability for the final consumer and support concerning the initial investment cost, meaning
   - Implementing tax rebates;
   - Developing well featured loans (flexibility on the required security, attractive interest rate…);
   - Looking for Clean Mechanism Development and Nationally Appropriate Mitigation Actions (NAMAs) projects.

c) Capacity building tools in the field of EE, meaning
   - Implementing communication and awareness campaigns;
   - Training professionals from the building sector;
   - Disseminating the use of Energy Performance Certificates for Buildings and Green Building Rating System (GRASS, ECOBat, etc.);
   - Implementing quality schemes in the building sector:
     - regarding the performed work, quality label for company/person;
     - regarding the implemented EE measures, quality labels for the equipment/building.

d) Institutional and organizational tools, meaning appointing a special coordinating and transversal institution to creating synergies between all stakeholders at the national and regional level (regional animated by MEDENER).

In conclusion, in 2030 energy trend scenarios in SEMCs are more than alarming. By integrating EE measures and new efficient technologies and devices in the residential sector, SEMCs would have the opportunity to decrease energy consumption and GHG emissions and to fight against energy dependency, thus improving also their national economic conditions. Therefore, in order to make the EDM alternative scenario concretely happen, it will be necessary to stop public subsidies related to electricity purchase. It will be key to use this money for implementing EE and RE measures and technologies instead, by taking in consideration at the same time the economic conditions of each country. In addition, dissemination of best practices of already implemented EE measures will help raise citizens' awareness about their economic benefits while enjoying the same comforts.

Panel Discussion

Moderator: **Ammar AL-TAHER** - Key Expert, Technical Assistance to the Renewable Energy and Energy Efficiency Programme in Jordan (REEE II)

- **Lina MOBAIDEEN** - Project Development Manager, Jordan Renewable Energy and Energy Efficiency Fund (JREEEF)
- **Didier BOSSEBOEUF** - Senior Expert in charge of International Studies, ADEME
- **Markos DAMASIOTIS** - Head of Development Programmes Division, CRES

6. Session 2: Energy Efficiency in the industrial sector

❖ *Fadel LABADI - Manager of Industrial Affairs Department, Amman Chamber of Industry*

One of the Jordanian best practices for EE in the industrial sector is the Mobile Energy Clinic Program, which was launched in 2010 and lasted for 4 years and a half. The main goals of the Program were to improve EE in industrial facilities while reducing industrial energy bills and to raise awareness in the industrial sector on energy saving opportunities.

The Amman Chamber of Industry managed and promoted the program, which aimed at providing full energy and water audit, detailed audit technical and financial reporting, and financial support through non-refundable partial grants covering the energy audit costs.[7]

The measurement equipment used during audit includes the measurement of the temperatures, fluid flow, air speed, combustion emissions, thermal insulation efficiency, revolution speed, current, voltage and power factor, sound level and light level, length and volumes. Beneficiaries of the programme have been the members of the Amman Chamber of Industry matching the following criteria:

- Employing less than 250 employees;
- Having a registered capital equal to or less than 1 million JD.

[7] The audit and technical services are performed by an energy audit company selected based on a tender.

Overall, 25 audit projects have been conducted, which involved the chemical, food, engineering, plastic and construction industry. Main indicators used for the energy audit projects have been the average pay back period valued at 1.76 year, the average investment volume valued at 38,000 JD and average energy saving percentage to the total energy consumption valued at 22.5%.

Some challenges were envisaged during the implementation of the programme. From a performance point of view, despite high expectations some cases of energy audits resulted in limited energy saving opportunities. From a financial point of view, investments have been hindered by difficult decision-making processes and the high uncertainty of the market.

Concerning the first, issues were overcome by considering a full energy audit conducted by experienced energy audit companies only for factories of expected energy saving of 15% minimum based on walk through audits. Concerning the latter, the Amman Chamber of Industry launched another program to provide financial partial grants to equip SMEs with energy saving instruments recommended by the energy audits. Furthermore, two specific funds - Green Loan and Subsidy - were established: one for small and micro industries and the other providing support to priority category of equipment for energy saving at the national level.

The "factories support program to procure energy & water saving equipment and RE systems" program was aimed at procuring energy and water saving equipments and RE systems to factories through a grant covering 50% of the total cost. Financial grants were provided to 13 factories, which concretely invested in EE measures and RE systems, such as Power Factor Correctors, high-pressure pumps and LED lamps. During the implementation of the project, limited awareness on the importance of energy saving led to difficult investment decision-making on medium to high cost energy saving measures. Furthermore, other challenges faced included internal resistance and technical uncertainty on the impact of EE measures on the productive sustainability and quality. Nonetheless, some improvements have been made. Specifically, awareness at different levels (Companies Owners, Top and Middle Managers, Engineers and Technical Staff) has been built and success stories promoted, whilst the energy audit activities on investments in EE measures were confirmed as priorities compared to the ones on RE.

In particular, specialised workshops and training courses on EE were used in order to raise awareness on the matter and a guiding directory on "Energy & Water Saving in the Manufacturing Sector" was issued and distributed to almost 1000 factories.

❖ ***Mohamed Ali SAFI*** - *Head of the Unit of Energy Efficiency in Industrial Sector, ANME*

The best practice presented is the Tunisian experience on EE in the industrial sector. Tunisia has been internationally recognised for its progress in the EE sector, ranked 18th over 111 countries considered by the World Bank.

