MED TEST II Case Study

switchmed

As part of the SwitchMed programme, UNIDO supports industries in the Southern Mediterranean through the transfer of environmental sound technologies (MED TEST II) to become more resource efficient and to generate savings for improved competitiveness and environmental performance.

Lebanon

A-Z Manufacturing and Trading
Food and beverage sector

Context

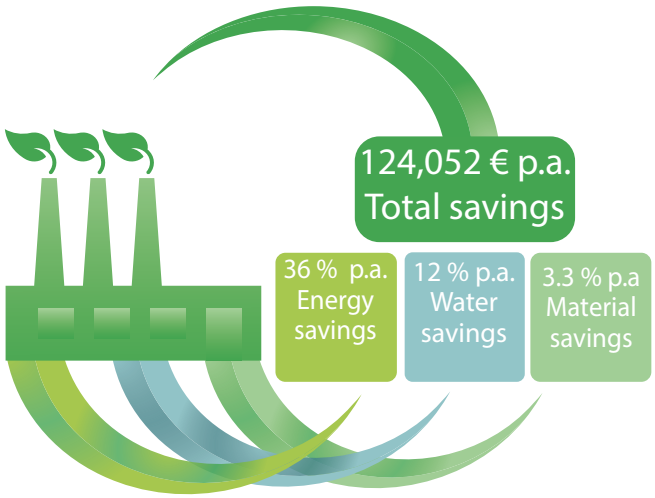
Number of full time employees:	43
Key products:	mayonnaise, ketchup and tomato paste
Main markets:	local and international
Management standards at project beginning:	ISO 22000:2005

A-Z Manufacturing and Trading is a medium-sized enterprise that produces mayonnaise as well as ketchup and tomato paste with a total production volume of 2,017 t per year directed to the local and international markets. The company joined the MED TEST II Project in order to identify opportunities to increase resource efficiency by solving existing problems such as loss of product and high water and energy costs.

"Our energy consumption costs are around 176 Million LBP/year and water costs 138 million LBP/ year, equivalent to around 29,000 m³. Reducing these costs was our main motivation to join the MED TEST II project"

Khalil El Hajj,
Factory manager

Benefits



Graphic: UNIDO

The MED TEST II project identified total annual savings of 124,052 euros for water, raw materials and energy costs with an estimated investment of 154,340 euros. The average pay back period is 1.2 years. Fifteen resource efficiency measures have been identified, 40% of which are already under implementation, 47% are planned for implementation by top management and 13% have been retained for study. An information system to monitor water and energy use has been installed for a total investment of 5,355 euros. In total 35 meters were installed by the company on the production line, the systems for process water filtration (RO) and pipes cleaning (CIP), the electricity generators, the steam boiler, the chillers, the air compressors and the lighting system.

Energy costs will be reduced by approximately 36%, water by 12% and materials by 3.3% through good housekeeping practices and conservation measures at the levels of water and energy. Environmental benefits will also be achieved by limiting material losses entering the drain system and by product recovery. Additionally, CO_2 emissions will decrease by 40% and solid waste generation by 33%.

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Saving opportunities[1]

Action	Economic key figures			Resource savings & environmental impacts per year		
	Investment euros	Savings euros / yr.	PBP years	Water and raw materials	Energy MWh	Pollution reduction
Reduction of raw materials and product losses	25,000	52,000	0.5	39 t raw material	-	Total: 312 t CO_2
Water conservation	5,000	7,801	0.6	3,121 m^3 water	-	
Steam system efficiency	3,340	10,037	0.3	-	228	4.2 t COD
Replacing electricity generators	60,000	29,393	2	1,200 m^3 water	474	
Installing a heat recovery system	60,000	21,589	2.8	-	478	3.7 t BOD_5
Improving chilled water and compressors systems efficiencies	1000	3,232	0.3	-	70	3,121 m^3 waste water
TOTAL	**€154,340**	**€124,052**	**1.3**	**39 t raw material 4,321 m^3 water**	**1,250 MWh**	

1 Numbers based on production value from 2016 for energy, 2015 for water and materials

Reduction of raw materials and product losses

Losses in raw materials will be minimized by decreasing the length of the process pipes, reducing the frequency of pipes cleaning and by installing a pigging system (PIG) to remove products between batches resulting in COD and BOD_5 load reductions in wastewater by 23.5%. Some jars do not close well, which can lead to the damage of their content and thus to product loss. Adjusting the distance between the jars and the lids, or tuning the machine that twists the lid and installing a meter to have a uniform weight or volume of product in each jar would prevent loss of final product.

Water conservation

Water losses have already been reduced by equipping water hoses with guns and preventing the unnecessary running of water between cleaning tasks. Additional savings will be achieved by increasing water recovery from the CIP system. The use of sponges for cleaning of equipment will be replaced with the use of brushes for more effective cleaning. Finally, the radiators of the generators have been replaced which led to water savings together with improvements in energy efficiency.

Steam system efficiency

The steam drainage valve, ballcock condensate tank and steam trap have been replaced and parts of the steam boiler and steam pipes have been insulated. The company will insulate the make-up water tank and adjust the boiler air-fuel ratio.

Replacing electricity generators

The existing generators have low efficiency and shall be replaced by new ones. This would allow increasing energy efficiency by approximately 37%.

Heat recovery system

The new electricity generators can be equipped with two heat recovery systems to reduce diesel consumption at the boiler. The first of these is a hot water to jacket water heat exchanger where heat from the jacket water system will be used to heat the CIP cleaning water. The second heat recovery system is a saturated steam heat exchanger where heat from exhaust gas can generate steam for the process.

Improving chilled water and compressors systems

The insulation of the chilled water system will be improved. The position of one of the compressors will be changed to avoid receiving hot air from the cooling compressor, the purging system will be replaced and the compressed air system pressure will be reduced through nozzles to reduce energy consumption.

"Although some of the measures identified by the project were known to the top management, the MED TEST II project gave the company the opportunity to enhance its understanding of resource efficiency and to discover more saving opportunities. The installed resource monitoring system provided valuable information on resource use and will enable us to continuously optimize our operation in the coming years."

Khalil El Hajj,
Factory Manager

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