



## SUCCESS STORY

# Al-Baha Chlorine Plant Shows Environmental Investments Boost Economic Performance

**Multiple initiatives reduce environmental impact while increasing profits.**



*Al-Baha's new line converts liquid sodium hydroxide into solid flakes.*



*Al-Baha's new boiler runs on hydrogen gas.*

The Al-Baha Company for Caustic Chlorine facility in Jordan's Al Hallabat Industrial Park is saving 293,000 JOD each year by cutting its water, fuel and energy consumption. The company has made multiple investments to improve environmental performance and reduce its carbon footprint:

- New equipment to create sodium hydroxide flakes uses 36,000 m<sup>3</sup> less water per year, saving 46,800 JOD annually
- New hydrogen boiler uses 400 metric tons less heavy fuel oil per year, saving 250,000 JOD annually
- Installing variable frequency drives cut electricity consumption by 75,600 kWh/year, and is saving 7,000 JOD in the first year alone
- Materials handling improvements reduced the risk of chemical spills and generated a profit of 40,000 JOD

**Sodium hydroxide flakes.** Encouraged by USAID's Water Reuse and Environmental Conservation Project, company management made a significant investment in a new line for converting liquid sodium hydroxide product into solid flakes, which saved about 40% of the water previously wasted with the product – water that can now be used for other operations. This improvement was largely responsible for reducing water usage by 36,000 m<sup>3</sup> per year, which translates into 46,800 JOD cash savings in the first year alone.

**Hydrogen boiler.** The facility installed a new hydrogen combustion boiler, which reduces heavy fuel oil use by 400 metric tons per year and reduces annual CO<sub>2</sub> emissions by over 1.2 million kg. The boiler uses gas previously vented as a waste product from the facility's chlorine production line, reducing greenhouse gas emissions.

Plant Manager Dr. Al-Janabi commented: "We thought we could improve our systems, but it's hard to make a business case for change until you have the hard data to back up your hunch. With assistance from USAID, we were able to cost the installation of a new hydrogen boiler and estimate savings of 250,000 JOD per year due to reduced fuel and maintenance costs. We saw how to change our steam heating system in ways that improve performance, both environmental and economic."



Plant staff examine new VFDs for cooling towers.



The new storage system at the Al-Baha warehouse reduces risk of spills.

**Variable frequency drives.** Electricity usage is also down following management's decision to invest in variable frequency drives (VFDs) on large cooling fans. The company projects that the drives will cut its annual electricity consumption by approximately 75,600 kWh, which equates to a reduction of about 40,000 kg per year in CO<sub>2</sub>-equivalent emissions.

"We expect to save approximately 7,000 JOD in electricity costs for the first year," says Eng. Ravinder Arora, the facility's Deputy General Manager. Furthermore, he notes that these savings will likely increase over time. "When the electricity tariff increases in 2015, the savings will be closer to 12,000 JOD for the year."

**Sub-metering.** Management's decision to install numerous water sub-meters throughout the plant defined and located water use more specifically within any given process and this identified further water-saving options.

Dr. Khazal Al-Janabi noted that the meters had opened up "many opportunities for water saving and better water management practices. Water balance is better established at the facility, to track water-in-product and wastewater quantities for each process."

**Materials handling.** Finally, applying best practices in materials handling proved to be a relatively easy and cost-effective improvement. A new computer-based system stores and tracks inventory items. Only items to be used are stored, so 40,000 JOD revenue was generated through the sale of unwanted spare parts, and future waste generation from this area is expected to be minimal. The reorganization also helped reduce the risk of chemical spills and the consequent need for cleanups.

*The Al-Baha Company for Caustic Chlorine in Jordan's Hallabat Industrial Park is one of 30 industrial partners working with USAID to reduce industrial pollution and conserve scarce water and energy resources – in ways that benefit the bottom line. The Water Reuse and Environmental Conservation Project examined water and energy use, material and waste flow, production processes, quality control, and other aspects of each facility's operations. The assessments suggested options for minimizing pollution and saving water, energy, and money. Costs and payback periods for various options were also analyzed.*