

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.

Egypt

El-Marwa Food Industries Company

Food and beverage sector

Context

Number of employees:	120
Key products:	Citrus concentrates, mango and guava fruit pulp, tomato puree
Main markets:	Local and international (60% export)
Management standards:	ISO 9001 ISO 22001-FSSC OHSAS 18001

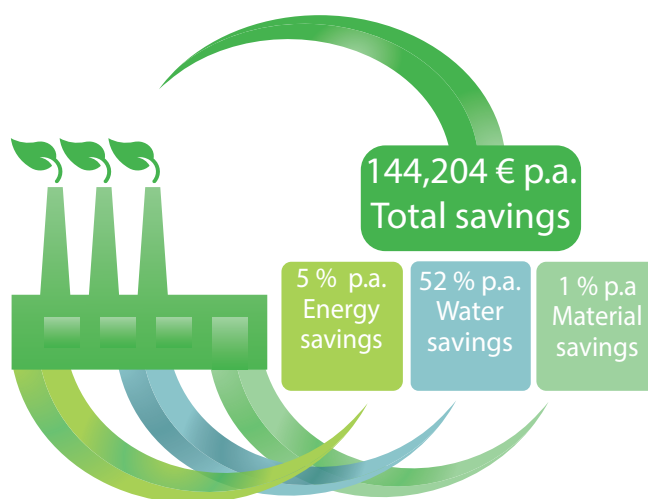
El-Marwa Food Industries is a member of the leading industrial group Juhayna S.A.I, the largest dairy and juice product company in Egypt. It was founded in 1997 with investment capital of up to 20 million Egyptian pounds.

El-Marwa Food Industries is a dynamic, fast-growing organization specializing mainly on manufacturing and marketing different concentrates that provide the best possible quality for its customers. The factory was built applying the most innovative technologies and practices, as well as the latest available equipment and is under the supervision of some of the most reputable international consultants.

“Energy saving and responsible consumption has always been on our priority. Knowing that, we were very excited to hear about the project to exchange and transfer knowledge from local and international experts as well as gaining training, coaching and guidance for the team to improve manufacturing processes and gain experience in untapped areas for energy saving/ usage.”

Martin Lomas,
Manufacturing Director

Benefits



Graphic: UNIDO

The MED TEST II project identified a total of nine measures to optimize energy and water efficiency within the orange production facility. The savings from these measures amount to around 144,204 euros annually, with a total investment of 333,270 euros, and a simple payback period of 2.3 years.

Measures to optimize water efficiency will lead to a reduction of 52% in water consumption. This will reduce the wastewater generated within the company, consequently also reducing the hydraulic load on the wastewater treatment plant. Total anticipated savings would reduce the water consumption by around 160,000 m³/year, equivalent to 45,870 euros annually.

Energy consumption would also be decreased by around 5% of the baseline consumption, saving 189,434 m³/year of natural gas, equivalent to 32,677 euros annually. CO₂ emissions will be reduced by around 4%.

Introducing the Eco innovative product push technique to replace the conventional CIP rinse would recover around 66 t of product suitable for sale, without the need of reprocessing. Besides the economic and environmental benefits, the company identified a potential upgrade project for the evaporator, which would result in further energy savings of 16%, and savings in water consumption of 2%.

Saving opportunities¹

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 optimization	10,270	21,945	0.5	13,992 m ³ of water	1,171	Total: 430 t of CO ₂
Optimization of water use	5,500	41,539	0.15	145,752 m ³ of water	-	
Utilization of process heat	50,000	14,720	3.4		960	
Product push techniques	267,500	66,000	4	1,200 m ³ of water 66 t of product	-	
Total	333,270 €	144,204 €	2.3	160,944 m³ of water 66 t of recovered products	2,131 MWh	

¹ Numbers based on production value from 2016

Steam optimization

This group of measures includes the recovery of steam condensate as boiler feedwater, isolation of unutilized steam users, and the introduction of a maintenance program for the steam network insulation. These measures reduced water consumption, energy consumption as well as the use of chemicals for the boiler feedwater. They were categorized as no/low cost measures, hence the company implemented them immediately.

Optimization of water use

This measure could be achieved by reusing orange condensate from the evaporator for washing fruit, reusing the second rinse water for the first rinse cycle, and reusing the CIP final rinse water for the pre-wash cycle in the next CIP step. This group of measures will reduce both water consumption and wastewater generation.

Utilization of process heat

It was noted that the pasteurization section did not use waste energy as a regenerative energy source. A simple heat exchanger was therefore designed to cool down the pasteurized product while preheating the incoming product entering the pasteurizer. This measure will eliminate the need for water from the cooling tower, as well as the hot water that was introduced to preheat the product.

Product push techniques

This measure employs an Eco innovative technique that replaces the conventional clean in place first rinse water with an ice pig. This ice pig can be recovered ensuring a clear separation from the product, allowing for complete product recovery. This measure will tremendously decrease the amount of water used for the first rinse cycle, it will enhance the level of cleanliness of the pipes and reduce rinsing times.

“El Marwa is a unique plant in the Juhayna group. Being committed to responsible consumption as one of the SDG goals and with the help of the MED Test team, we were able to support in optimizing the water efficiency leading to reduction of water use by 52%. In addition, the energy consumption would also be decreased by around 5% of the baseline consumption. Besides the economic and environmental benefits, the company identified a potential upgrade project for the evaporator, which would result in further 16% savings in energy, and 2% savings in water consumption.”

Martin Lomas,
Manufacturing Director

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