

As part of the SwitchMed programme, UNIDO supports industries in the Southern Mediterranean through the transfer of environmental sound technologies (MED TEST II) to become more resource efficient and to generate savings for improved competitiveness and environmental performance.

Egypt

Alexandria Mineral Oils Company (AMOC) Chemical sector

Context

Number of employees:	200 full-time employees for the lube oil complex
Key products:	Oil and wax
Main markets:	Local and export
Management standards:	ISO 9001:2000 ISO 14001: 2004 OHSAS 18001:1999

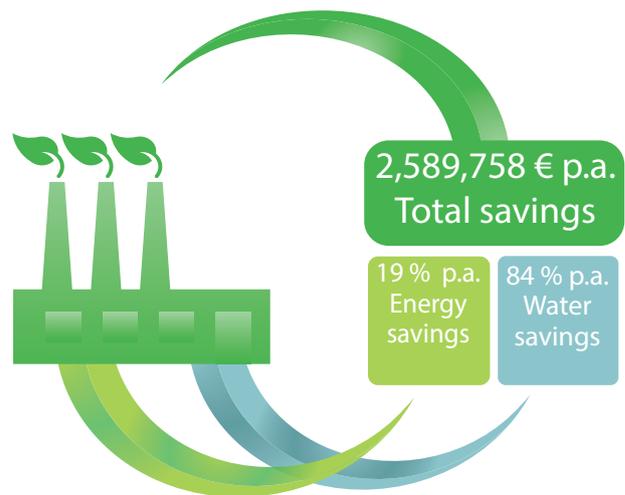
Alexandria Mineral Oils Company (AMOC) is a second stage oil refinery established in 1997 as a joint stock company with two main production complexes. The project focuses on the Lube Oil Complex, which produces 174,039 t of oil and wax annually. The company's motivation to participate in the MED TEST II project is to maximize the benefits of its natural resources, especially water and energy, marked by continuously rising tariff values, besides reaching full compliance with the standard environmental regulations.

The company is already certified according to ISO 14001 at project start. The company integrated cleaner production and resource efficient measures into the existing environmental management system through the MED TEST II project. In addition, AMOC is interested in applying for ISO 50001 certification for its energy management system.

“We realized that economizing our natural resources is a must to achieve sustainability. The MED TEST II project supports our company with technical experts who thoroughly analyze our situation to figure out all rationalizing potentials.”

Eng. Amr Lotfy
General Manager of Utilities

Benefits



Graphic: UNIDO

The MED TEST II project identified an annual saving potential of 2,589,758 euros in water and energy consumption with an estimated investment of 18,121,320 euros, resulting in an average payback period of approximately 7 years. Seven resource efficiency measures have been identified, all of which were approved by top management. Five measures are under implementation while only two measures are retained for study.

The most important benefit for the company was improving the control of water and energy flows and their related cost. The company welcomed the opportunity to quantify costs associated with specific inefficiencies and losses using the Material Flow Cost Accounting (MFCA) tool of the TEST methodology which confirmed that the inefficient use of energy and water are the two main areas with the highest potential for improvement.

The total cost of water will be greatly reduced by about 84% with some resource efficient and cleaner production measures, mainly the Zero Liquid Discharge project (ZLD). During the course of the TEST project, the company was assisted in preparing a feasibility study and related documentation for accessing the Egyptian Pollution Abatement Project (EPAP III) financing scheme, which was granted and approved. Energy consumption will also be reduced by about 19%, which is equivalent to a reduction of 24,079 t of CO₂ per year.

Saving opportunities¹

Action	Economic key figures			Resource savings & environmental impacts per year		
	Investment euros	Savings euros / yr.	PBP years	Water and raw materials	Energy MWh	Pollution reduction
Water conservation measures	5,420	10,807	0.5	32,174 m ³ of water	-	Total: 24,079 t of CO ₂
Zero Liquid Discharge Project (ZLD)	17,460,900	622,080	28 (EPAP III project)	622,080 m ³ of water	-	
Improving steam system efficiency	175,000	736,877	0.2	40,000 m ³ of water	45,449	
Matching supply and demand of the steam system	480,000	1,219,994	0.4	108,000 m ³ of water	87,152	
Total	18,121,320 €	2,589,758 €	7	802,254 m³ of water	132,601 MWh	

¹ Numbers based on production value from 2015

Water conservation measures

Two measures were identified to save on water consumption: The first measure involves installing water aerators on water taps and placing cistern devices in toilets, while the second measure involves the implementation of an optimized monitoring plan of daily water consumption by installing water meters. These two measures will reduce total water consumption by about 3%.

Zero Liquid Discharge Project (ZLD)

The purpose of this project is not only to reach full compliance with the legally applicable environmental threshold values, but also to reduce AMOC's fresh water consumption and provide a sustainable source of clean water by recycling the treated water as boiler feed water. Due to AMOC's high commitment to a cleaner production process and the efficient use of natural resources, the company is going to implement this high investment project with a long payback period, believing that such projects will have a great benefit due to the continuous increase in water tariffs and the anticipated water crisis.

Improving steam system efficiency

This group of measures addressed maintaining the pipes' insulation and the introduction of an efficient monitoring system (SCADA) for steam consumption. Maintaining the pipes' insulation as well as adopting a suitable maintenance program to identify and replace missing insulation would reduce the current energy consumption level by 1%. In order to improve monitoring of the steam consumption, the SCADA system uses realistic data from the steam meters. This will result in savings of about 4% in total water consumption and 5% in total energy consumption.

Matching supply and demand of the steam system

This group of measures involves replacing malfunctioning steam traps to eliminate the loss of steam. It will then be possible to switch part of the utility pumps and fans to electrically operated motors rather than steam turbines. Repairing the steam traps will recover the wasted steam and return it back as condensate to the boiler feed water tank, leading to savings of 11% in water consumption, in addition to energy savings. Switching the pumps and fans to operate on electricity would improve energy efficiency and tremendously reduce their costs of operation.

“The MED TEST II project enabled AMOC to explore opportunities to save our resources. We are planning to also apply TEST procedures in the other production complex to evaluate its performance.”

Eng. Amr Lotfy
General Manager of Utilities

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