INDUSTRIAL
ENERGY
ACCELERATOR
MOROCCO

CASE STUDY

Accelerating the Uptake of Energy Management Systems by Moroccan Industries

Morocco's industrial sector is on the rise and so is its energy consumption, which has steadily grown over the past years. Helping vital industries – large and small – save and manage energy more efficiently is a national priority for a Government who is determined to reduce its dependency on fossil fuel imports and curb CO_2 emissions. Thanks to the training and mentoring provided by the Industrial Energy Accelerator, a group of 18 Moroccan 'flagship companies', 13 energy consultants and nine government officials are now championing an energy efficiency movement across the country and making energy savings.

UNIDO CARBON TRUST amee Agence Marocaine pour l'Efficacité Energétique CGEM

The Challenge

Morocco is almost wholly dependent on imported energy to power its economic development. Over 93 per cent of its energy needs are met through imports of mostly fossil fuels. This places a significant strain on Morocco's **industrial sector, which uses 21 per cent of the country's overall energy**. As the industrial sector grows and diversifies, so does its demand of energy which has increased consistently over the last few years at an average rate of 4.38 per cent per year.

Industries such as mining, textiles and mineral manufacturing employ almost a quarter of the country's workforce and contribute to around 30 per cent of the nation's GDP. Also, small and medium-sized enterprises (SMEs) form the backbone of the North African country's economy and are a vital source of its economic growth and social inclusion.

There is a considerable potential for improving energy efficiency in Moroccan industries, especially amongst SMEs. According to the results from industrial energy audits conducted by the European Commission, more than **15 per cent of the baseline energy use could be saved in Morocco**.

"Morocco is filled with SMEs. Providing these companies with the right tools to manage their energy consumption properly is essential to harness the potential of national energy efficiency and significantly reduce our CO_2 emissions."

M. Slimane Smouh,
AMEE's Head of Energy Efficiency in Industry for the Moroccan Agency for Energy Efficiency

The Barriers

However, despite this potential for energy savings, implementation of energy efficiency measures in Moroccan industries is relatively low. Some of the reasons are:

- Lack of awareness among the industries of the potential savings
- Limited technical capacity of industries to identify the opportunities and realize the potential
- An underqualified and uncertified local energy services market with limited knowledge of the tools available to manage energy more efficiently.

Morocco's Climate Change Burden and Commitment

Moroccans are bearing the brunt of climate change. In 2015, a devastating drought destroyed harvests and significantly depressed the economy as a result. Ongoing desertification is one of many looming threats as average temperatures are expected to rise between 2 and 5°C by the end of this century.

The country's coastline faces severe erosion with some areas of the north coast already eroding at a rate of one meter per year. Recognizing its vulnerability to the impacts of climate change, the government ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1995 and the Kyoto Protocol in 2002. In 1996 a National Committee on Climate Change was established, and in 2009 the National Plan to Combat Climate Change set the first targets for reducing GHG emissions in the energy and industry sectors.

In 2016, Morocco hosted the UN Climate Change Conference (COP) in its iconic city, Marrakech, which strengthened its global commitments towards climate change action.

Bold Actions Are Underway

With a comprehensive package of policies and regulations, Morocco is harnessing the power of industrial energy efficiency to achieve bold national targets. The approval of a National Energy Strategy in 2009, set the foundations for an energy efficiency movement across the country. The bold plan established the goal to reduce energy use by 20 per cent before 2030.

Covering a range of interlinked areas, the National Energy Strategy aims to:

- Optimize the fuel mix in the electricity sector
- Accelerate the development of energy from renewable sources, especially wind, solar and hydropower
- Make energy efficiency a national priority
- Encourage more foreign investment in the energy sector
- Promote greater regional integration.

In 2011, the Government of Morocco also passed the Energy Efficiency law (47.09) and a related decree that introduced compulsory energy audits for energy intensive industries. As part of this mix of policy measures, it lifted all subsidies on diesel, gasoline and heavy fuel oil to encourage more efficient use of energy and to free up resources to invest in the transition to a green economy. The creation and upgrade of the Moroccan Agency for Energy Efficiency – ADEREE but renamed to AMEE in 2016 - also signaled the country's firm commitment to implement energy efficiency programs across sectors.

> “Morocco is already one of the advanced countries in the region in terms of laws and regulations dealing with energy efficiency. So, with this combination of effective policy and support from the private sector, the potential for a wide-scale and rapid adoption of industrial energy efficiency in Morocco is very high.”

