MED TEST II

Transfer of Environmentally Sound Technology

Project summary and achievements

switchmed

SwitchMed Programme is
funded by the European Union

The SwitchMed Program is funded by the European Union and implemented by the United Nations Industrial Development Organization (UNIDO) in cooperation with UN Environment Mediterranean Action Plan (UN Environment/ MAP), the Regional Activity Centre for Sustainable Consumption and Production (SCP/RAC), and the UN Environment Economy Division.

This document has been produced without formal United Nations editing and with the financial assistance of the European Union.

October 2018 by the United Nations Industrial Development Organization.

This publication is printed on 100% recycled paper certified by the EU Ecolabel.

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Foreword

"Doing better with less" is a challenge that many industries around the world face in today's hyper-competitive global economy, but it can also be an opportunity to overcome some of the most pressing environmental and social issues of the future.

In the next 20 years, the global population is predicted to grow by 30 percent and most of this increase will happen in developing countries. A growing population, coupled with already increasing consumption levels, raises the stakes in our efforts to reduce poverty, create employment, provide water and energy security, all while safeguarding the environment. Therefore, we need to change the way we produce and consume goods in order to find a balance between much-needed economic growth and the excessive consumption of resources that currently underpins it.

The circular economy model – which aims to use closed-loop production to keep resources in play for as long as possible – is currently trending amongst policymakers worldwide, but we at UNIDO have been practising the fundamentals of this concept for decades. Many of UNIDO's projects already address various building blocks of a circular economy. Some support the resource-efficient and cleaner production of goods (RECP); others help develop safe, easy-to-recycle products with longer lifetimes; some projects also support capacity development for product repairs, and still others deal with the recovery or safe disposal of resources at the end of a product's life.

In this context, resource-efficient production is in many cases the first step towards circular economy for productive industries. It demonstrates, on a practical, business-oriented level, the economic benefits of reducing resource costs. On this basis, the wider implementation of circular economy principles by industry is facilitated: whether through improved product design for longevity, repair and recycling, or through innovative business models, such as chemical leasing, the business case becomes clearer with each step.

With the support of the European Union, UNIDO has through the MED TEST II project been able to demonstrate that the RECP concept has a substantial potential to improve industrial performance in the resource-scarce Southern Mediterranean region. This project has revealed to industries that protecting the environment while maintaining a competitive edge in the global market is not a contradiction - it is an opportunity for industries to develop better and more profitable business models.

Assisting industries in developing countries to attain inclusive and sustainable growth is not only the core of UNIDO's mandate, it also represents a major step on the global stage toward internationalizing the circular economy and realizing the 2030 Agenda for a Sustainable Development.

Stephan Sicars
Director Department of Environment
UNIDO

The MED TEST II project

The EU funded SwitchMed Program is about changing the way goods and services are produced and consumed so that human development can decouple from environmental degradation. SwitchMed strives to assist the Southern Mediterranean region to turn on the switch for Sustainable Consumption and Production (SCP) patterns in Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Palestine, and Tunisia. The Program seeks to enable the actors of this region to realize their full economic potential by supporting industries, emerging green entrepreneurs, service providers, civil society organizations, and policy makers through demonstration activities, policy development, and networking of incubators for eco innovations. By working at these different levels, countries are able to catalyze progress towards low carbon and climate resilient societies and to give rise to new circular economic opportunities.

Assisting the private sector in turning SCP challenges into opportunities is at the core of the MED TEST II component - a unique and innovative part of the SwitchMed Program. The Transfer of Environmentally Sound Technology (TEST) methodology of UNIDO addresses rising energy and raw material costs by demonstrating how best practices in Resource Efficient and Cleaner Production (RECP), with an attractive return on investment, can be integrated into current business operations of the Southern Mediterranean industry.

To effectively transform industries in switching to a production that uses less resources, reduces pollution, and can support businesses to manage the transition of becoming more competitive, a change in knowledge, attitudes and practices related to resource consumption in the production is needed. The MED TEST II project has followed a combined approach to strengthen national capacities for sustainable production. The project enabled 44 service providers with hands on experience in offering RECP services, thereby developing the local market for sustainable production services to local industries. Furthermore, 125 industry demonstrations successfully showcased the potential for RECP in the Southern Mediterranean region,

The extensive on-the-job training combined with an evidence based, best-practice methodology, and a technical assistance programme have been effective to bring the industry closer to innovative knowledge networks and practitioners with hands on experience in RECP. Finally, policy decision makers of the region have been exposed to the lessons learned and the business case for resource efficiency as well, so that they can build that knowledge and those opportunities into the formulation of new national programmes and incentives for scaling up the results to the whole industrial sector in their own countries.

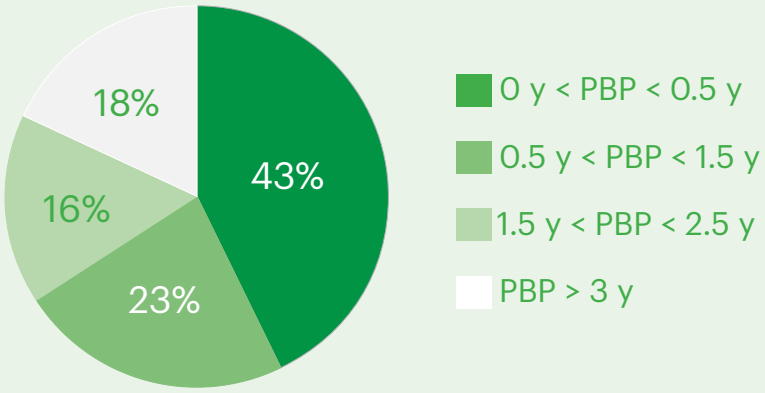
125
RECP industry demonstrations

30,673
Directly impacted employees

87.6
Million euros RECP investments in pipeline

41.7 million in annual economic savings identified

Payback period of the identified RECP investments:



1,830 identified RECP measures which annually save:

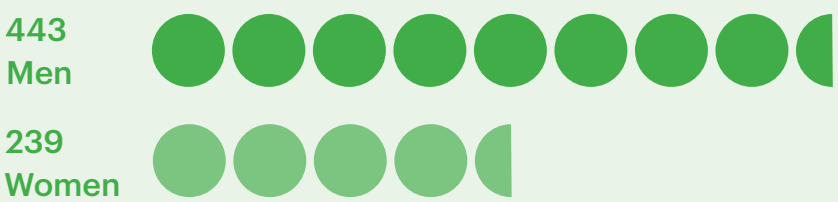
- 707 GWh of energy
- 3,512,660 m^3 of water
- 33,623 t of raw materials

and will avoid:

- 197,525 t of CO_2 emissions
- 19,612 t of solid waste

The MED TEST II project has enabled **44** service providers with a hands on experience in RECP

682 professionals from academia, business associations, government institutions and industries received training on the TEST tools:



The TEST approach

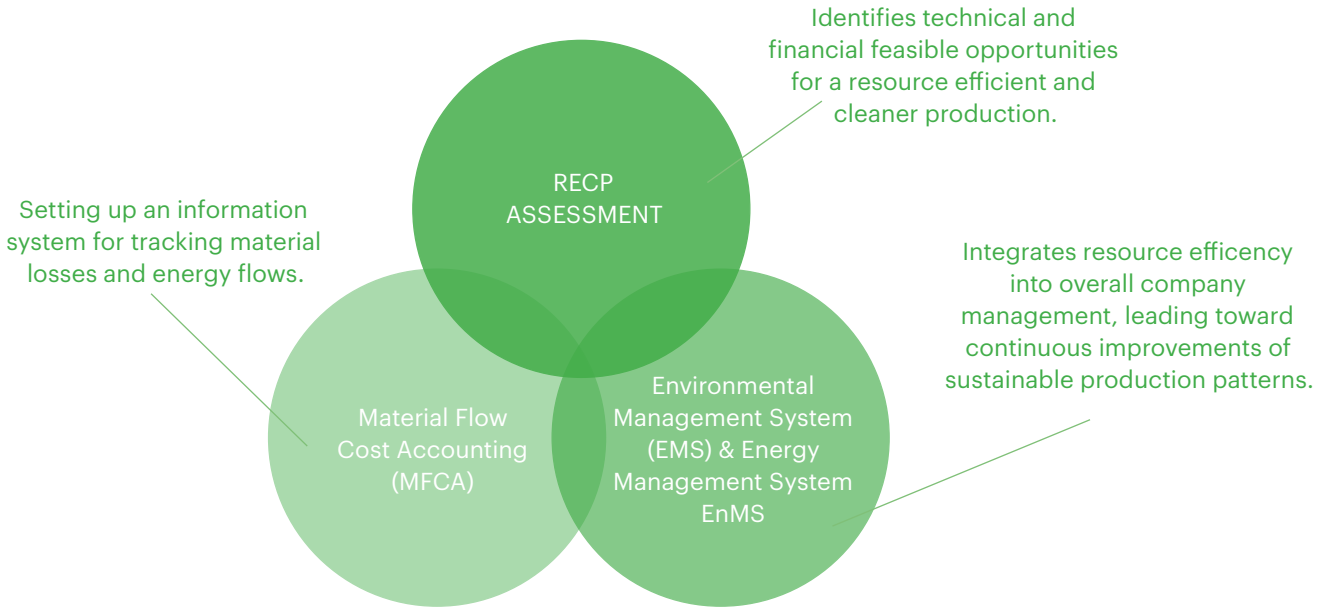
The TEST methodology developed by UNIDO, is a systematic way of identifying and exploiting the most feasible potentials for resource efficiency and continuous improvement in the use of materials, water and energy within a company. This approach combines the essential elements of a set of tools for sustainable production, namely; Resource Efficient and Cleaner Production Assessment (RECPA), Material Flow Cost Accounting (MFCA) and environmental and energy management systems (EMS/EnMS). As a result of the customized integration and implementation of these tools and their elements, best practices, new skills and an innovative management culture are adopted, enabling any company to move forward towards more sustainable production business models.

The adoption of sustainable production strategies has its fundaments into the concept of the "learning organization" that requires the commitment and engagement of the different people who influence resource efficiency (customers, suppliers, production managers, workers, etc.), in line with the internal management processes of a business. Acknowledging this, the implementation of TEST has been structured into the four phases of the learning cycle used in the ISO standards (P,D,C,A).

At the core of TEST there is the RECPA tool, a step-by-step assessment for improving the resource efficiency and environmental performance of production systems. The core output of this tool is a portfolio of financially feasible solutions, including good housekeeping, operational control improvements, process and product modifications, and eco-innovative technologies.

Within TEST methodology, elements of the MFCA are utilized to strengthen priority-setting based on non-product output costs and to establish an ad hoc information systems for the important material and energy flows and key processes. This is essential for monitoring major losses and consumption of resources. An MFCA-based information system is also important for calculating economic improvements resulting from implemented RECP measures and programmes demonstrating their real impact on medium to long-term decisions. It also enables accountability of enterprise staff, as well as reporting actual company performance against baselines and company targets.

The core elements of Environmental Management System (EMS) and Energy Management System (EnMS) are used in TEST to integrate resource efficiency into the company's overall management systems, providing operating criteria and the internal resources structure for ensuring that resource efficiency programmes are implemented, sustained and further developed.



RECP is a step towards Circular Economy

Roberta de Palma holds a Master Degree in Mechanical Engineering and has been working in the Southern Mediterranean region for over 20 years as a green industry expert and as the Chief Technical Advisor in the UNIDO MED TEST programmes. Together with us, she shares her ideas and experience in moving the industries of the Southern Mediterranean to become more resource efficient and what impact this might have on the region.

Why is RECP so important for the Southern Mediterranean region?