The Tunisian energy transition strategy entails:

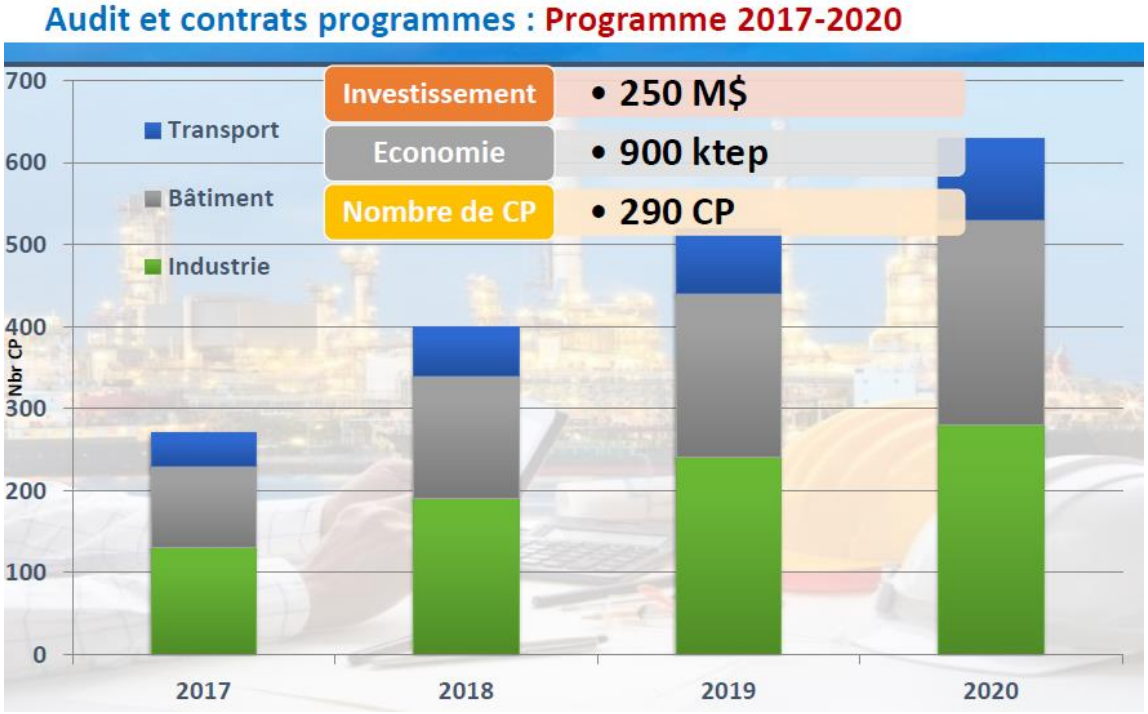
- Developing EE measures;

- Diversifying the electricity mix and integrating RE;
- Reinforcing conventional energy sources (oil and gas);
- Rationalising energy subsidies system;
- Reinforcing interconnections in the electricity sector at regional level.

The strategy is based on three pillars:

- institutional programmes;
- specialised programmes and mechanisms;
- other actions.

Some institutional programmes deal with energy audits and contracts: particularly thanks to their implementation, energy audits became periodical and mandatory. After the elaboration and approval of the audit contracts, audit operations are carried out, then the audit reports are examined, and their content subject to quality control. Finally, dossiers on possible investments for the CTC (Commission Technique Construction) are prepared and implemented. Until 2017, $300 billion have been invested and 183ktep of energy deployed. For the period 2017 – 2020, the programme envisages $250 million of investments, mostly split between the industry and building sector.



Some assessments studies are conducted also regarding cogeneration systems generating both thermal and electric energy, which are supervised remotely and specifically designed to send automatically an alert if problems arise. Under the programme 2017-2020, $ 300 million have been invested and resulted in 300 MW. In this framework, some institutional programmes have been also implemented to set an energy certification system for home appliances and electronic devices.

With respect to specific implemented mechanisms, an energy management system has been set for two enterprises together with some training sessions on IRCA ISO50001 aimed at establishing an Energy Management System (EMS) based on the standard ISO 50001. This standard implements an internationally recognised framework to integrate energy performance in the management procedures. Under the programme 2017-2020, $10 billion have been invested in this EMS, which works as a toolbox for 250 enterprises to increase their EE levels, thus improving their energy performance while reducing their incurred costs.

Despite the great results achieved on energy efficiency, Tunisia still needs to improve in some areas: namely, tariff policies and regulations favouring EE, control devices to ensure compliance with regulations, more funding on innovation, improved quality of EE services and greater spread of awareness and communication campaigns.

Many programmes have been funded also in the framework of international cooperation initiatives. Please, find some of them in the table below.

