

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 Star Glass Company Chemical sector

Context

Number of employees:	350 full-time employees
Key products:	Transparent, colored, decorated and printed tableware glass as well as home accessories
Main markets:	Local
Management standards:	ISO 9001 ISO 14001 ISO 18001

Star Glass was founded under the Egyptian Law of Investment and Approvals from the Ministry of Trade and Industry and is located in 10th of Ramadan industrial city. The company, formerly part of the City Glass Group, was sold to a new owner at the beginning of 2016 and consequently changed its name to Star Glass. The company produces transparent, colored, decorated and printed tableware glass as well as home accessories.

“Before joining the project, we were wasting energy resources in the areas of lighting, motors, gas and air compressors. This led not only to high energy expenses but also to a limited production capacity, which counteracted the company’s ambitions to increase production.”

Hazem Tahon
HSE Manager

Benefits



Graphic: UNIDO

The MED TEST II project identified total annual savings of 797,368 euros mainly in connection with energy usage, with an estimated investment of 5,011,500 euros. The average payback period is 6.28 years. Seven energy efficiency measures have been identified during the project with the active support of the internal company team. All identified measures were accepted by the top management for implementation.

Energy consumption will be cut by 54.7%, reducing CO₂ emissions by a total of 8,291 t.

Material Flow Cost Accounting (MFCA) helped the company quantify and allocate material and energy losses to specific cost centers, which resulted in the implementation of low-cost measures such as furnace insulation or a power factor correction panel. The company was assessed against glass industry benchmarks with the support of international experts. Also, the company's TEST team received training in Life-Cycle Cost Analysis (LCCA) in order to be able to calculate the feasibility of the furnace replacement. The purpose of an LCCA is to estimate the overall costs of project alternatives within the life cycle of an investment and to select the design that ensures the facility will provide the lowest overall cost of ownership consistent with its quality and function. The LCCA should be performed early in the design process while there is still a chance to refine the design to ensure a reduction in life-cycle costs (LCC).

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
Compressed air system	0	6,011	Immediate	-	156	Total: 8,291 t of CO ₂
Improved electrical system	2,500	9,017	0.3	-	234	
Maintenance	0	21,840	Immediate	-	1,424	
Melting furnace optimization	9,000	43,680	0.2	-	2,849	
Melting furnace replacement	5,000,000	716,820	7	-	46,749	
Total	5,011,500 €	797,368 €	6.3	-	51,412 MWh	

¹ Numbers based on production value from 2015

Compressed air system

The compressors' yearly consumption represents about 38% of the total electricity consumption, yet the company did not have any leakage management system in place. The measurement campaign detected that the air leaks account for at least 10% of the compressors' consumption, which motivated the company to measure each leakage point, mark and fix them.

Improved electrical system

Using power factor (PF) correction to improve the electrical system consists of installing a separate PF panel to the feeding panel of the compressors in addition to the main one at the transformer terminals. The company team validated the consumption before and after the installation. A significant saving of 15% of the transformer's consumption could be achieved.

Maintenance

Improper stamp maintenance was detected as the primary cause of many stopping periods and defect products, so the staff designed a quality assurance program to insure proper stamp maintenance. Once implemented, the maintenance program will reduce production stopping periods and minimize the need for reprocessing (re-melting) out-of-specification glass products.

Melting furnace optimization

In glass production, natural gas is mainly consumed in the furnace, so that continuous monitoring and tuning of the firing process is required. Three measures were developed to optimize furnace consumption. Those measures include rehabilitation of the furnace walls, installing a heat recovery system by using the dissipated heat from the stack which reaches about 850 °C, tuning the melting furnace and monitoring the combustion parameters to optimize the combustion process.

Melting furnace replacement

The furnace at Star Glass Company had almost reached the end of its useful life. Operation and maintenance costs were increasing rapidly due to the deterioration of its wall insulation. This issue was confirmed by the thermal imaging conducted during the project. The company started the process to replace the furnace by a new and more efficient one. Med-Test experts provided guidance for the company staff and recommended them to make their decision based on a Life-Cycle Cost Analysis (LCCA), rather than the lowest initial cost.

"After learning about the MED TEST project, we developed a vision to double our production while reducing energy consumption, which gave us a great competitive opportunity to reduce production costs and increase our competitiveness within international markets."

Hazem Tahon
HSE Manager

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