



MED TEST Case Study

## FOOD sector — MOROCCO

# Dairy industry — COLAINORD Cooperative

### Company overview

COLAINORD, a dairy cooperative located in Tétouan, employs 580 persons and produces about 55,000 tons/year of dairy products and derivatives. The main products are: pasteurized milk, UHT milk, yoghurt, fermented milk, butter and cheese.

COLAINORD has joined the MED TEST project in order to identify opportunities regarding the rational use of resources (water and energy), the valorization of by-products, the reduction of production costs and the minimization of pollution loads.

At project start-up, the company was already engaged in a wastewater treatment plant project: the construction work started in early 2011 (pre-treatment phase).

### Benefits

The actions identified by MED TEST will enable the company to achieve annual savings of about \$US 381,436 in terms of energy (electricity and heat), water and raw material, against an estimated investment of \$US 117,929, resulting in a payback time of 3.6 months. Over half of these actions were carried out in 2011 and the rest is planned in Q1 2012.

The energy saving potential represents 13% of the annual energy bill (electricity and fuel): it can be achieved by optimizing the chillers operation, improving the electrical power factor, implementing hot and cold surfaces thermal insulation and installing variable speed drivers at the compressors. The CO<sub>2</sub> emissions reduction potential amounts to 551 tons/year.

Water consumption can be reduced by 23% by optimizing cleaning techniques (e.g. introducing spraying nozzles), repairing leakages in various equipments, eliminating on-site washing of the tank trucks and using well water for cleaning annexes.



**“MED TEST project has been instrumental for our company, in light of all the realized improvements and the associated economic benefits”**

Youness EL OUAHABI, Director General

Further savings will be generated through the valorization of by-products: buttermilk, whey and fat. These actions will also reduce investments and operating costs concerning the on-going wastewater treatment plant project.

They will also help to achieve environmental benefits including a reduction of industrial wastewater pollution loads through a better management of customers' returns, a recovery and recycling of products and a better monitoring of material losses at the plant. These actions will therefore reduce the annual pollution loads by 19% for BOD<sub>5</sub> and by 12% for COD.

In addition, COLAINORD initiated an EMS implementation process. The medium-term objective is to obtain ISO 14001 and ISO 22000 certifications.

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]
Electrical system and compressed air	33 003	16 801	0.5		338
Reduction of water, chemicals and liquid effluent	71 041	15 550	0.2	Water: 36,940 m <sup>3</sup> Chemicals: 8.2 tons	
Valorization of by-products	218 750	68 750	0.3	Whey: 50 tons Milk: 55 tons Buttermilk: 700 tons	
Steam system	24 462	14 328	0.5		617
Chillers	34 180	2 500	<0.1		364
<b>TOTAL</b>	<b>381 436</b>	<b>117 929</b>	<b>0.3</b>		<b>1 319</b>

**Electrical system and compressed air:** A reduction of the electrical power consumption has been obtained by improving the power factor (cosQ), optimizing lighting and installing variable speed drivers on compressors. As for the compressed air distribution system, measures include: installation of air tank storage and of a distribution network with pressure gauges and isolation valves.

**Reduction of water, chemicals and liquid waste:** The site has implemented several measures to improve water consumption levels, including the optimization of cleaning in place (CIP) by installing a conductivity meter and recycling rinse water etc., the reduction of water consumption for washing soil and equipment by using spraying nozzles, the elimination of on-site tanker trucks washing and the installation of workshop meters. The potential reduction represents about 20% of the annual water bill (\$US 38,700).

**Steam systems:** Several measures have already been implemented, including: insulation of hot surfaces (steam pipes, valves), recovery of steam condensate and combustion optimal setting. Other measures are planned, including energy recovery from the boilers steam traps and installation of a conductivity meter on the boilers. The total annual saving is estimated at 617 MWh.

**Valorization of by-products:** The production of cheese generates about 2 tons/day of whey: it was formally discharged to drain though it contains 70% lactose and can be used as livestock feed. The company has decided to valorise it by distributing it to the farmers, so as to avoid treating 50 tons/year of dry whey in the wastewater treatment plant. Buttermilk is also recovered after the transformation of cream into butter (about 1,400 m<sup>3</sup> buttermilk on 2 sites) and will be incorporated in products such as “leben” and in the formulation of new creams and custards. This action will generate a net gain (since it is rich in protein and fat) and will help to reduce the size of the new treatment plant. These measures will reduce the BOD of liquid waste by 51 tons/year and the COD of 107 tons/year.

**Chillers:** The cold unit represents the primary energy consumer (53%). Several actions have been undertaken to reduce this consumption, including: setting of the chillers high and low pressure, reduction of cold losses in cold pipes and room doors, limitation of chillers use during peak hours. The annual saving is estimated at \$US 34,180.



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