Programmes	Budget	Financing institutions
SUNREF programme	€100 million + € 13 million	AFD/EBRD/EIB
Deploying EE appliances in Industrial sites in Tunisia	€ 2 million	German Ministry of Environment (BMUB)
EE Project in the industrial sector	$ 8,5 million	GEF/World Bank
Environment and EE Project	€ 40 million + € 720 000	AFD
EE and cogeneration Project	$ 55 million	World Bank

Panel Discussion

Moderator: **Rim Boukhchina** - Project Manager, RCREEE

- **Fadel LABADI** - Manager of Industrial Affairs Department, Amman Chamber of Industry
- **Mahmoud ALEES -** Adviser to the Minister, Ministry of Energy and Mineral Resources (MEMR)
- **Muhieddin TAWALBEH** - Manager in the Energy Efficiency and Solar Thermal Division, RSS/NERC

7. Conclusions

Energy transition and climate change: more pragmatism, less dogmatism

Today's Conference focused on two dichotomies affecting energy transition, particularly in the Euro-Mediterranean region: the first, by now very well-known for a long time, between energy prices and energy efficiency; and the second, more recent but very alarming, between the time needed to act and the time we have left to save the planet from a major catastrophe. The first dichotomy becomes evident mainly as the energy prices entirely supported by the State - and, therefore, the tariffs – do not incentivize the end consumers to lower their consumption - their comfort being equal - because the return investment could go beyond the life of the intervention. Even in a free market, some authors have postulated an undesirable return effect linked to energy efficiency, called "rebound effect". This means that the end consumer purchases more household appliances for his comfort thanks to a significant drop in consumption achieved through energy efficiency interventions. Nonetheless, this ultimately leads him/her to consume more than before.
The second dichotomy is related to the fact that, if we consider the liberalized and competitive market situation as a *sine qua non* condition for energy efficiency to be achieved while keeping the final consumer satisfied, it should be noted that the time needed to establish a liberalized market from a monopoly by law, does not match the urgency to act highlighted repeatedly by the Intergovernmental Panel on Climate Change (IPCC). Finally, how to solve this double impasse? In 2019, it will be 30 years since the first package of directives for the realization of an internal market for electricity and natural gas was launched by the European Commission. At the end of these 30 years, the European internal market has not delivered all the benefits that its architects desired at the time of its design and first implementation, especially with respect to lowering prices and reducing energy poverty. How many years will it take for a liberalized market to be realized in the Maghreb and Mashreq and, even more so, for a market expanded to the whole Mediterranean region? It is quite obvious that we must rethink the approach to the implementation of energy efficiency measures, which has to be better adapted to the peculiarities of the countries on the Southern shore of the Mediterranean and, at the same time, immediately implementable. This must be recognized as a Lapalisse, which consists in the fact that a best practice – whatever it is - is such, only in the regulatory and legislative context in which it was conceived. Therefore, its transportability *sic and simpliciter* to another context could result in a failure. How to apply a system of tax exemption for the costs associated with energy efficiency interventions in a system where taxes are not paid? How to apply the tool of the Covenant of Mayors, which has been so successful in Europe, in a country where the mayor is a prefect? How to impose binding targets for energy efficiency on the distributor and the energy wholesaler in a context where there is a single distributor and there are no wholesalers?
We could continue presenting many other similar examples, but by now the point seems very clear. Moreover, any attempt to accelerate the creation of a liberalized market may lead to the loss of social peace, especially wherever family incomes cannot pay the real energy price

and, at the same time, an increased taxation. The remaining problem, then, is how to design an alternative approach to the best practices of the liberalized market until the liberalized market itself is established. It should be noted that nobody has theorized yet that energy efficiency and renewable resources can develop only in a liberalized energy market. The clearest example is that the 38% of the total power plants fired by renewables, build in 2017 at world level (1017 GW), were realized in China. Moreover, the 2017-2022 IRENA projections provide for China to be the country with the highest rate of growth capacity in the solar, hydroelectric and wind energy sectors. Concerning energy efficiency, in the five-year plan 2016-2020, the Chinese government has planned important measures to increase EE standards in the building sector and in the heavy industry. The technological approach to increase energy savings, especially in the tertiary sector, is based notably on the centralized district heating system. This does not mean that the Chinese model should be taken as a reference for countries in a monopoly situation; especially since China itself is opening its internal energy market, through a process that has been lasting for a long time. Indeed, the reforms of the electricity sector in China have started in 1985 but the State still owns most of the assets all along the electricity supply chain.

The Chinese example aims only to demonstrate that it is possible to implement alternative measures to the liberalized market until the market itself will be in place. As the main outcome of the event, the Conference identified two possible ways ahead to increase energy efficiency where energy prices are not influencing consumers towards responsible energy choices: in the short term, by entrusting the public institutions to lead by example on the benefits of investing in renewables and energy efficiency; whilst in the medium and long term, by joining forces towards the harmonization of Mediterranean energy markets. The unwelcomed effects of climate change are becoming undeniable; thus, waiting for "perfect" market conditions to improve energy efficiency and further spread renewable energy sources without further concrete interventions, is not an option.

This is the remark made during our International Conference on Energy Transition, now in its sixth year.

Annex 1 – Conference Conclusions

6th MEDENER international conference on energy transition

Energy efficiency and energy prices: a peaceful solution to the Jigsaw

Conference Conclusions

- Participants to the 6th MEDENER International Conference, organised in the framework of the EU-funded meetMED project and in close cooperation with RCREEE, recognised the utter significance of energy transition in the Mediterranean region to mitigate the unwelcomed effects of climate change.

- Since the 1st international conference in Tunis in 2013, MEDENER associates underlined energy efficiency (EE) and renewable energy (RE) sources as the two main drivers for energy transition.