Samir Khafagui,
UNIDO ISO 50001 International Expert

Mandatory Energy Audits for High Consuming Industries

According to Morocco's Energy Efficiency law, companies consuming over 1,500 ton of oil equivalent (TOE) of thermic and/ or electric energy per year must undergo mandatory audits by certified companies to help them establish solutions and targets to save energy. However, the law exempts companies that have already established an Energy Management System (EnMS) in accordance with national regulations. The EnMS have to be certified by an accredited institution and are valid for five years.

The Moroccan Agency for Energy Efficiency

Created in 2016, the Moroccan Agency for Energy Efficiency (AMEE) – previously ADEREE - is a strategic public institution, whose mission is to contribute to the implementation of the national energy policy. AMEE's vision is to become a hub of excellence and a facilitator for cooperation between institutions, civil society, the private sector as well as national and international cooperation. Its main role is to:

- Implement energy efficiency programmes
- Coordinate and supervise development actions in the field of energy efficiency; as well as awareness and promotion
- Monitor and coordinate energy audits and support the implementation of their recommendations
- Raise awareness and promote energy efficiency measures, cooperation and communication.

An Innovative Process to Accelerate the Uptake of Energy Management Systems

The Industrial Energy Accelerator's (the Accelerator) engagement in Morocco has focused on building the capacities of market actors to facilitate the uptake of Energy Management System (ISO 50001) and energy efficiency best practices.

Over a period of ten months - from January to October 2019 - the Accelerator's experts imparted an innovative four-module training, and mentored a first cohort of engineers, floor, quality and systems managers representing different industries across sectors.

In total, 18 companies joined the training as 'flagship companies' with the idea that other companies across the country will see the benefits and will also decide to adopt similar measures. The training was carefully designed to guide the company representatives in the implementation and/ or enhancement of a formal EnMS in their respective businesses and, during the course of the ten months, to save energy, CO_2 emissions and money.

At the same time, a group of Moroccan energy consultants, determined to become experts in the implementation of EnMS, as well as government officials from AMEE and the Ministry of Energy, Mines and Sustainable Development, were also involved in the training. The 13 participating national consultants were assigned to assist the companies as energy saving measures were put in place.

Face-to-face sessions to impart each module were run in Casablanca, Morocco's industrial hub. And, in between, a series of webinars tailored to each company allowed the trainers to check on individual progress and address issues specific to each company's sector and business.

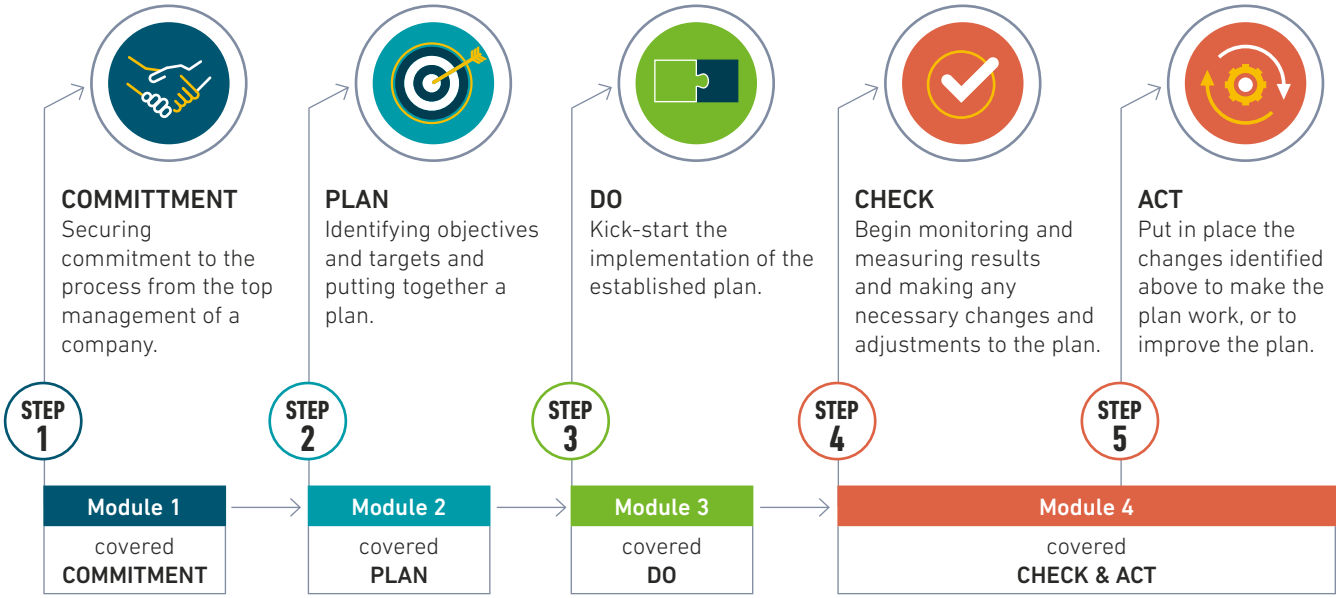
In parallel to the training, the Accelerator's experts visited each of the 18 companies to assess first-hand their production processes and the potential to enhance the management of energy.