Characterized by intensive demographic, social, economic and environmental changes, the Southern Mediterranean countries are facing a rapid growth of the region's demand for natural resources. For the industrial sector, this translates into increased production costs and higher business risks related to securing the supply of essential production inputs. If we also look at the anticipated challenges related to climate change the Southern Mediterranean faces, a business-as-usual approach is not an option. RECP presents a business case for industries of the region, as demonstrated by the MED TEST II project, helping them to do better business with fewer resources which is good for the environment and the economy. By doing so, more resources become also available to other parts of the economy and this improves the life of the local communities, which ultimately contributes to job creation and economic stability of the region. Especially in our work in Palestine and Jordan, where for instance water is a very scarce resource, it was very evident that businesses are very sensitive to preserve important resources for the future of their countries. This is a good start and motivation for companies to embark in RECP.

Why should industries in this region be interested in adopting circular and resource-efficient practices?

The business case for RECP in the region has become more prominent in the last decade, due to rising prices of imported raw materials and especially energy. In the last decade (2008-2018), electricity prices increased from a minimum of 20% in Algeria to almost 80% in Egypt. This led to an increased awareness of businesses to look into the issue of how to lower production costs related to the resource input. For instance, while in 2008 the MED TEST I project showed an average energy savings in industry by 18%, the same went up to 24% by 2016 during the implementation of MED TEST II. Water is still heavily subsidized and industries of this region do not pay the real costs for its extraction, distribution and final treatment. Yet, average water savings in MED TEST II industries ranged to 20%, highlighting that even projects related to water efficiency have a good potential in the local industries. Resource efficiency can drive the competitiveness of local industries, but efficiency on costs is not the only driver: the growing consumer awareness and demand for green products open new business opportunities for companies.

But if the business case of resource efficiency is so profitable for industries, why does this not happen on a wider scale?

Well, in our experience we see that most companies have a limited awareness of how much money they lose by using resources inefficiently. This is because internal information on resource use is either lacking or rather dispersed across different people and departments. This is enlarged by the fact that sustainability objectives are not equally cascaded and harmonized throughout all functions of a business, creating a situation with conflicting perspectives. For instance, in a company we were able to identify measures that would save more than 800,000 euro per year, by better tuning the sales forecast to production planning: this saved a lot of unnecessary costs in producing goods that

were anyway returned from clients. Raising sales and reducing production costs, in this case, were two conflicting objectives that did not lead to a better profit for the business. The TEST approach seeks to overcome such challenges by engaging the various departments of a business, using tools that measures and puts a price tag on the inefficiencies of a production. The moment the management becomes informed on the cost of operating inefficiently this often becomes the turning point for change.

"Most companies have a limited awareness of how much money they lose by using resources inefficiently"

Another reason for why RECP has limited uptake in the region is due to the deficient access to knowledge that is essential to modify technological process or acquire new eco-innovative solutions. Industries know that they have a problem with resource use, but they do not know where to go and find the expertise they need. The element of strengthening local service providers that offer RECP services has therefore been central to the MED TEST programme, and industries in the region have started to pick up on the opportunities offered by local RECP experts.
For instance, a service provider in Egypt, which received training on the TEST methodology during the project, has already managed to sell RECP services to additional industries on a commercial basis. So there is a change taking place, but, we need to continue the effort in building more skills and raise awareness on the business case for RECP, also involving the local financial sector that can offer dedicated financing instruments for resource efficiency.

Can a more resource-efficient production help the Southern Mediterranean to become a circular economy?

While the concept of a green economy is advocating for circular economy as the new paradigm, we shall not forget that being circular does not mean we are necessarily preserving natural resources in the most effective way. Recycling and remanufacturing still will involve additional resources. Resource efficiency is a complementary concept to circular economy and shall be taken hand in hand. We must be able to produce in a resource-efficient way and be circular at the same time. Yet, there are several steps that need to be done in adopting RECP as a fundamental strategy for industry development in the region, and organizations like UNIDO can play an important role as knowledge and a change agent.

What needs to be done to boost the adoption of RECP in the Southern Mediterranean region?

The MED TEST II project has been able to demonstrate to the local industry that the concept of RECP is something that businesses and societies can profit from. Throughout the project we have also been closely working with key stakeholders from the industry and the policy makers of the region to identify actions that need to be done so that many more industries adopt RECP as core business strategy. Although we talk about a region, we must not forget that every country has its own regulatory framework and business environment. Therefore we have developed eight national roadmaps for scaling up the adoption of RECP addressing the different local contexts. Two common axes of intervention, besides skill development and awareness raising seem to be relevant for all countries: linking RECP with the enforcement of the environmental legislation and setting up proper market recognition for businesses embarking in RECP. If, for instance, companies who implement RECP would be granted more time for environmental compliance, and/or if an internationally recognized ISO standard for RECP would exist, this would naturally drive the industry demand towards RECP services.

What role could the European Union play to strengthen RECP and circular economy in the region?

The EU will have a continued important role to play in supporting the adoption of RECP in the region, not only as a key trading partner, but also as a knowledge partner for technology cooperation delivering eco-innovative production solutions to assist the local industries to modernize. The EU is already contributing a lot to such developments, not only through projects like this, but also through supporting several financing programmes of the EBRD on green economy in the region. The UNIDO partnership with EBRD was pivotal to provide access for financing accelerating large RECP investments that were identified, corresponding to 10-20% of the total investments portfolio of the MED TEST II companies. The Mediterranean countries will ultimately benefit from partnerships like the one between UNIDO and EBRD, whereas integration of technical assistance and financial instruments could be further strengthened, already at the design stage of future programming of the EU on green and circular economy cooperation.

MED TEST II *in Algeria*

"The TEST approach enabled us to improve our environmental and energy performance with positive impacts on our productivity and our economic results. We intend to continue improvement efforts by setting up environmental management systems and energy according to ISO 14001 and 50001 standards."

