UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

وزارة الصناعة والتجارة الخارجية

Solar Heating in Industrial Processes (SHIP) Project

The project "**Utilizing Solar Energy for Industrial Process Heat in Egyptian Industry**" is financed by the GEF and implemented by UNIDO in partnership with the Egypt National Cleaner Production Centre ENCPC. The objective of the project is to develop the market environment for the diffusion and local manufacturing of solar energy systems for industrial process heat. The project results will increase the knowledge and strengthen the awareness among the major stakeholders on the penetration potential of solar technologies in the food, chemical and textiles sectors in the region. The project focuses on improving the energy efficiency of the industrial process heating systems and the introduction of solar thermal technologies mainly in industrial companies that have low and medium temperature heat demand in three industrial sectors, namely the food, chemical and textiles sectors.

SOLARheating for Industrial Process
Together Toward Efficient Production

Universal for Carton Case Study

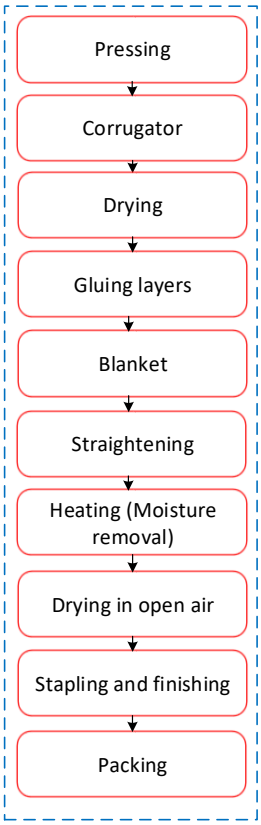
1st Industrial Zone, Al Kawthar, Sohag

Chemical sector

Paper

150 Tons/year

Production Processe Flow Diagram
Universal for Carton Factory



Universal for Carton Company has an average production of about 1 ton per day. Universal for Carton Company products are printed corrugated cardboard products.
The existing thermal energy system in Universal for Carton factory is supplied through electrical heaters that supply heat directly at the processes. The thermal energy system in the factory did not include any boilers, steam systems, or water heaters.

- Optimization Opportunities -

Solar Water Heating

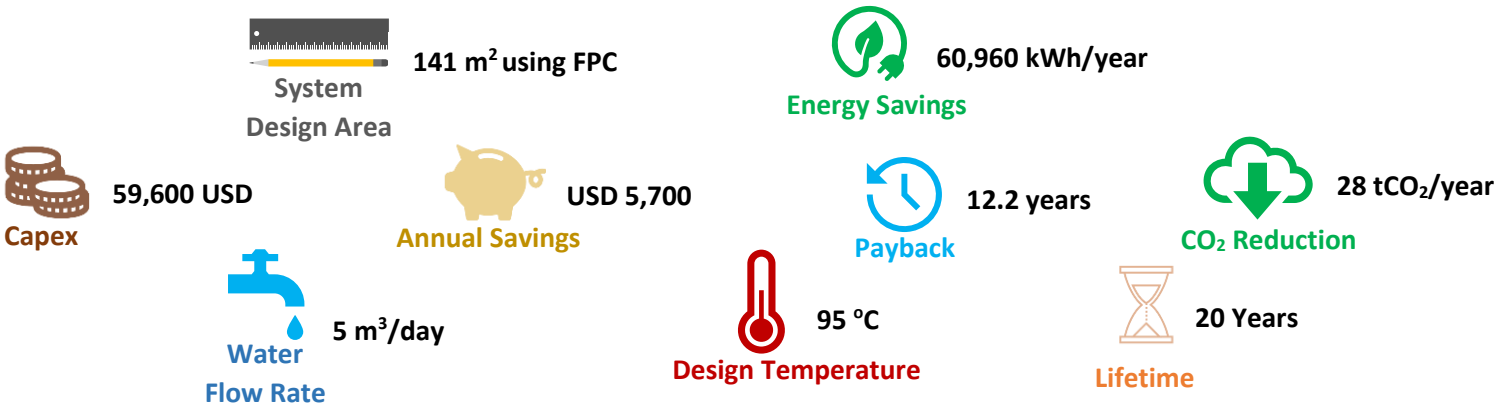
Thermal Insulation

Insulation of pipes, tanks, fittings, and machines is a general principle that should be applied in all steam consuming processes in the factories. Insulation needs to be fixed at multiple parts of the steam system. The collective saving from proper insulation is usually enormous. Insulating steam pipes will help **to reduce energy consumption**, **CO_2 emission**, and **operation costs**. **safety will be enhanced** after **reducing** surface temperature.

Energy Savings: 20%/year
Payback: less than 1 years
CO_2 Reduction: 25%/year

Integration of Solar Thermal Heating System

Solar heating technologies collect thermal energy from the sun and this heat can be used for heating purposes. Solar collectors are selected based on the range of the operating temperature range and the type of the industrial sector. Heat in the lower temperature range (<80 °C) can easily be provided with systems commercially available, such as flat plate collectors (FPC) and evacuated tube collectors (ETC). The **scenario envisioned** for the factory is to **preheat boiler feed water** which will decrease the energy consumed by the boiler. The system will be **installed on the roof** occupying **141m²** of area. The system is designed to **heat 5 m³/day to 95 °C**. The **system cost** is around **USD 59,600** and the **annual savings** will be **USD 5,700**. With lifetime of **20 years**, the **total savings is USD 114,000**. Other parameters are shown below.



Lessons Learnt

- **Thermal insulation is a quick win. It saves energy with very low upfront costs and have high impact a low payback**
- **Solar thermal integration combines renewable energy resources utilization and energy savings measures**

The **total proposed solutions** summary:
Thermal Energy Savings: up to **60,960 kWh/year**.

- **Financial Savings:** 5,700 **USD/year,**
- **Av Capital Cost**: 59,600 **USD**,
- **Overall Payback Period:** 12.2 **years**,
- **CO_2 Emissions Reduction:** 28 **tCO_2eq/year**.

SCAN ME

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For more information:
UNIDO Project Management Unit in Egypt,
Email: info@shipprojectegypt.org
Phone: +20 102 895 1112
www.SHIPprojectEgypt.org

UNIDO Headquarters:
Mark Draek,
Email: m.draeck@unido.org
Phone: +43 (1) 26026 4356