- In 2014 the MEDENER Presidency, in close collaboration with OME and ADEME, prepared the 2040 scenario for the Mediterranean energy transition calling for the urgent need to act on RE and EE, thus anticipating the conclusions of the COP21 in Paris.

- Simultaneously, RCREEE developed several regional initiatives in collaboration with the League of Arab States (LAS), as well as with regional and international partners, in order to implement Arab RE and EE strategies, guidelines and action plans by activating RE and EE markets and mobilising investments.

- Today, the 6th MEDENER International Conference in Amman has stressed the central role of energy prices as the main bottleneck for EE and RE investments wherever electricity prices are very low, and as one of the main prerequisites for energy policy to work effectively.

- On the one hand, support mechanisms to promote renewable energy sources could become impracticable, when incentives exceed the costs of the commodity faced by the consumers. On the other hand, energy efficiency remains difficult to foster as long as end-users have no incentives to invest in EE measures or to change consumption behaviours.

- How to solve the dilemma? We can imagine two different ways ahead: in the short term, adapting to the specificities of national energy markets and entrusting the public institutions to lead by example on the benefits of investing in renewables and energy efficiency.

- In the medium and long term, efforts for a harmonized Mediterranean energy market (sharing common approaches, tools and targets) should not be spared, bearing in mind that the time-action of the “perfect” energy market and the one to slow down the unwelcomed effects of climate change are irreconcilable.

- Sharing practices and knowledge between the members of MEDENER, RCREEE and interested stakeholders is key in order to provide sound policy advice on these crucial matters. Time is running and climate change too: we cannot wait for the perfect market alone to act in support of energy efficiency and renewable energy sources.

Amman, 4 October 2018

Annex 2 - Conference Programme

08:30 - 09:00	**Registration of participants**
09:00 - 09:45	**Welcome Address: Walid SHAHIN**, Director, Jordan National Energy Research Centre (NERC) **Opening remarks:** • **Fawaz AL-KARMI,** Assistant Secretary General for Scientific and Technological Affairs, Higher Council for Science and Technology • **Sirpa TULLA,** Head of Economic, Infrastructure and Trade Facilitation Section, EU Delegation to Jordan
09:45 - 10:55 incl. Q&A	**Overview of the challenges** **Chair: Walid SHAHIN,** Director, NERC Jordan • **Leonidas KIOUSSIS**, Senior Expert, International relations & Enlargement, DG Energy, European Commission • **Maged MAHMOUD,** Technical Director, RCREEE • **Dario CHELLO**, President, MEDENER
10:55 - 11:15	***Coffee break,*** *including family photo*
11:15 - 12:15 incl. Q&A	**Keynote speeches** **Energy prices and Energy Efficiency in the Euro-Mediterranean region: an economic and political appraisal** **Chair: Matteo BARRA,** Project Manager, meetMED • **Alberto POTOTSCHNIG,** Director, Agency for the Cooperation of Energy Regulators (ACER) • **Wijdan AL RABADI,** Vice President of MEDREG and Deputy Chairman of Energy and Mineral Regulatory Commission (EMRC)
12:15-13:30 incl. Q&A	**Session 1: Energy Efficiency for households and transport** • Case study Mashreq - **Muhieddin TAWALBEH,** Head of Energy Efficiency & Solar Thermal Division, NERC Jordan • Case study Mashreq 2 – **Adel MOURTADA,** Expert Senior Energy & Climate change, ALMEE **Panel discussion** Moderator: **Ammar AL-TAHER,** Key Expert, Technical Assistance to the Renewable Energy and Energy Efficiency Programme in Jordan (REEE II) • **Markos DAMASIOTIS,** Head of Development Programmes Division, CRES • **Didier BOSSEBOEUF**, Senior Expert in charge of International Studies, ADEME • **Lina MOBAIDEEN**, Project Development Manager, Jordan Renewable Energy and Energy Efficiency Fund (JREEEF).

	Suggested points of discussion: - Can the prosumers' concept be projected on the southern shore of the Mediterranean? - Citizens' behavioural change towards energy efficiency: the way forward to a sustainable urban mobility
13:30 - 14:30	***Lunch break***
14:30 - 15:45 incl. Q&A	**Session 2: Energy efficiency in industrial sector** • Case study Mashreq - **Fadel LABADI,** Manager of Industrial Affairs Department, Amman Chamber of Industry • Case study Maghreb - **Mohamed Ali SAFI,** Head of the Unit of Energy Efficiency in Industrial Sector, ANME **Panel discussion** Moderator: **Rim Boukhchina,** Project Manager, RCREEE • **Fadel LABADI**, Manager of Industrial Affairs Department, Amman Chamber of Industry. • **Mahmoud ALEES,** Adviser to the Minister, Ministry of Energy and Mineral Resources (MEMR) • **Muhieddin TAWALBEH**, Manager in the Energy Efficiency and Solar Thermal Division, RSS/NERC **Suggested points of discussion:** - Fuel prices and the choice of technologies for industrial manufacturing - Prosumers' concept for the industrial sector on the southern shore of the Mediterranean as a self-producer approach
15:45 - 16:00	***Coffee break***
16:00 - 16:30	• Conference conclusions by **Walid SHAHIN,** Director, NERC Jordan • Closing remarks by **Dario CHELLO,** President, MEDENER

Annex 3 - Speakers' bios (Alphabetical order)

