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

Manara Dairy

Food and beverage sector

Context

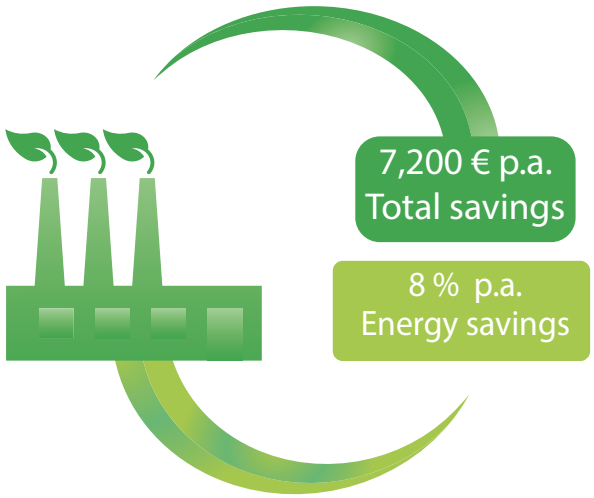
Number of full time employees:	6
Key products:	white cheese, laban, labneh, ayran
Main markets:	local

Manara Dairy is a small size enterprise, with a production volume of 2,000 t of milk in 2016. The company is aware of the importance of industrial resource efficiency in industry and joined the project to explore further resource saving measures. Since the company was already planning relocation to a new site with three times the capacity of the existing one at the project start, the company's intention was to apply the identified solutions in the design and commissioning of the new production facilities.

"We embarked on the path of resources efficiency in 2013, and the water efficiency measures that already were implemented, resulted in nearly 50% reduction in our water consumption. The knowledge and experience gained through MED TEST II could be very beneficial when implemented in our new plant which is currently in its final phases of completion."

Said Abou Ghouneim, CEO,
Al Manara Dairy

Benefits



Graphic: UNIDO

The MED TEST II project identified total annual savings of 7,200 euros with an estimated investment of 16,000 euros. The average pay back period is 0.3 years. All four identified measures were accepted by the top management and 75% of these have already been implemented. The range of interventions has been limited to measures with short to medium term pay-back periods due to the planned company relocation. The interventions focused mainly on energy, since this is a major cost component, and on whey (where most of material losses occur).

Annual energy cost savings will amount to 8%, whereas CO_2 emissions will decrease by 7% .
The company installed an information system consisting of 36 meters for monitoring water, energy and materials (essentially for whey) with a total investment of 8,750 euros. Besides highlighting improvement potentials at the energy level, this monitoring system showed that water and energy use per unit product are in line with international benchmarks.

Finally, the company gained extensive experience from the Material Flow Cost Accounting (MFCA) tool of the TEST methodology for both the existing plan and the new plant.

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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
Steam system	6,000	3,400	1.8	-	89	Total: 49 t CO_2
Chilled water system	10,000	3,800	2.6	-	85	
Total	**€16,000**	**€7,200**	**2.2**	**-**	**174 MWh**	

1 Numbers based on production value from 2016

Steam system

The steam system is one of the key energy users accounting for 16 % of total energy consumption. The steam boiler efficiency was measured at 73%, which is somewhat low, while the steam piping and equipment insulation is either lacking or in poor condition.
Purchase of a flue gas analyzer for periodic tuning of the boiler to improve its combustion efficiency to at least 78% was recommended and as well as an upgrade of a full thermal insulation. Total savings are expected to be 8 t of diesel fuel per year. The insulation upgrade was fully implemented during the project while boiler tuning is planned.

The meter readings showed that the average yearly energy intensity of the steam system before the upgrade was 0.30 KWh/kg milk processed, while after implementation the value dropped to 0.23 KWh/kg milk processed, corresponding to an improvement of nearly 24%!

Chilled water system

The chillers represent 22% of total energy use and 53% of total electricity bill.
Several improvement options were identified, the two most important being the upgrading of the chilled water piping thermal insulation and the modification of the layout of the refrigeration coils at the chilled water storage tank. The thermal insulation upgrade has a double advantage, on one side it reduces heat losses and on the other it avoids running the chilled water pumps in winter to prevent freezing of the water in the chilled water circuit that is installed on the roof (temperature in the area can drop to - 5 °C).

Thanks to the installed information system, the company was able to monitor the improvement in energy intensity of the chilled water system after the implementation of the actions. In August 2016, the measured energy intensity of the chilled water system was 0.09 KWh/kg milk processed, while in August 2017, the measured energy intensity was 0.06 KWh/kg milk. Taking into consideration the weather factor and improved good practices in the plant, the intervention has improved the chilled water systems performance by at least 20%.
Due to interventions on the steam and chilled water systems, the energy intensity of the plant has dropped from 0.45 KWh/kg milk processed to 0.38 KWh/kg milk processed, an improvement of 15% which brings it nearer to international benchmarks. Currently, energy savings are measured at 140 MWh/year. Once the boiler tune up is completed, it is expected that the company will be in line with the international benchmark.

"The Manara management and technical staff have greatly benefited from the MED TEST II project in three major counts. First are the good practices introduced in our cost accounting system, second is the culture of performance monitoring now ingrained in the staff behavior thanks to the monitoring system installed at the onset of the project, and third is the improvement in energy efficiency of the plant. "

Said Abou Ghouneim, CEO,
Al Manara Dairy

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