Monsieur Zaoueche
Directeur de production, Tchin-Lait

The MED TEST II project in Algeria was implemented by the Centre National des Technologies de Production plus Propre (C.N.T.P.P), under the patronage of the Ministry of the Environment and Renewable Energies (MEER) and the Ministry of Industry and Mines (MIM), and in cooperation with the National Agency for the Promotion and Rationalization of Energy Utilities (APRUE).

In Algeria, 12 companies from the food and beverage sector were engaged for the RECP demonstration phase of MED TEST II. The companies that took part in the project ranged from SME's with 150 full-time employees to large companies with 500 employees, and are located along the coast of north in different regions within Algeria. Over a total of 192 resource efficiency measures were identified by the TEST team in the 12 demonstration companies out of which 167 measures, corresponding to approximately 87"% of the total, were approved by companies' management and incorporated into the action plans for implementation in 2017. Whilst substantial savings were identified, most of the RECP measures had a short Payback Period (PBP), that is to say 50% of the measures had a PBP less than or equal to 0.5 years, 15% less than or equal to 1.5 years, 13% less than or equal to 3 years and 22% greater than 3 years. This shows the great profitability of investing in RECP in Algeria.

Companies were encouraged to incorporate the TEST approach into their policies, strategies and activities. As a result, all of these companies have adopted environmental policies that integrate the concept of RECP. As an example, a milk-manufacturing company has anticipated integrating the MFCA tool into the company's accounting system as a complementary analytical instrument and intends to pursue the continuous improvement efforts by implementing environmental and energy management systems according to ISO 14001 and ISO 50001.
Another example comes from a beverage producer that invested in a new mineral water production line. This investment will save 24,000 m^3 of water per year, and takes into account the RECP recommendations that were made for the old existing line but at the level of conceptual design of a new line. As a result, there are no more losses of corks and handles noticed at this stage of production. Correspondingly, the company has embarked on a process of setting up a food safety system according to the ISO 22000 standard and updating its environmental management system.

In addition, the MED TEST II project has strengthened the capacity of local RECP service providers to help develop solutions for Algeria that improve production without wasting scarce resources. The important role of C.N.T.P.P as an enabler of increasing the awareness on RECP has, through this project, contributed significantly to the capacity building of RECP services and to develop innovative and resource-efficient production solutions for the Algerian industry.

12
RECP industry demonstrations

3,628
Employees impacted

192
RECP measures identified

With a total investment of **3.3** million euros the 12 industries could save **2.7** million euros in annual production costs

The identified RECP measures will annually save:

- **29.8** GWh of energy
- **435,000** m^3 of water
- **14,514** t of raw materials
- **18,818** t of CO_2 emissions
- Reducing solid waste with **819** t

MED TEST II *in Egypt*

"For any business, there are always drivers for cost and the MED TEST II project drives efficiency and costs. So, it benefits us completely in all KPIs that we want to drive."

Martin Lomas,
Manufacturing Director, Juhayna Food Industries

Under the patronage of the Ministry of Trade and Industry (MoTI), and the Ministry of Environment (MoE), the MED TEST II Project in Egypt was implemented in cooperation with the Egypt National Cleaner Production Center (ENCPC), in close collaboration with the Egyptian Federation Industry (EFI) (Chambers of Chemical and Food Industries), Food Export Council and Chemical & Fertilizers Export Council. The main implementing partners assisting the ENCPC were EnviGlobe and EWATEC Consultants.

In Egypt 28 companies from the food, beverage, chemical and textile sectors were engaged for the RECP demonstration phase of MED TEST II. The companies that took part in the project ranged from SME's with 15 full-time employees to large companies with 1,200 employees, and are located in Alexandria, Cairo, and Sadat City. The selected sectors for the MED TEST II project in Egypt were of particular interest because of the high "replicability" potential that the results can have to other production sites. Also, supporting these particular sectors would allow a demonstration on the business case of RECP in some of the most recognized industries in Egypt and to support their ambition to produce environmentally sound high-quality products that can compete on better terms on national and international markets.

The majority of the identified RECP measures had a payback period (PBP) of less than half a year (50%), showing the high profitability of RECP measures in the Egyptian industry. The demonstration of RECP in the Egyptian industry also gave industry professionals from the participating companies the opportunity to join in RECP training, forming TEST teams, and to undertake resource efficiency improvements within their own workplace. Moreover, additional expertise from industry associations, financial institutions, government administrations and academia, received training on the TEST methodology. For instance, 10 local service providers from the consulting sector joined the TEST programme and received on the job training. There is a growing market potential for sustainable production services in Egypt, which now can be met by a qualified offer of RECP services, thanks to the contribution of the UNIDO MED TEST II initiative.

Responding to the sometimes high investments that new resource efficient technologies require, companies in the MED TEST II project were given guidance by UNIDO on how to access existing green financial incentives that have been developed by the Green Economy Financing Facility (GEFF) of EBRD and with the Egyptian Pollution Abatement Programme (EPAP III). So far, four companies have accessed the existing green financial incentives, accelerating the implementation of more than 19 million euro of RECP investments, almost half of the total private sector leverage of the MED TEST II project in Egypt. In this regard, one company was enabled to finance a zero liquid discharge RECP investment amounting over 17 million euros through the EPAP III programme. Four additional companies are preparing to apply for GEFF financing for investments exceeding 7.5 million euros, and two companies are preparing to apply for the EPAP III for investments amounting to 450,000 euros.

The technical assistance provided within the MED TEST II project also helped businesses in establishing linkages with other companies along their value chain and to explore opportunities related to the circular economy. This was the case for a business group of three plastic converters, which before the project utilized only virgin PET resins for their production, and a local rPET producer. As result, the plastic converters are now implementing technical modification of their processes in order to use a blend of recycled and virgin resins into their products, which will bring interesting savings, and the rPET producer opened the domestic market for their products. Business opportunities like this, when scaled, can effectively contribute in preserving resources to last in the local economies, while also reducing dependency from import of raw materials, which is at the core of the circular economy paradigm.