> "Mixing companies and consultants has been very innovative. Also having companies representing different industrial sectors was important as they can share and duplicate the experience within their own professional federations."

Mme Hanan Hanzaz,
UNIDO Representative in Morocco

A Comprehensive Ten-Month Process

The four ISO 50001 training modules ran in January, March, June and September and aligned with the typical steps of a management system standard which involves:



Energy Management System (ISO 50001)

An energy management system helps companies better manage their energy use, thus improving productivity. It involves developing and implementing an energy policy, setting achievable targets for energy use, and designing action plans to reach them and measure progress. This might include implementing new energy efficient technologies, reducing energy waste, improving current processes to cut energy costs or simply raising the awareness of staff so they are empowered to participate in saving the company's energy.

The ISO 50001: 2018 Energy Management Standard is one of the frameworks for developing an effective EnMS. To date, industrial companies have saved millions of dollars and tons of carbon emissions as a direct result of implementing the ISO 50001 standard.

Mock Audits

At the end of the process, during Module 4, the trainees carried out a mock audit on the EnMS in three participating companies including MCI Santé Animale, Superceram and Sothema. The audits had two distinctive phases 1) to cover production and floor visits, and 2) to review the necessary documentation describing how the system is managed and quantifying the energy savings.

Spotlight: MCI Santé Animale

MIC Santé Animale is one of the flagship companies audited by the trainees at the end of the programme. It is a market leader producing vaccines and medicines for animals. Before the ISO 50001 training and following an energy audit carried out by AMEE in 2014, the company had been implementing a series of measures to cut its energy bill. For example, the company had:

- Installed variable speed drives on production machines to reduce energy consumption
- Implemented heat recovery on the chiller systems
- Insulated hot and cold surfaces to reduce heat loss
- Installed new compressors with variable speed drives to reduce energy consumption
- Installed variable speed drives on chilled water pumping system
- Put in place a digital system to monitor in real time its energy consumption.

The mock audit recommended MCI Santé Animale maximize the use of the monitoring system by integrating the different energy performance indicators and boosting communication with staff.

Watch our video showcasing the mock audit

The Achievements

IN NUMBERS

Ten Months of Training and Mentoring

65 PEOPLE TRAINED in ISO 50001

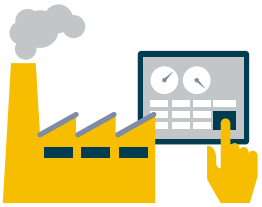
32 INDUSTRY REPRESENTATIVES

13 NATIONAL ENERGY CONSULTANTS

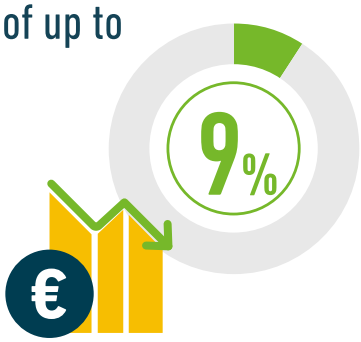
9 GOVERNMENT OFFICIALS

of which **33%** ARE WOMEN

18 COMPANIES mentored and guided to implement a new or improved ENERGY MANAGEMENT SYSTEM



ENERGY SAVINGS made throughout the process of up to



by some companies

The ten-month process has delivered the following key achievements:

1

Energy efficiency champions gained new **skills and tools** to establish and/ or enhance and maintain over time energy management system across their production. These tools also empowered energy managers to monitor and demonstrate with figures the savings made in the short and long term.

“With this training not only have I gained further knowledge about energy management, it has helped me structure and coordinate the implementation of all the actions to reduce the energy we use and, most importantly, analyze and quantify the impact.”

Wiame Fathi,
Energy Optimization Manager
for Sothema

2

The understanding and **involvement of industries' managers and staff** increased throughout the process, which legitimized the energy teams and the important work they do. This is a pre-requisite for EnMS to succeed.

"Training, awareness and the involvement of the staff is key – if not the most important lesson – for the success of any energy efficiency or energy optimization effort."

