

MED TEST III Lebanon

Transfer of Environmentally Sound Technologies

Food and beverage sector

Rim Mills

Company overview

Number of employees:

12 Full-time employees

15 Part-time employees

Key products:

Bulgur (Coarse and Fine), White Peeled wheat and White Sieved Wheat

Main markets:

Local (90%), International (10%)

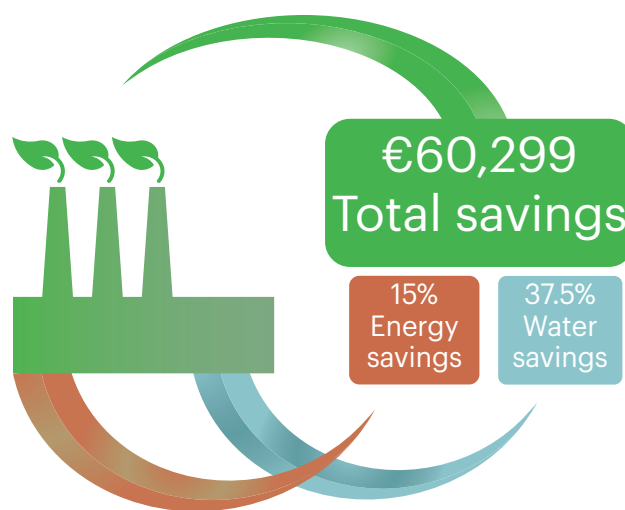
Rim Mills is a third-generation family business that has been operating since 1952. It is one of the largest and most modern wheat mills in the Bekaa region. The company produces three main products: Coarse and Fine Bulgur, White Peeled Wheat, and White Sieved Wheat, with an annual production of approximately 1,313 tons in 2022. Rim Mills mainly serves the local market while exporting to countries such as the USA, Sweden, and Kuwait. The company recently upgraded its production facility by switching from traditional solar drying in open plots to thermal drying, resulting in increased productivity and reduced production cycle time. This move has positioned Rim Mills as a modern production site in the Lebanese mill sector.

Benefits

The MED TEST III project identified total annual savings of €60,299* related to energy and water with an estimated investment of €112,465*. The average payback period is less than 2 years. The top management accepted to implement three out of the four identified measures, while the remaining measure is postponed subject to financing. Of the approved measures, to the measure for the installation of a 100 KWp Photo Voltaic (PV) system has already been implemented.

The identified measures have the potential to reduce annual electricity consumption by 27% and thermal energy consumption by 13%, for a combined total energy reduction of 15%; water savings by 37.5% and the reduction of Green House Gas emissions by 174 tons of CO₂-eq per year. The MED TEST III intervention is also part of the company's interest in becoming more environmentally responsible, as demonstrated by its ongoing initiative of installing a wastewater treatment plant.

Identified annual savings



“ We have taken steps to modernize our operations. A few years ago, we upgraded our processing from manual to fully automated. While this modernization brings many advantages, it also led to an increase in energy consumption. This has motivated Rim Mills to join the MED TEST III, an initiative aimed at exploring ways to reduce our energy and resource bills, helping us to remain competitive in the market.

Mr. Najib Saliba
Owner and General Manager, Rim Mills

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As part of the EU-funded SwitchMed programme, UNIDO demonstrates in the MED TEST III project pathways for industries in the Southern Mediterranean to become more resource efficient and to generate savings for improved competitiveness and environmental performance.

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Saving opportunities**

Actions	Economic key figures			Resource savings & Environmental impacts		
	Investment Euro*	Savings Euro* per year	Payback period years	Water & Materials per year	Energy MWh per year	Environmental impact per year
Thermal insulation	3,789	6,993	0.5	-	143	Total: 174 tons CO ₂ -eq
Optimizing wheat cooker performance	4,198	5,270***	0.8	1,530 m ³ water	98	
Heat recovery from the thermoblock air flow	11,194	5,475	2	-	112	
Installing a PV system	93,284	42,562	2.2	-	114	
TOTAL	112,465	60,299	1.9	1,530 m³ water	467	

* Using average exchange rate October 2022-October 2023 1 USD=1.072 Euro

**Numbers based on the production value 2022

*** Savings would be slightly higher due to reduced wastewater volume and subsequent treatment cost reduction once the wastewater treatment plant is operational

Thermal insulation measures

Heat flows ensure temperature requirements that determine quality of products along Rim Mills' production line, so thermal insulation becomes very relevant to spare increasing energy costs. Hot water pipes in the wheat cooking section as well as the hot air ducts entering the wheat dryer will be properly insulated enabling the company to achieve good energy savings corresponding to €6,993* at an investment cost of €3,789*, resulting in a payback period of just 6.5 months.

Optimizing wheat cooker performance

The wheat cooker is heated using direct fire from a black oil burner. The hot gases resulting from combustion are short circuited, leading to very high exhaust temperatures (350°C), which indicates an inefficient use of fuel. Furthermore, the hot water used in the cooking process is sent to drain after each cooking batch. The optimization of the wheat cooking process entails two different options.

- **Option A** suggests changes in the fire chamber to lengthen the exhaust gases path and increase the heat transfer area, thus decreasing the exhaust gas temperature which directly results in better thermal efficiency, thus reduced fuel use.
- **Option B** suggests replacing the black oil burner with an existing steam boiler operating on black oil. Steam would be directly injected into the cooker. Furthermore, for subsequent batches, it is planned to preheat 1,500 liters of water using heat recovery from boiler exhaust which will normally raise the temperature by 15°C. The energy savings from Option B are primarily because of a higher thermal efficiency of the steam boiler setup. In both cases, the measure suggests reusing the remaining cooking water of the previous batch for the next batch instead of draining it, by ensuring water reservoir's isolation and shorter time between production batches.

Option A has been quantified as the one with higher economic savings of €5,270/year and a needed investment of €4,198, resulting in a payback period of just 10 months. On the other hand, water savings will reduce wastewater dis-

charges and consequently the treatment costs by around USD 950/year once the planned wastewater treatment plant is operational.

Heat recovery from the thermoblock

The hot air exiting the wheat dryer is discharged to atmosphere at a temperature of around 40-45°C, while the inlet air temperature of the thermoblock is at ambient temperature. This measure suggests installing a shell and tube heat exchanger that allows to recover heat from the exiting hot air downstream from the dryer fan, to preheat the air entering the thermoblock. This is most effective during the winter season. This measure will enable the company to save €5,475 at an investment cost of €11,194, resulting in a payback period of just 25 months.

Installing a Photo Voltaic (PV) system

This measure suggests the installation of a 100 kWp on-grid PV system without battery storage. The PV system, which is estimated to supply around 114 MWh of electricity per year, represents around 42% of Rim Mills annual electricity consumption without the polishing stage. This measure will enable the company to save €42,562 /year at an investment cost of €93,284, resulting in a payback period of just 26 months. The company decided to install a 120 kWp PV system to ensure that growth needs as well as the reincorporation of operational areas currently out of order are partially covered.

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The MED TEST III project provided a positive experience in two ways. Firstly, due to the productive interactions with the project team on both technical and personal levels. Secondly, because of the potential cost savings that Rim Mills can achieve by implementing the suggested measures. With adequate financial support these measures will significantly reduce our operational costs and environmental impacts.

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