

MED TEST III Jordan

Transfer of Environmentally Sound Technologies

Chemical sector

Al-Baha Company for Caustic Chlorine Industry

Company overview

Number of employees:
180 Full-time employees

Key products:
Caustic Soda, Sodium Hypochlorite, Chlorine gas, and Hydrochloric Acid.

Main markets:
Local (30%) International (70%)

Standards & certifications before MED TEST III:
ISO 9001, ISO 14001, ISO 45001, and ISO 17025 (with JAS accreditation)

Al-Baha Company for Caustic Chlorine Industry specializes in producing Caustic Soda and Chlorine and is considered one of the region's most significant companies in the Chlor-Alkali sector. The company adopted the latest cell technologies bipolar membrane from INEOS, Bichlor electrolysis system. This modern technology is environmentally friendly and preserves the health and safety of workers and community members. Moreover, Al-Baha applies many modern operating systems to cope with ongoing industrial developments that secure higher efficiency in operation and lower variable cost. The operational capacity of Al-Baha Company is 93 tons of Caustic Soda per day. The quality of the products is analyzed in the company laboratory, which has been certified under the Jordanian Accreditation System (ISO/IEC 17025: 2017).

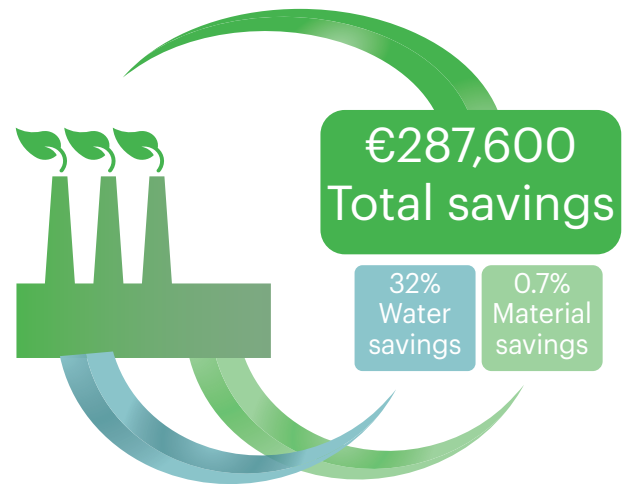
Benefits

The MED TEST III project identified total annual savings of 287,600 Euro* (215,700 JOD) in auxiliary material and water with an estimated investment of 326,667 Euro* (245,000 JOD). The average payback period is 1.1 years, the top management accepted 90% of the identified 10 measures for implementation or further study, and 50% are already implemented or under implementation.

Material and water consumption will be reduced by 0.7% and 32%, respectively, by implementing the accepted measures. Additionally, implementing the identified options will reduce 0.71 tons of Solid Waste per year.

The company will apply a research and development study toward Zero Liquid Discharge (ZLD), such as examining membrane distillation (MD) or other innovative technologies that present fewer limitations than reverse osmosis.

Identified annual savings



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We took part in the MED TEST III project to explore any chances for receiving technical support and to explore new technology opportunities.

Eng. Mufeed Khalaf Omar
Chairman of the Board of Directors

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As part of the EU-funded SwitchMed programme, UNIDO demonstrates in the MED TEST III project pathways for industries in the Southern Mediterranean to become more resource efficient and to generate savings for improved competitiveness and environmental performance.

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Saving opportunities**

Actions	Economic key figures			Resource savings & Environmental impacts		
	Investment Euro*	Savings Euro* per year	Payback period years	Water & Materials per year	Energy MWh per year	Environmental impact per year
Savings in material and reducing Solid Waste	326,667	210,667	1.5	256 tons	-	Total of 0.71 tons of Solid Waste
Water savings	Negligible	76,933	-	57,700 m ³	-	
TOTAL	326,667	287,600	1.1	256 tons 57,700 m³	-	

*Exchange rate 0.75 Jordanian Dinar (JOD) = 1 Euro
** Numbers based on production value from 2020

Savings in material and reducing Solid Waste

Consumption of auxiliary material is minimized by applying new technology in purifying the brine using nano-filtration instead of barium chloride salt. This also has reflected not only in reducing the quantity of the generated Solid Waste but also in its type and quality.

Water savings

Lab tests of feed water from different sources (wells and municipality), and specific calculations related to the water chemistry utilizing certain software were undertaken along with an analysis from international experts on the characteristics of feed water used in the plant. As a result specific parameters were calculated and could identify saving options based on two strategies Minimal Liquid Discharge (MLD) and Zero Liquid Discharge (ZLD).

The main result of this analysis focuses on the fact that using filtered raw water instead of reverse osmosis water is reasonably possible and will save purging the reverse osmosis unit. This option will also help to consider the sodium chloride content in water coming from the old and/or new wells, which currently remain trapped in the reverse osmosis unit. Accordingly, the following low/no cost options are identified to save water consumption:

- Replacing the reverse osmosis water with filtered raw water for the brine saturation process, since the main source of salts rather than NaCl is from the impurities in the salt and not from feed water and the use of nano-filtration technology has improved the capture of divalent ions.
- Avoid providing feed water to the boiler with higher quality than needed, softened water is generally sufficient for the boiler, and if RO or demineralized water is used, the boiler blowdown can be used for cooling tower make-up.
- Avoid providing make-up water to the cooling tower with higher quality than needed and control the added substances to that water.
- Scheduling the irrigation process and conducting maintenance of the irrigation system.

Moreover, as per the results of the latest energy audit conducted by the company before participating in the MED TEST III project, the old cooling tower was replaced by a new one with Variable Frequency Drive (VFD) control aiming at saving energy consumption. However, the company benefited from this measure to reduce water consumption, which led to saving about 18.5% of utilities' water.

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The MED TEST III project helped us to raise the company's team capacity on the Resource Efficient and Cleaner Production methodology to identify areas and root causes of inefficiencies and accordingly generate improvement options and analyze their feasibility for investment. Through the project, mass balance, lab tests, and assessment of water input, output, and NPO had been conducted with the support of international experts to assist the company's efforts toward zero liquid discharge (ZLD).”

Eng. Mufeed Khalaf Omar
Chairman of the Board of Directors

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