



MED TEST Case Study

## FOOD sector — TUNISIA

# Milk and dairy product industry — CLC

### Company overview

Cap-Bon milk company (CLC) is part of the DELICE group, the market leader for dairy products in the Tunisian food industry. The site produces about 1,696,744 hl/year of milk beverages and 3 tons/year of butter.

Among the company's main incentives for joining the MED TEST was the opportunity to find ways of reducing and reusing the generated waste, as well as the rationalization of raw material consumption.

At the beginning of the project, the company was in a preparatory phase for obtaining the ISO 22000 certificate, a goal reached over the course of 2011; the company then took steps to implement an environmental management system in line with ISO 14001.

### Benefits

The MED TEST project has generated annual financial gains of \$US 546,903 in raw materials, products, water and electricity with an overall investment of \$US 484,945. The average payback period is estimated at 10 months. Most of the identified measures have been implemented in 2011.

Energy costs have been reduced by 19% through the implementation of an efficient action plan: optimization of compressed air consumption, boiler upgrade, improved regeneration capacity of pasteurizers and sterilizers, adjustment of the chillers' coefficient of performance (COP). Measures were also identified to reduce water consumption, such as closed-circuit equipment cooling, which led to a 13% reduction in the costs of water purchases.

Further environmental benefits have been achieved at the level of wastewater pollution loads. The company



**“The economic and environmental benefits the project has generated have reinforced the management's commitment to maintain a preventive environmental approach.”**

Mr. Karim BELOUARDA, Energy and Environment Director

has achieved annual reductions of 22% in BOD<sub>5</sub> and 28% in COD through the reduction of product losses, as well as the research for valorization measures regarding waste and by-products. Moreover, this spectacular improvement will allow the company to renegotiate its wastewater processing fees with the communal treatment plant in Sial, also member of the DELICE group and situated nearby.

During the implementation of the MED TEST project, CLC has been provided with the tools necessary to ensure strong linkages between the Clean Production process and the ISO 14001 environmental management system, so as to allow for the good management of all implemented measures and the sustainability of the method. Indeed the environmental policy has been documented and communicated, so as to initiate the implementation of all necessary procedures, as well as of a suitable environmental management scheme.

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]
Reduction of product losses	237 021	123 304	0.5	414 m <sup>3</sup> milk 7.5 tons butter	-
Water savings	32 993	77 750	2.3	35 500 m <sup>3</sup> water	-
COP of NH <sub>3</sub> chillers	153 606	35 731	0.2	3 142 m <sup>3</sup> water	1 666
Efficacy of pasteurizers and sterilizers	65 442	71 918	1.1	5 846 m <sup>3</sup> water	2 858
Boiler regulation	21 576	86 306	4	-	459
Compressed air production	36 265	89 936	2.5	-	376
<b>TOTAL</b>	<b>546 903</b>	<b>484 945</b>	<b>0.88</b>		<b>5 359</b>

**Reduction of product losses:** The installation of transmitters integrated into the control system of selected workstations, as well as the retrieval of residual milk and butter before the cleaning stage will entail product gains of 414 m<sup>3</sup>/year and 7.5 tons/year respectively. Moreover, the company has launched a collaboration with a research unit so as to develop a procedure facilitating the elimination of fat from centrifuges and of non-compliant milk. As a consequence, COD and BOD<sub>5</sub> levels have been reduced to the minimums of 295 and 144 tons/year respectively.

**Water savings:** The company has implemented several measures aiming to reduce water consumption. These measures include a closed-circuit equipment for cooling as well as the replacement of existing vacuum pumps with closed-circuit pumps. These initiatives will reduce the volume of water used by 35,500 m<sup>3</sup>/year.

**COP of NH<sub>3</sub> chillers:** Ammoniac-based chillers are the site's foremost electricity consumer. The optimisation of the coefficient of performance via condenser and evaporator temperature regulation will improve the current chillers' performance by 27%. As a further direct effect of the measures regarding electricity consumption (gains of 1,660 MWh/year and 883 tons/year of CO<sub>2</sub>), less heat will be transferred to the cooling towers,

which will result in water gains of 3,142 m<sup>3</sup> (cooling tower makeup water).

**Efficiency of pasteurizers and sterilizers:** The regeneration efficiency of heat exchangers between heating and cooling sections should be higher than 90%. This is feasible through the installation of additional plates (heat exchangers). Besides limiting the thermal energy consumption, this initiative will reduce CO<sub>2</sub> emissions by 629 tons/year and water consumption by 5,846 m<sup>3</sup>/year.

**Boiler regulation:** This action consisted of installing an online oxygen analyser on the heater chimney, facilitating the real-time regulation of air/gas debit and therewith the optimization of boiler house efficiency. In addition to energy gains (459 MWh/year), this initiative will cut CO<sub>2</sub> emissions by 153 tons/year.

**Compressed air production:** Several measures have been initiated in order to optimise compressor performance: insulation of hot air sheaths inside the air compressors, acquisition of a lubricated compressor, reduced compressor solicitation achieved through an increase of storage capacity and the installation of an air debit meter on the exit to the factory. These actions have reduced electricity consumption by 376 MWh/year.



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