Mahmoud ALEES - Adviser to the Minister, Ministry of Energy and Mineral Resources (MEMR)

Fawaz AL-KARMI - Assistant Secretary General for Scientific and Technological Affairs, Higher Council for Science and Technology

Dr. Fawaz Z. Elkarmi is assistant Secretary General of the Higher Council for Science and Technology (HCST) since October 2013. He worked for the government, para-government organisations and the private sector for over 40 years. His experience spans several positions including: holding the post of Dean of Engineering Department at the Amman University, Director of energy at HCST, planning manager at the electricity company, owner of a consulting firm, general manager of an industrial company, freelance consultant and trainer, and university professor. Dr. Elkarmi worked as local consultant/expert in many projects entailing the formulation of energy strategies and as an expert for local, regional and international organizations, such as the World Bank, UNDP, EU, and local entities in Jordan and in the Middle East. Dr. Elkarmi published a book related to power system planning, two book chapters and several journal articles in well-known scientific journals, as well as several technical reports as a local consultant. Dr. Elkarmi is a member of several professional local and international committees and organizations.

Wijdan AL RABADI - Vice President of MEDREG and Deputy Chairman of Energy and Mineral Regulatory Commission (EMRC)

Eng. Wijdan Al-Rabadi is a Deputy Chairman of Energy and Minerals Regulatory Commission (EMRC) since January 2017. She has been a Commissioner from October 2011 till January 2017 and she has been the General Secretary of EMRC since November 2012. Currently, she is also a Vice President of the Mediterranean Energy Regulators (MEDREG). She holds a B.Sc. in Electrical Engineering from the Yarmouk University and master's degree in Electrical Engineering from the University of Jordan. She worked as Chairman of the Electricity Regulatory Commission (ERC) before merging with other Governmental utilities and she worked as Director at the Cost and Pricing Department at the Ministry of Energy and Minerals Resources (MEMR). She also worked as Planning Engineer in the Technical Studies Section of the Planning Division of the National Electric Power Company (NEPCO).

Her experience covers, among others, electrical and energy sectors from restructuring point of view, regulation in different fields and pricing. She is also UK Chartered Engineer at the Institution of Engineering and Technology and a Senior Member of the IEEE (USA). She is also the Honor Secretary and Treasurer of IET (IEE formally) Jordan Committee and Member of Jordan Engineers Association.

Ammar AL-TAHER - Key Expert, Technical Assistance to the RE and EE Programme in Jordan (REEE II)

Prior to joining the Technical Assistance to the Renewable Energy and Energy Efficiency EU Programme in Jordan "REEE II" - a project funded by the European Union and implemented by a consortium led by GFA-, in 2016 Mr. Al-Taher worked at the Regional Centre for Renewable Energy and Energy Efficiency (RCREEE). Previously, he worked at Toronto Hydro for four years (2012-2015) as part of the utility sponsored Conservation and Demand Management Business Development and Delivery program. Between 2008 and 2012, he was working for the German Agency for International Cooperation (GIZ) for the EU funded regional energy programs “Euro-Mediterranean Energy Market Integration (MED-EMIP)” and “Energy Efficiency in the Construction Sector in the Mediterranean (MED-ENEC II)”. He worked also for the National Energy Research Centre & the Royal Scientific Society in Jordan, where he acted as the Secretary for Mediterranean Association of National Agencies for Energy Management (MEDENER) during Jordan Presidency from 2005 to 2007. Mr. Al-Taher holds a bachelor’s degree in mechanical engineering from the University of Arkansas and an MBA from the University of Jordan in 2003.

Matteo BARRA - Project Manager, meetMED

Mr Barra is currently working as Project Manager for the meetMED Secretariat. His main responsibility is to lead the implementation of the meetMED Project by coordinating the work package leaders and monitoring the organisation of the activities in order to ensure that the deliverables of the project will be achieved. Matteo is also responsible for reporting to the European Commission on the implementation of the Project. In his former experiences, Matteo has worked as senior expert on investments at the Energy Charter Secretariat, acting mainly on ECT investment provisions and dispute settlement. Previously, he was associate with the international arbitration team of a large law firm in Geneva, where he acted in investment and commercial disputes concerning among others the electricity, gas and oil industry. Matteo holds a Ph.D. in International Economic Law (Bocconi) and an LL.M. in International Energy Law and Policy (CEPMLP).

Didier BOSSEBOEUF - Senior Expert in charge of International Studies, ADEME

Economist with more than 30 years of experience on energy demand analysis and energy efficiency policies evaluation, at ADEME Mr. Bosseboeuf is in charge of international studies, thus coordinating several international projects on energy efficiency indicators such as ODYSSEE-MURE for the European Commission and Med-Ind for MEDENER. He has applied the EE indicators methodology in more than 60 countries. He is general secretary of the WEC energy efficiency policy network, French delegate at the EED CA, EEWP/IEA, and EED committee, convener for ISO 257 on energy saving calculation. He has been in the French delegation on climate change for 10 years. He is ECREEE board member. He is lecturer in five universities and IFDD and has published more than 30 articles on energy efficiency evaluation and published several books. He is graduated from Paris University and got a PHD in Energy Economics in Grenoble University.