28
RECP industry demonstrations

9,838
Employees impacted

253
RECP measures identified

With a total investment of **36.5** million euros the 28 industries could save **10.6** million euros in annual production costs

The identified RECP measures will annually save:

- **411** GWh of energy
- **2 million** m^3 of water
- **5,111** t of raw materials
- **79,452** t of CO_2 emissions
- Reducing solid waste with **12,118** t

"When you talk about savings and the environmental impacts, it can easily be promoted to the industry, especially when it reflects the competitiveness of the business."

Hanan Al Hadari,
Ministry of Trade and Industry

MED TEST II *in Israel*

"We were aware that our plant had substantial potential for environmental and economic improvements. The problem was figuring out where this potential was hiding in the process. The TEST methodology helped us to discover how to use data to find the most cost-effective solutions"

Oren Avrashi
CSR manager, Tempo Beverages Ltd.

With the support from the Ministry of Environment Protection (MoEP), and the Ministry of Economy and Industry (MoE), the MED TEST II project in Israel was implemented by the Weitz Center, in partnership with two consulting firms, Green Target and Sher Consulting. In collaboration with the Israeli manufacturer's association and other key national stakeholders, UNIDO brought together influential organizations and institutions through collaborative efforts that will facilitate a continued application of RECP in the Israeli industry.

Seven companies from the food and beverage, plastics, metal, and chemical sectors took part in the demonstration of the MED TEST II project in Israel. The companies participating in the project ranged from SME's with 100 employees to large companies with 1,000 employees, also with multiple production sites in Israel and abroad. Some of the industries participating in the project have on their own replicated the TEST methodology to other manufacturing sites, extending the lessons learnt and the scope of the project beyond the initial boundaries of the Mediterranean region.

The project was particularly supportive in Israel as it demonstrated to the local industry and to the governmental authorities, how effective the RECP concept can be applied to achieve environmental compliance at reduced costs.

For instance, after having realized the significant economic implications of material and energy losses, one of the companies decided to upgrade the Enterprise Resource Planning system so that a new monitoring system based on energy metres readings could be integrated. This system will extract its data from the newly installed metres on key consumers on the production floor and will focus on raw material losses and reporting the data to management on a monthly basis. The company also launched a four-year investment and modernization programme with a budget of more than 4 million euro that will enable them to reduce 26% of the losses in cost-intensive raw materials by 2020.

Moreover, the monitoring and verification of the level of implementation of the RECP measures identified during MED TEST II project one year after its completion indicated an increase from 51% to 64% of the implementation rate in the demonstration industries. This shows the high sustainability of the project's impact, and the significant potential of the UNIDO TEST methodology as an efficient tool that can improve the environmental performance of the industries, while improving their competitiveness.

The concrete results from the demonstrations of MED TEST II in Israel have convinced the Israeli ministries of Economy, Environment and Finance to jointly commit 20 million euro to upscale resource efficiency among Israel's industry.

7
RECP industry demonstrations

1,870
Employees impacted

129
RECP measures identified

With a total investment of **4.4** million euros the 7 industries could save **2.1** million euros in annual production costs

"As consultants we help people to look differently at the problems they face with new tools of strategic thinking. That is better environmental management."

Eran Doron,
Consultant - Green Target

The identified RECP measures will annually save:

- **15.1** GWh of energy
- **113,985** m^3 of water
- **503** t of raw materials
- **8,689** t of CO_2 emissions
- Reducing solid waste with **205** t

MED TEST II *in Jordan*

"With this project we have established a new culture and a new way of thinking. We now enhance our information system to become more sustainable."

Waleed Habibah,
Plant manager, Al-Haj Mahmoud Habibah & Sons Co

Under the auspices of the Ministry of Industry, Trade and Supply (MoITS) and the Ministry of Environment (MoEnv), the MED TEST II project in Jordan was implemented by UNIDO, together with the Royal Scientific Society (RSS), in partnership with Amman Chamber of Industry (ACI). The collaboration with the Jordan Chamber of Industry (JCI) and local financial institutions, such as the Jordan Renewable Energy and Energy Efficiency Fund (JREEEF), and the Jordan Environment Fund (JEF), established under the framework of the MED TEST II project, succeeded in assembling important organizations and institutions to mobilize funding and support for a continued application and scaling-up of RECP in Jordan.

In Jordan, 12 demonstration companies from the food and beverage sector, signed up for the MED TEST II project. The Jordanian demonstration companies ranged from SME's with 60 employees to large companies with 500 employees and located around several areas of Jordan, covering different industrial zones in Amman including Sahab and Marka. The demonstration activities focused on the food sector considered one of the most important for the Jordan's economy.

Initial assessments in the 12 MED TEST II demonstration companies in Jordan showed a clear potential to reduce consumption of raw materials, water, and in particular energy with an average saving potential of 30% on the total energy bill. Reducing operating costs in the production process that were related to water and energy is vital to Jordan's industries, as the country is reliant on expensive energy imports and scarce water supplies. The companies participating in the MED TEST II project realized the linkages between water and energy costs and the importance to install monitoring systems within their management structure. This will help industries to remedy rising energy and water costs and counterbalance the phase-out of energy subsidies. Almost half of the identified RECP measures in Jordan had a Payback Period (PBP) of less than half a year, with a required investment below 10,000 euros, and around 23% of them are good housekeeping measures, showing the cost effectiveness of RECP measures in Jordan's industry.

The beneficial impact of the project in Jordan was confirmed by the monitoring campaign to measure and verify the real savings achieved in a group of six companies after the implementation of the identified RECP initiatives. In the six companies, the water consumption per unit of product reduced on average by 44%, fuel by 42%, and electricity by 35% compared to the initial baseline. One of the companies designed their EMS integrating RECP, and applied for Lloyd's audit to obtain the ISO 14001 certification. Companies with high potential for water savings, realized the importance of monitoring water in a systematic way, and have decided to install metres for key water consumers. Additionally, three companies changed their accounting systems to achieve better tracking of material losses.