Diyae Sahraoui,
Responsible for Quality Management and Security for MCI Santé Animale

3

As the training took place, the 18 'flagship companies' that participated were able to asses in detail their energy usage, minimize waste, **harness opportunities in their existing production system and implement low cost measures**. With close guidance from the trainers, most of them experienced energy savings.

"Throughout the training I was encouraged to implement a number of very practical actions to reduce our electricity consumption, such as reducing the pressure from the compressor, eliminating air leaks, changing traditional light bulbs for LED ones and conducting awareness raising amongst staff. We saw a reduction of our electricity bill of 7 to 10 per cent."

Lamiaa Hamzi,
in charge of systems and quality for L'usine Electrique

"We have put in place measures with zero investment like minimizing the pauses of our production chain and stopping our driers in case of emergency or planned pause, especially if they go beyond 10 minutes. And these very small low-cost actions have allowed us to reduce our gas consumption by 6 per cent."

Dalal Tabti,
Responsible for Energy Quality for Superceram

"The focus of an EnMS is to encourage companies to focus first on what they have, including the no-cost or low-cost opportunities, which may of course generate savings, before investing in new technology. For example, sometimes machines may be running even in non-productive moments. This is using energy. Sometimes it's just about paying attention and making small changes. Having the systems in place allows that."

Samir Khafagui,
UNIDO ISO 50001 International Expert

4

Capacity of local energy efficiency professionals is now strengthened to offer specialized energy efficiency services to small and large companies. This ensures the sustainability of the intervention and provides the opportunity to scale it.

"With this program, we are creating a market for energy management in Morocco. We are doing this from two sides, following a 'push-pull' approach: with industry pulling in the service (because they see that flagship companies have benefited from it) and energy consultants (now certified) pushing their services to industry."

Gerard Doherty,
UNIDO ISO 50001 International Expert

"Having consultants in the same room as industries helped them understand better the needs and problems that companies face. It was a win-win situation for both companies and consultants, where everybody is learning and sharing and also helping the market we are forming."

Younness El Fouih,
Training Coordinator and Director of TRUSTED ENERGY Consulting

Top Five Companies with Significant Energy Savings as a Result of Low Cost Energy Efficiency Measures Adopted During the Course of the Programme

1

COMPANY

SUPERCERAM

Ceramics, floor and wall tiles

Through the program the company has transitioned to the new version of ISO 50001 and revised their approach to energy planning, data analysis, measurement and monitoring.

They have seen improvement of their monitoring and control of their large energy users.

SAVINGS OF

2% **IN ELECTRICITY**

6% **IN GAS**

11% **IN FUEL**

2

COMPANY

GROUP BEL

Food and cheese

Group Bel have had a focus on energy efficiency for several years. During the programme they formalized their system to follow the template laid out by ISO 50001 and implemented mainly low cost improvements relating to operational control.

They've been able to improve their understanding of their energy consumption and how they can better monitor and control it. They are now able to better verify the energy savings.

SAVINGS OF

5% **IN ELECTRICITY CONSUMPTION**

3

COMPANY

GPC Mohamedia

Paper, corrugated box

The company was certified to ISO 50001:2011 in 2014. During the programme they improved their system and adjusted it to comply with ISO 50001:2018.

They implemented low cost improvements such as monitoring the systems to identify overconsumption.

SAVINGS OF

3%  **IN ENERGY CONSUMPTION**

4

COMPANY

USINE ELECTRIQUE

Electrical, contractor

They initiated a formal energy management system in compliance with ISO 50001.

They initiated small actions in the area of operational control as well as investment in new lighting to improve waste and control of the energy consumption.

SAVINGS OF

9%  **IN ENERGY CONSUMPTION**

5

COMPANY

MAGHREB STEEL

Steel

They established a formal energy management system and implemented low cost improvements including energy awareness, improved operational control and maintenance.

Formal energy management has improved energy awareness and has improved the capability to monitor energy performance, leading to improved control.

SAVINGS OF

0,25%  **IN ELECTRICITY CONSUMPTION**

About the Industrial Energy Accelerator

In partnership with key government agencies and industry stakeholders, the Industrial Energy Accelerator works on the ground to rally government, industry and finance around solutions that ignite change in industries. We then take our knowledge and experience to the world, sharing what we have learned to inspire a global movement for industrial energy efficiency. We currently operate in Indonesia, China, Mexico, Brazil and Morocco, five major industrial countries responsible for around 26 per cent of the world's energy consumption.

Key Partners in Morocco

The Ministry of Energy, Mines and Sustainable Development

The Ministry of Industry, Investment, Trade and Digital Economy

The Moroccan Agency for Energy Efficiency (AMEE)

The Confederation of Moroccan Employers (CGEM)

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