Dario CHELLO - President, MEDENER

Since January 2016, Mr. Chello has been the head of European Union and International Organisations Unit of ENEA in Brussels. He has been elected Chair of MEDENER for the period 2017-2018, the Association of national Energy Efficiency and Renewable Energy Agencies of the Mediterranean Region, by the General Assembly, held in Marrakech as a side-event of the COP22.The MEDENER Presidency Office has been established in Brussels at ENEA premises. Eng. Chello became Senior Advisor for International Co-operation at the National Agency for Energy Efficiency of ENEA in February 2013. Since February 2007, he has been Director of Energy Efficiency and Investment at the Energy Charter Secretariat in Brussels. Before that, he worked as specialist member of the Technical Secretariat of the General Directorate for Energy at the Italian Ministry of Industry, now Italian Ministry of Economic Development, and, from January 1995 to May 1996, as consultant in the Policy Assessment Office of the Minister's Cabinet. In November 2004, he was appointed by the Di-rector General to coordinate international relations and energy planning with reference to both EU and other international activities. He holds a Ph.D. in physics of energy systems at the University of Paris "Paris 7" in 1989.

Markos DAMASIOTIS - Head of Development Programme Division, CRES

Mr. Damasiotis holds a master's degree in electrical engineering from the National Technical University of Athens (NTUA). He has more than 25 years of experience in the energy sector. Since 1994 he has been working for CRES, where he participated as senior expert or project manager in more than 60 national/ international projects in the field of renewable energy and energy efficiency. Since 2007, he has been the Head of Development Project Applications Department and since 2015 the Director of the Development Programmes Division of CRES, managing multinational scientific teams in the fields of technology analysis, energy systems analysis and planning, market studies, research and training, awareness raising, innovative policy and financing mechanisms, approximation of legislations, business and financing issues of RES and EE sector. His professional experience geographically expands also to South East Europe, Black Sea Countries and the Mediterranean. He is member of the Board of Directors of MEDENER.

Leonidas KIOUSSIS - Senior Expert, International relations & Enlargement, DG Energy, European Commission

Mr Kioussis holds a PhD in Operations Research from the George Washington University. In 1992, he joined the European Commission, where he has served consecutively in Eurostat, DG Transport, DG EuropeAID and DG Energy, being responsible for the management of a great number of EU programmes and projects. On 2009, Dr Kioussis was placed as a principal administrator and later as a senior expert in the International Relations unit of DG Energy, serving as desk officer for the EU relations – bilateral and regional – with the North African and Middle Eastern countries. Mr Kioussis is currently responsible for energy cooperation with the MENA countries, covering the gas, electricity, renewable energy and energy efficiency sectors for both

supporting the countries to promote the necessary regulatory reforms as well as for helping and facilitating investments in the framework of the Union for the Mediterranean (UfM).

Fadel LABADI - Manager of Industrial Affairs Department, Amman Chamber of Industry

Eng. Labadi works as Manager of Industrial Development Department at the Amman Chamber of Industry. He has more than 20 years of experience in designing, planning and management of programs and projects. Particularly, he worked on projects in the areas of industrial and economic development, competitiveness and enterprise development, specifically tackling issues such as industrial advisory and consultancy, SMEs development, energy saving, renewable energy, quality and conformity, innovation, vocational training and export development. He holds a master's degree in Industrial Engineering and a bachelor's degree in Mechanical Engineering.

Maged MAHMOUD - Technical Director, RCREEE

Dr. Mahmoud is a sustainable energy expert and the Technical Director of RCREEE. He has joined RCREEE in 2011, where he played a key role in formulating renewable energy (RE) strategies and introducing respective implementation mechanisms focusing on increased reliance on private sector. Dr. Mahmoud is an active member of the League of Arab States RE/EE Committee and since 2013 he has been leading the regional "Private Investment Promotion Portfolio", where several business models and instruments have been explored to support both utility- and small-scale developers, and to assess the economic and social impacts. He has also served for 20 years at the Egyptian New and Renewable Energy Authority (NREA). Among his key achievements, he contributed significantly to setting the Egyptian RE 2022 strategy targeting 20% renewables share, and in the design of the "best-fit" policies and measures for the strategy implementation. He deeply contributed to planning and contracting several megawatts of wind energy projects amounting to more than 700 million USD. Dr. Mahmoud holds the "Egyptian Academy of Scientific Research Award for Development and Innovations in Renewable Energy" since 2001. He has managed and contributed to over 40 research projects and studies in the sustainable energy fields in collaboration with national and international organizations.

Lina MOBAIDEEN - Project Development Manager, Jordan Renewable Energy and Energy Efficiency Fund (JREEEF)

Ms Mobaideen is the Head of Project development division in the Jordan Renewable Energy and Energy Efficiency fund (JREEEF). She has been effectively promoting the EE and RE economic realities for the past 19 years, by working to design and develop the EE legal and institutional framework and the National Energy Efficiency Action Plans (NEEAP) as well as by contributing to establish the JREEEF in Jordan. She has also participated in designing the first Jordan NEEAP for 2013 and the second NEEAP in 2016 to achieve reduction in energy consumption by 2020. She is leading the supervision of the implementation of these action plans. Furthermore, Ms Mobaideen has been in charge of climate

change issues related to energy sector as a member of the Climate Change National Committee since 2002. She graduated in Administration and Strategic Studies (MA) at the Royal Jordanian National Defense College in 2013 and in Chemical Engineering (B.Sc.) at the University of Jordan in 1992.