Some new green jobs opportunities were also generated throughout the MED TEST II project. For instance, one company employed two young engineers to follow up the implementation of RECP programmes and another company hired new maintenance staff to follow up on the implementation of RECP monitoring and information system.

12
RECP industry demonstrations

2,312
Employees impacted

214
RECP measures identified

With a total investment of **3.7** million euros the 12 industries could save **2.1** million euros in annual production costs

The identified RECP measures will annually save:

- **22.1** GWh of energy
- **63,844** m^3 of water
- **404** t of raw materials
- **8,086** t of CO_2 emissions
- Reducing solid waste with **82 .6** t

"The most important achievement is the change of culture in the companies. All the companies plan to keep their TEST teams so that they can make continuous improvements."

Rafat Assi,
Project manager and coordinator – Royal Scientific Society

MED TEST II *in Lebanon*

"Thanks to the project, we achieved in two years energy efficiency improvements that would have taken us ten years to accomplish without project intervention."

Ahmad Dirani,
General Manager, Dirani Group

The MED TEST II project was implemented in Lebanon under the protection of the Ministry of Industry (MoI) and the Ministry of Environment (MoE. In Lebanon the MED TEST II project was implemented by UNIDO with the local coordination done by the Industrial Research Institute (IRI), in collaboration with the Association of the Lebanese Industrialists (ALI), the Chamber of Commerce, Industry and Agriculture of Beirut and Mount Lebanon (CCIA-BML). A dialogue was initiated with the and Banque du Liban (BDL) to mobilize existing green financial instruments, and eventually develop dedicated RECP loans for a sustained application and scaling-up of RECP in Lebanon.

Eight demonstration companies from the food and beverage sector signed up for the MED TEST II project in Lebanon. The Lebanese demonstration companies ranged from SME's with six full-time employees to large companies with 382 employees located in several areas of Lebanon and covering different industrial zones in great Beirut, Mount-Lebanon and the Bekaa Valley. Moreover, the MED TEST II project in Lebanon has reinforced the capacity of 10 local service providers, which have been offered an on-the-job training of the TEST methodology and will be able to offer RECP competences to other manufacturing sites in the future.

The majority of the identified measures had a payback period (PBP) of less than half a year (60%), showing the high profitability of resource efficiency in the Lebanese industry. Of the 112 identified measures, 101, corresponding to approximately 91% of the total measures, were approved by management in these companies and included in the action plan for implementation in 2017. In order to respond to the sometimes high investment requirements, companies were assisted by the MED TEST II project to access the existing green financial incentives as part of the national strategy and policies to support the Lebanese economy.

As recommended at the project's start, each company installed a set of metres to monitor energy and water use at key consumers. A total of 475 metres were installed in the eight companies with an investment of 120,108 euros, showing the high commitment of top management and a raised awareness on the importance of resource efficiency. The installation of this resource monitoring system, together with the formulation of RECP policies, and the recommendation to improve accounting systems (MFCA) for material losses, will facilitate companies' adoption of environmental and energy management standards and also enable them to have continuous improvements in resource efficiency as a routine practice in future. Correspondingly, all companies prepared EMS policy statements and were provided with specific guidelines to integrate RECP in their management system and towards the end of the project, one of the companies decided to commence its ISO 14001 certification.

The economic gains in some companies have been very high compared to the required investment cost. For instance, one company managed to save more than 850,000 euro per year in production costs, with a return on investment of 20 days, by implementing new software for tuning sales forecast with production planning that would drastically reduce the market returns.

Despite that water is considered to be a free resource for the industries in Lebanon, insufficient local water distribution leads to shortages and additional costs for industries. This makes businesses increasingly aware and concerned about the availability of this resource.
The MED TEST II project in Lebanon identified several measures related to water savings and one of the companies conducted a water footprint analysis and is now able to manage and monitor its water consumption more efficiently. This also clearly shows that there is a genuine interest from the industry to contribute to a more resource-efficient development when they are given the appropriate tools on how to do it.

8
RECP industry demonstrations

1,197
Employees impacted

112
RECP measures identified

With a total investment of **1.4** million euros the 8 industries could save **1.6** million euros in annual production costs

The identified RECP measures will annually save:

- **14.3** GWh of energy
- **53,412** m^3 of water
- **544** t of raw materials
- **3,568** t of CO_2 emissions
- Reducing solid waste with **523** t

"We embarked in RECP, implementing water efficiency measures which resulted in 50% reduction of water use. The knowledge and experience gained through MED TEST II project will be very beneficial when implemented in our new plant which is currently in its final phases of completion."

Said Abou Ghouneim
CEO - Al Manara Dairy

MED TEST II *in Morocco*

"The results of the project exceeded our expectations, with actions to improve our process, our energy consumption, and environmental performance. The project has contributed to our competitiveness on the market not only by optimizing resources, but also by improving the quality of products."

Mr. EL ACHAM,
QSE Director - Afriques Câbles

With the support of the Ministry of Industry, Investment, Commerce and the Digital Economy, and the Ministry of Energy, Mines and Environment, the MED TEST II project in Morocco was set up to be implemented by a consortium composed of two service providers - Fraquemar and MSI Conseil. The MED TEST II project brought together influential organizations and institutions that will continue to influence the uptake of RECP in Moroccan industries.

In Morocco 22 companies from the food and beverage, mechanical, and textile sectors engaged in the RECP demonstration phase of MED TEST II. The companies that took part in the project ranged from SME's with 50 full-time employees to large companies with 400 employees, and are located in Casablanca, El Jadida, Tangiers and the Rabat regions.

The partnership established by UNIDO with the MorSEFF programme of the EBRD, was instrumental to channel some RECP high investment projects to existing financial incentives schemes. To date, almost 5 million euros have been approved by MorSEFF for Clean and Resource-Efficient Production (PPER) projects for projects from MED TEST II companies. These funds have been used to leverage new production technologies with increased efficiency, enabling higher productivity while requiring significantly reduced energy, water and resource quantities compared to current processes.

