Sinokrot Chocolate and Confectioneries was founded in 1982 in Ramallah. The company is part of the Sinokrot International Group and produces a variety of confectionery with an annual turnover of approx. 10 million euros.

The company produces 60 different products in 12 production lines, in accordance with international quality and health standards, under the following brands (examples): Ali Baba, Jericho Wafer, Sababa Nougat, Marsh, Zaki, Toffee Nut, Rollo, Noody Tubes, and Kanz Wafer.

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"Our main challenge was to reduce the volume of defective wafers during the baking stage. The second problem was the high energy consumption. Here, we needed external support from the MED TEST II project to help us identify the causes of our problems and find solutions to address them."
Eng. Muhsen Sinokrot
General Manager

The company participated in the MED TEST II project with the goal of reducing energy losses and costs and training its employees in Resource Efficient and Cleaner Production (RECP).

As result of participating in the MED TEST II, a total of 12 resource-efficiency measures were identified that will bring total savings of 399,200 euros by reducing energy and raw materials losses. The total investment required is 891,750 euros, corresponding to an average payback period of 2.3 years.

All the identified measures were approved by senior management, and 30% were implemented immediately. The ratio of out-of-specification products will be reduced from 16% to 1% in gradual stages by means of a series of resource-efficiency measures, summarized in the table below.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Out-of-spec products t/y</th>
<th>Investment euros</th>
<th>Annual savings euros</th>
<th>PBP years</th>
</tr>
</thead>
<tbody>
<tr>
<td>At start of project</td>
<td>315</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction of proper operational conditions</td>
<td>284</td>
<td>0</td>
<td>22,491</td>
<td></td>
</tr>
<tr>
<td>Adjustment of the wafer recipe</td>
<td>256</td>
<td>1,000</td>
<td>42,841</td>
<td></td>
</tr>
<tr>
<td>New wafer machine</td>
<td>20</td>
<td>750,000</td>
<td>292,841</td>
<td>3</td>
</tr>
</tbody>
</table>

* Including annual energy savings of 80,000 euros
Saving opportunities

<table>
<thead>
<tr>
<th>Action</th>
<th>Economic key figures</th>
<th>Resource savings &amp; environmental impacts per year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Investment euros</td>
<td>Savings euros / yr.</td>
</tr>
<tr>
<td>Preventing losses of wafers</td>
<td>1,000</td>
<td>42,000</td>
</tr>
<tr>
<td>Replacing the wafer machine</td>
<td>750,000</td>
<td>250,000</td>
</tr>
<tr>
<td>Raw material central dispensing unit</td>
<td>5,000</td>
<td>17,500</td>
</tr>
<tr>
<td>Efficient energy use</td>
<td>98,750</td>
<td>76,700</td>
</tr>
<tr>
<td>New lighting and air compressor</td>
<td>37,000</td>
<td>13,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td>891,750</td>
<td>399,200</td>
</tr>
</tbody>
</table>

Preventing losses of wafers
The major financial loss was related to out-of-specification wafers, amounting to 16% of total production. Despite the fact that this material is for the most part recycled on site, the associated loss was calculated by the company at 714 euros/t of out-of-specification product. The company addressed the causes of defective products at the baking stage and the associated losses by implementing a series of good housekeeping measures (including for example better cleaning of the moulds). Another measure to reduce losses of wafers caused by breakage was the adjustment of the wafer recipe.

Replacing the wafer machine
Investment in a new wafer machine at 750,000 euros will increase productivity and reduce out-of-specification wafers to 20 t per year (less than 1% of total production volume). Production capacity will increase, and operational costs (including energy consumption by the machine) will decrease by 30% corresponding to 80,000 euros per year for LPG. In addition, there are savings from prevention of losses from out-of-specification wafers.

Raw material central dispensing unit
The company initiated a study to examine the feasibility of using a central dispensing unit for whey, milk powder, lecithin, sodium carbonate and gelatin. All have relatively high losses, which will be reduced by 10 t/y.

Efficient energy use
The company is replacing all inefficient fluorescent lamps with energy saving LED tube lamps with a target of saving more than 40 MWh/year; 30% of the total flourescent lights have already been replaced and the company plans to replace the remaining lights by the end of 2018. The total annual savings will be approx. 5,000 euros with a calculated payback of 1.5 years. At the same time, the company has invested 30,000 euros in a new air compressor with a payback of 3.75 years, saving 67.2 MWh/y.

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“Participating in the MED TEST II project highlighted some problems in the manufacturing process. Together with external experts we succeeded in identifying these problems and to develop plans that will improve the production process and to reduce costs and energy losses. Constant monitoring for material and energy costs gave us control over expenditure and prevented losses.”
Eng. Muhsen Sinokrot
General Manager