Adel MOURTADA - Expert Senior Energy & Climate change, ALMEE

Adel Mourtada has an engineering degree in Building Sciences and two PhD in Energetic and energy conversion. He is Member of the Board of Directors of MEDENER and of the Lebanese Association for Energy Saving and for Environment (ALMEE). Among others, he is member of the Energy and Sustainability Committee of the Order of Engineers of Beirut; Member of the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE); and Founding Member of Lebanese Green Buildings Council (LGBC)). He is Director of Research in the field of RE & EE at the Lebanese University. He has 25 years of experience as international expert in energy and climate change. He developed Energy Efficiency Building codes and green building rating systems for several countries (Lebanon, Morocco, Tunisia, Ivory Coast, etc.). He carried out several market needs assessment studies to evaluate the potential of EE & RE projects and to better understand the barriers that have so far hindered the growth of RE, EE and environmental investments. He participated in more than 50 International projects and published more than 100 articles in peer-reviewed journals and symposia proceedings in the field of energy efficiency, renewable energy and prospective studies.

Alberto POTOTSCHNIG - Director, Agency for the Cooperation of Energy Regulators (ACER)

Dr Pototschnig is the first Director of the European Agency for the Cooperation of Energy Regulators (ACER), established in 2010 pursuant to Regulation (EC) No 713/2009. He was appointed in May 2010 and took office on 16 September 2010.

Before joining the Agency, from January 2006 he was a Partner in Mercados EMI, a Madrid-based international consultancy specializing in the energy sector, where he served as CEO and Deputy Chairman. He previously worked at the Italian Transmission System Operators (from 2003 to 2005), served as first CEO of the Italian Electricity Market Operator (from 2000 to 2003) and in the Italian Energy Regulatory Authority (AEEG, from 1997 to 2000), with his final position being Director of Electricity Regulation. Mr Pototschnig started his professional career in 1989 with London Economics, an international economic consultancy, where he was eventually in charge of the industrial economic advisory practice. Between 2003 and 2005, he acted as an adviser to the Italian Government on environmental policy issues. Since 2004, he is an adviser at the Florence School of Regulation, where he regularly teaches on energy regulation and market design. Mr Pototschnig holds a Degree in Economics from Bocconi University in Milan and an MSc in Econometrics and Mathematical Economics from the London School of Economics, University of London.

Mohamed Ali SAFI - Head of the Unit of Energy Efficiency in Industrial Sector, ANME

Mr. Safi is Head of Unit "Energy Efficiency in the Industrial Sector" at the Tunisian National Agency for the Master of Energy (ANME) since 2013. It has more than 14 years of experience in Project management, especially in the field of energy management.
He is in charge of the Energy Efficiency Program in the Industrial Sector aimed at assisting the entrepreneurs in the identification, the implementation and the follow-up of energy efficiency actions. He monitors and evaluates energy audits and the realization of the industrial programs. He also manages cooperation programs with international institutions such as GIZ, the World Bank and the *Agence Française de Development* (AFD).

Walid SHAHIN - Director, NERC Jordan

Mr. Walid Shahin has more than 25 years of experience in the energy sector with hands-on experience in Energy Efficiency (EE) and Renewable Energy (RE), policy dialogue, load research and tariff setting, energy auditing and management, Research and Development (R&D)
Eng. Walid is currently the director of The National Energy Research Center at the Royal Scientific Society which is one of the key leading institutions in the energy sector in Jordan, and is responsible for conducting studies, research, audits, trainings and experimental EE and RE projects, the results of which are used on the national level in informing the policy making process. Eng. Walid is very active in committees and policy making; in terms of EE and RE, he was the head of "Energy and Green Building Committee" at the Jordan Engineers Association, head of the "Energy Labeling for Household Appliances" Committee at the Jordan Institute for Standards & Metrology, member of "Energy Efficient Building Code" Committee, Ministry of Housing & Public Works.

Muhieddin TAWALBEH - Manager in the Energy Efficiency and Solar Thermal Division, RSS/NERC

M. Tawalbeh is an Electrical Engineer graduated from the University of Technology, Iraq. Currently, he is Manager in the Energy Efficiency and Solar Thermal Division at the NERC/RSS. His work focuses on energy efficiency audits, energy management, Solar Thermal Energy, power demand management, energy policies and GHG mitigation project's analysis. He has managed and supervised the MENA Region Initiative as a model of NEXUS Approach and Renewable Energy Technologies (MINARET and the Energy Label & Minimum Standards Project in Jordan. He has been project Director for the Capacity Building in Wind energy and Concentrating Solar Power Project (WECSP) Project, Manager for Residential and Street lighting Pilot Project and Med Term Expert Counterpart (MTE) for the twining project on Capacity Building for NERC between NERC/ Jordan and CRES/ Greece. He has also been involved in the preparation of Jordan's First Biennial Update Report to the UNFCCC on the EE & RE Mitigation Actions.

Sirpa TULLA - Head of Economic, Infrastructure and Trade Facilitation Section, EU Delegation to Jordan

Ms. Tulla graduated in Economics from the University of Helsinki in 1989. She worked in the Ministry of the Environment and the Ministry of Finance in Finland until 2001 when she was recruited in the European Commission. Before joining the EU Delegation in Jordan in September 2018, she held the position of a Deputy Head of Unit in the International Relations Directorate of the Economic and Financial Affairs Directorate-General in the European Commission.