An important feature of the MED TEST II project in Morocco was the significant potential for renewable energy, which was identified during the execution of projects. Nearly all companies included the installation of photovoltaic panels in their action plans with a cumulative investment value of 7 million euros, corresponding to an installation capacity of approximately 10 MW of renewable energy, out of which 60% are under implementation. The combined annual savings from the investments in renewables, and other identified energy efficiency measures, will reduce CO_2 emissions with approximately 40,000 tonnes per year and almost 100 GWh of energy per year.

Almost all the demonstration companies have approved measures to install monitoring systems for energy and environmental aspects, according to ISO 14000 and 50001 standards. A total investment of 770,000 euros is planned for the implementation of these measures in the 22 companies, which would result in annual savings of 445,000 euros in energy and water costs. Finally, most companies plan to integrate the MFCA tool into their accounting system in order to effectively monitor material flows.

22
RECP industry demonstrations

2,951
Employees impacted

475
RECP measures identified

With a total investment of **21.5** million euros the 22 industries could save **10.4** million euros in annual production costs

The identified RECP measures will annually save:

- **97.6** GWh of energy
- **131,519** m^3 of water
- **5,153** t of raw materials
- **39,488** t of CO_2 emissions
- Reducing solid waste with **3,162** t

MED TEST II *in Palestine*

"For our company, saving water or saving energy is not only saving money, we are also resourcing for the community "

Ismael Izhiman
Sales and Marketing Director - Siniora Food Industries Company

With the support of the Ministry of National Economy (MNE) and the Environment Quality Authority (EQA) the MED TEST II project in Palestine was implemented with the support of the Palestine Academy for Science and Technology (PALAST), in collaboration with the Palestinian Food Industries Union (PIAU), the Palestinian Federation of Industries (PFIU), and the Bank of Palestine (BOP).

10 demonstration companies from the food and beverage sector were selected for participating in the MED TEST II project in Palestine. The companies ranged from SME's with 15 full-time employees to medium-size companies with 310 employees and are all located in the West Bank. The majority of the identified measures had a payback period (PBP) of less than half a year (50%), showing the high profitability of resource efficiency. Of the 92 identified measures, 68, corresponding to approximately 75% of the total measures, were approved by companies' management and included in the action plan for implementation in 2017-18.

The active participation of the company staff in identifying and implementing RECP measures was decisive for the success of the project in Palestine. One of the companies, in particular, distinguished itself by committing to the project's objectives in organizing a set of training workshops for all company staff that could influence resource efficiency in the production lines, storage, maintenance, utilities and company management. Consequently, all company staff were trained and involved; the owner even introduced a financial premium for those employees who identified resource efficiency options. This resulted in more than 30 RECP measures identified and implemented, which will be extended to the new production lines and premises of their expansion project. Moreover, the implementation of the recommendations to improve accounting systems (MFCA) for managing material, energy and water losses, will continue to facilitate companies' adoption of environmental and energy management standards and also enable them to have continuous improvements in resource efficiency as a routine practice in future. Nearly all the companies prepared their EMS policy statements and were provided with specific guidelines to integrate RECP in their management system.

Palestinian companies involved in the demonstration activities showed strong willingness to contribute in preserving resources, such as water, not only for their businesses, but also for the communities. This is an important feature of the MED TEST II project in Palestine, considering that a growing population and demand for already scarce resources, energy and water costs will likely rise in Palestine. As an example, three companies located in the Jordan Valley, can now, thanks to the project, produce with a better environmental performance and contribute in protecting the unique biodiversity of the area.

10
RECP industry demonstrations

1,130
Employees impacted

92
RECP measures identified

With a total investment of: **2.5** million euros the 10 industries could save **2.4** million in annual production costs.

The identified RECP measures will annually save:

- **5.3** GWh of energy
- **244,850** m^3 of water
- **5,153** t of raw materials
- **4,197** t of CO_2 emissions
- Reducing solid waste with **297** t

MED TEST II *in Tunisia*

"The experience of the sectoral technical centers in the implementation of the MED TEST II project marks a turning point in their commitment towards sustainable industrial development and opens up real prospects for enriching the range of services offered to companies in terms of environmentally sound technologies."

Nabil Benbechir
Director General of the CNCC

Under the patronage of the Ministry of Industry and Small and Medium Enterprises, and the Ministry of Local Affairs and Environment, the MED TEST II project in Tunisia was implemented by a consortium of 5 sectoral technical centres: CNCC as a leader, CTC, CETTEX, CETIME and CTAA. The MED TEST II project in Tunisia has brought together influential organizations and institutions that can ensure that a continued uptake of RECP in Tunisia's industries can take place.

In Tunisia 26 companies from the food and beverage, mechanical, chemical, leather, and textile sectors were engaged for the RECP demonstration phase of MED TEST II. The companies that took part in the project ranged from SME's with 20 full-time employees to large companies with 1,045 employees.
A total of 363 resource efficiency measures were identified by the TEST teams. Of these, 349 measures, corresponding to approximately 95% of the total, were approved by the company management and included in the action plans for implementation in 2017.

One of the important features of the MED TEST II project in Tunisia was the significant number of RECP investments identified for technology upgrade and eco-innovation. For instance, one textile company acquired three E-flow machines that will save up to 95% water compared to the traditional jeans finishing processes. In addition, an agribusiness company has acquired a new aerosol technology to accelerate the defrosting process for sardines, reducing the water consumption and the defrosting time by 50%, which will also improve productivity and the product quality. Furthermore, two pharmaceutical companies decided to invest in changing their technological process to reduce the rate of out of specifications products and install tri-generation units to produce cooling, heating and electricity required by their processes. This will enable to save the companies 790,000 euros in annual production costs. Another example of a profitable circular economy measure came from a company that produces frozen seafood and shrimps. Through the MED TEST II project this company started to valorize the proteins content of its organic waste into new products for human consumption.

