



MED TEST Case Study

## CHEMICAL sector — EGYPT

# Chemical Industry — Misr Chemical Industries Company (MCI)

### Company overview

MCI is a chemical enterprise affiliated to the Chemical Holding Company. It produces sodium hydroxide solution and flakes, chlorine gas, sodium hypochlorite, calcium hypochlorite and hydrochloric acid for the local market and for export (10%).

The company joined the MED TEST project to identify opportunities for increasing resource efficiency through solving the existing problems which mainly include: high water consumption, materials and energy losses in compliance with law limits for the discharged effluents.

At project start-up, the company was already certified ISO 9001 and ISO 14001 and had plans to establish a management system for safety and health according to the OSHAS 18001 standard.

### Benefits

The MED TEST project has identified annual total savings of \$US 416,057 in water, raw materials, fuel and electricity with an estimated investment of \$US 49,033. Some options have excellent return on investment and immediate payback period. The identified measures have partially been implemented in 2011; the rest are scheduled for 2012.

Water costs will be reduced by 26% thanks to good housekeeping measures, segregation and recycling of compressors cooling water, implementation of a monitoring and controlling system for water consumption, control of washing water and overhaul of the cooling towers.

Thermal energy costs savings of 10% will be achieved by insulating the steam conveying system of the boiler inlet to reduce heat losses. Electrical energy costs will decrease by 6% through the redistribution of the capacitors in the capacitors bank to improve the power factor.



**“The Med Test project is a very good opportunity to apply the concept of cleaner production and to rationalize resource consumption and environmental conservation.”**

Eng. Ragab EL SAID ALI, Chairman

Environmental benefits will be reached by reducing the capacity of the WWTP and wastewater pollution loads (3% TSS and 1% TDS). The identified measures would reduce the investment and operational costs of the WWTP at design stage. MED TEST has assisted the company to fill in the required documentation for accessing EPAP II grants and funding scheme for the implementation of the WWTP, which will have a capacity of 1,500 m<sup>3</sup>/day, achieving 99% reduction in TSS pollution load as well as environmental compliance.

In parallel to the identification of saving opportunities, the company has updated the policy, actions plans and internal procedures related to integration of cleaner production and resource efficiency into the existing ISO 14001 management system. This will ensure the sustainability of all identified actions at company level as well as the development of new cleaner production projects.

MED TEST is a UNIDO green industry initiative to promote sustainability and competitiveness in the private sector in Egypt, Morocco and Tunisia. TEST integrated approach includes tools like resource efficiency and cleaner production, environmental management system and accounting, cleaner technology transfer and CSR.

**Learn more about TEST approach at [www.unido.org](http://www.unido.org)**

MED TEST is sponsored by the Global Environment Facility, the Italian Government and the MedPartnership.

## Saving opportunities

Measure	Economic key figures			Resource savings per year	
	Savings [USD/yr]	Investment [USD]	PBP [yr]	Water, Chemicals	Energy [MWh]
Good housekeeping	46 128	-	-	112 500 m <sup>3</sup>	
Power factor	288 750	1 000	< 0.1		6 930
Water conservation	39 111	3 700	< 0.1	117 332 m <sup>3</sup>	
Insulation of the boiler	18 000	3 500	0.2		2 469
Cooling tower	24 068	40 833	1.7	72 204 m <sup>3</sup>	
<b>TOTAL</b>	<b>416 057</b>	<b>49 033</b>	<b>0.1</b>	<b>302 036</b>	<b>9 399</b>

**Good housekeeping:** The project has identified several good housekeeping measures to improve work environment and reduce pollution loads, which include: implementing regular maintenance programmes, applying a brine recirculation process, eliminating excessive floor washing and all sources of spillage and water leakages, closing/sealing running water taps, avoiding blockages of the wastewater channels by using screens to prevent brine impurities and solids from entering them. These measures will save 9% of the water consumption and reduce the WWTP capacity, resulting in a decrease of TSS (4.3 tons/year, 3%) and TDS (5.7 tons/year, 1%).

**Power factor:** The power factor sometimes reaches 0.84 (which is below the standard) due to the inefficient distribution of the capacitor banks. The redistribution of the existing capacitors requires a small capital investment to achieve standard power factor in the range 0.92-0.95. This option would reduce the electricity consumption by 6%, extend the equipment's lifetime, limit risks for power drops in case of additional load in the future and eventually prevent the company from getting penalty from the Electricity Distribution Company.

**Water conservation:** Several measures have been identified to reduce water consumption: segregation and recycling of compressors cooling water; installation of water meters,

combined with an effective monitoring plan; control of washing water by using high pressure water. The implementation of these options will decrease water consumption by 11% as well as the hydraulic load to the WWTP.

**Insulation of the boiler:** The process requires high thermal energy inputs, which could be reduced by properly insulating the steam distribution system (mainly steam pipes) to prevent heat losses. This measure would save 10% of thermal energy consumption.

**Cooling tower:** The project has identified several actions for overhauling and tuning the cooling tower (which has not been maintained since its installation 16 years ago), resulting in increased performance and cooling capacity: fixing the fans (by adjusting blades' angle, changing belts, maintaining or replacing motors) and overhauling the hot water distribution system. The increased efficiency of the tower will allow recycling the compressors' cooling water back to the tower, which concerns 6% of the total water consumption. This option will also reduce the capacity of the WWTP under design.



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