DISCLAIMER

This document contains information, data, references and images prepared by the participants in the 6th MEDENER International Conference on Energy Transition in the Mediterranean Region, held in October 2018 in Amman, Jordan as part of the activities of the meetMED Project. Whilst the information contained in this document and the ones recalled and issued by MEDENER have been presented with all due care, no MEDENER nor the meetMED team do warrant or represent that the information is free from errors or omissions. The information is made available on the understanding that MEDENER, the meetMED team or the speakers at the Conference shall have no liability (including liability by reason of negligence) to the users for any loss, damage, cost or expense incurred or arising by reason of any person using or relying on the information and whether caused by reason of any error, negligent act, omission or misrepresentation in the information or otherwise. Whilst the information is considered to be true and correct at the date of publication, changes in circumstances after the time of publication may impact on the accuracy of the information. The information may change without notice and the MEDENER/meetMED employees and experts are not in any way liable for the accuracy of any information printed and stored or in any way interpreted and used by a user. The information of this document and the ones recalled and issued by MEDENER/meetMED team include information derived from various third parties.

Funded by the
European Union

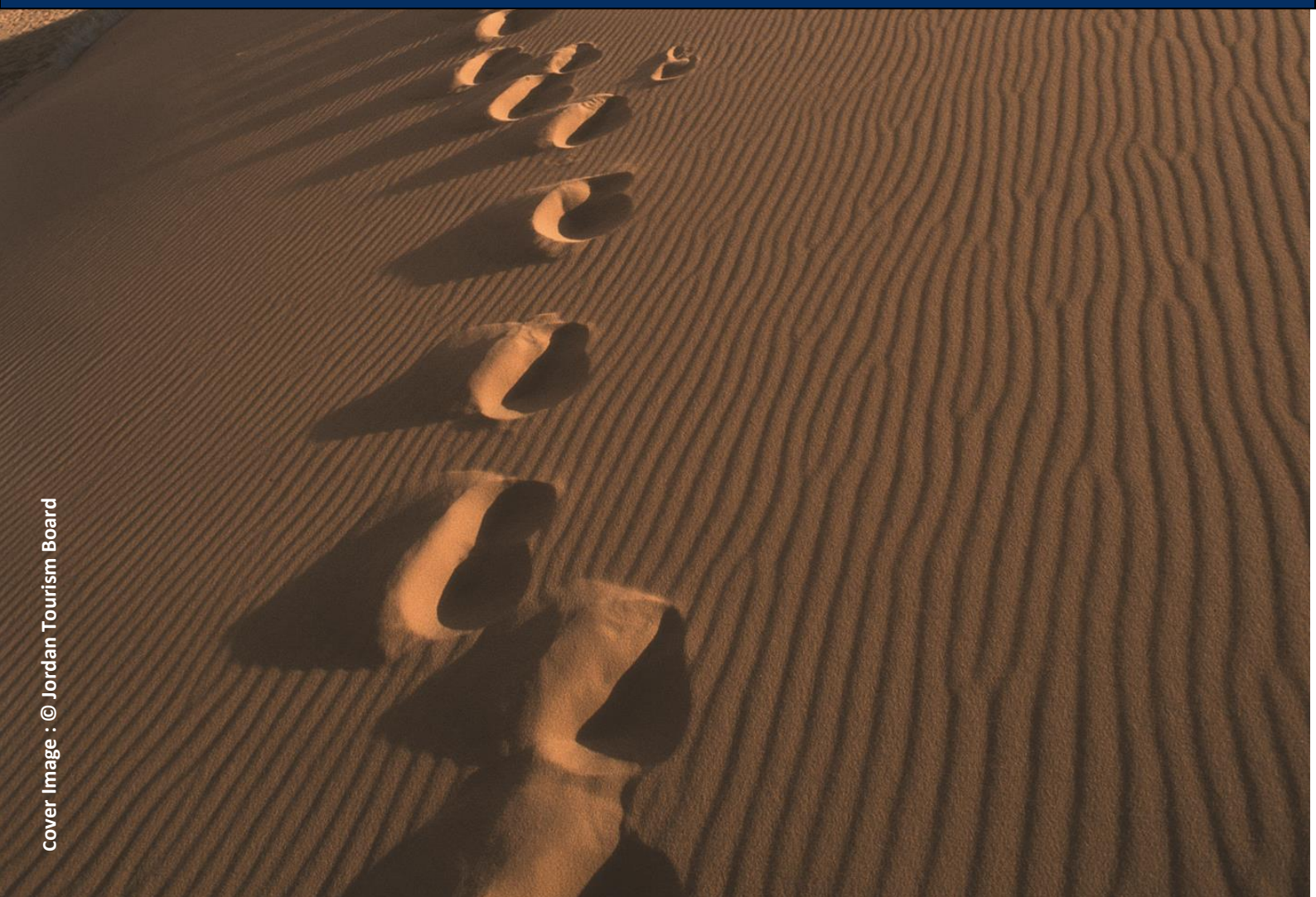
meetM

Mitigation Enabling Energy Transition in the Mediterranean Region

www.meetmed.org

info@meetmed.org

Follow us on



Cover Image : © Jordan Tourism Board