Companies were during the project encouraged incorporating the TEST approach into their policies, strategies and activities. As a result, all the companies have adopted environmental policies that incorporate the concept of the RECP. Five companies have put in place a comprehensive EMS certification according to the ISO 14001 standard (2015 version) obtaining certification by the end of the project. Finally, most companies intend to integrate the MFCA tool into their accounting system in order to continue an effective monitoring of material flows.

In addition, the MED TEST II project has strengthened the capacity of local RECP service providers to help develop solutions for Tunisia that can increasingly decouple production from the consumption of limited resources. To this end, five technical centres (CTAA, CETTEX, CNCC, CTC and CETIME) operating in the agro-food, textile, leather and footwear, chemical, and mechanical sectors are now able to provide RECP services to the local industries. This core group of experts in the various industrial sectors already master the TEST tools and are available for a continued support to Tunisia's industry in providing technical assistance and innovative solutions in the field of RECP.

26
RECP industry demonstrations

7,747
Employees impacted

363
RECP measures identified

With a total investment of **14.1** million euros the 26 industries could save **9.7** million euros in annual production costs

The identified RECP measures will annually save:

- **111.2** GWh of energy
- **448,950** m^3 of water
- **7,097** t of raw materials
- **35,227** t of CO_2 emissions
- Reducing solid waste with **2,371** t

"Thanks to the MED TEST II project, we have been able to create a culture that reflects the preservation of resources and waste reduction, within the different departments of the company, which will result in economic and environmental gains"

Ali Aichi,
CEO - L'homard

Scaling up the impacts of RECP in the region

Adopting the concept of RECP would not only be a profitable step for the industries of the Southern Mediterranean, it would also help the region to become more competitive while improving climate change resilience, raw material security, and the ability to create green jobs.

The ability of economies to adapt, become low carbon and resource-efficient, while remaining competitive, depends on the upscaling of eco-innovative production models that can be carried out over the whole industrial supply chain. The MED TEST II project has demonstrated that the concept of RECP, paired with the UNIDO TEST methodology, is a viable tool to reduce resource use and environmental impacts while increasing the competitiveness of industries in the Southern Mediterranean. Moreover, the transition towards a more circular economy is becoming a central issue in sustainable development strategies at international, regional and national level. Thus, engaging industries in becoming more resource efficient is fundamental to achieve such ambitions. To this end, the United Nations 2030 Agenda for Sustainable Development urges member countries to ensure sustainable consumption and production patterns for prompting resource and energy efficiency.

By the end of the MED TEST II project, the 125 participating demonstration companies reported total annual savings of 3.5 million m^3 of water, 707 GWh of energy, 33,623 t of raw material and an evasion of 197,525 t of annual CO_2 emissions. In this sense, the achieved results from the MED TEST II project are conclusive as they confirm the relevance and effectiveness of the TEST methodology as an instrument for industries that wish to overcome challenges related to a sustainable consumption and production.

The average reduction achieved by the demonstration companies in water consumption was by 20%, while energy use by 24%, and the raw material inputs by 5% per unit of product manufactured. Extrapolating and projecting these figures on the resource consumption of the whole manufacturing sector of the region would result in 76,667 GWh of energy saved per year and 700 million m^3 of water conserved, which are impressive figures.

Moreover, if the RECP concept would be adopted by most of the industries in the region, the expected reduction in greenhouse gas emissions would correspond to 18.5 million t of CO_2 per year. This again, underlines the potential of RECP, not only as a tool to improve the productivity, but also as a mean for local governments to fulfil national commitments and achieve greenhouse gas emission targets set by the United Nations 2030 agenda.

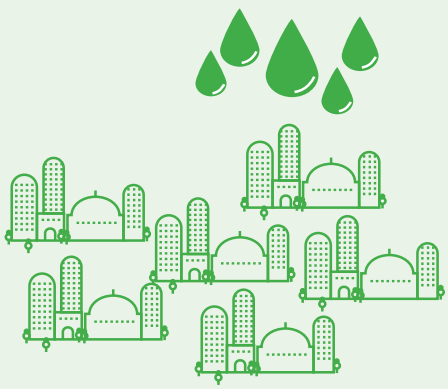
The 41.7 million euro of economic savings achieved by the 125 demonstration companies in MED TEST II project are equivalent to the salaries of approximately 10,500 workers, taking into account the different average salary scales of employees in the manufacturing sector of the eight countries. This highlights that an adoption of RECP not only supports companies to become more competitive and productive, but also gives them a better position to expand their activities, retain the existing labour force, also by creating new job opportunities.

Managing the transition from demonstration activities to a sector-wide mainstreamed adoption of RECP in the industry of the Southern Mediterranean will require country specific actions that can address local constraints, regulatory frameworks, and development aspects into the required scaling up actions for RECP. In this regard, UNIDO together with the Governments, local partners, and stakeholders from the industry and civil society, have during the MED TEST II project developed eight national roadmaps with propositions on how to guide a sector-wide adoption of RECP within the national industries and what actions are required to do so.

Scan the QR Code to access the eight MED TEST II scaling up roadmaps

Projecting the average resource savings achieved in the MED TEST II project on energy (24%), water (20%), and CO_2 (24%) to the overall industrial manufacturing sector in the Southern Mediterranean region:

Saving
76,667 GWh
per year, which corresponds to the residential energy consumption of the inhabitants of Morocco, Tunisia and Palestine together equivalent to the consumption of more than 50 million people.



Saving **700 million m^3 of water**, which corresponds to the annual domestic water consumption of 11 million people living in Algiers, Amman, Beirut, Rabat, Tunis, and Tel Aviv together.

Avoiding **18,570,856 tons of CO_2** emissions, which equals the unconditional declared contribution of Algeria for reaching the 2030 reduction target under the Paris Agreement.

For more information visit
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