MSME chemical unit invests Rs 30 lakhs in energy efficiency measures—and saves Rs 20 lakhs every year!

Background

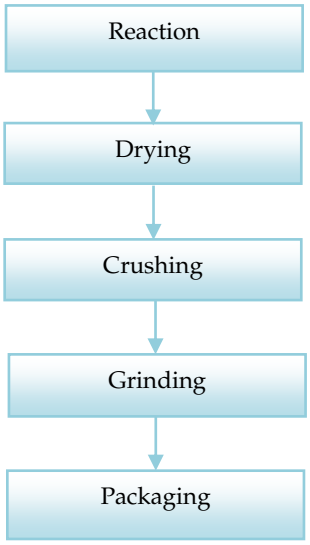
Ankleshwar is a chemical cluster in Gujarat. It has over 700 MSMEs manufacturing various kinds of chemicals (dyes and pigments—67%; pharma and pharma intermediates—27%; and pesticides and chlor-alkalis—6%). The production capacity of these units varies from 50 tonnes to over 10,000 tonnes per annum (tpa).

Unit profile

M/s **A19** is an MSME unit that manufactures iron oxide (red and yellow), producing about 600 tpa. The annual energy bill of the unit was INR 108 lakhs, which was around 86% of total turnover. The annual energy consumption was around 756 tonnes of oil equivalent (toe), of which firewood accounted for 676 toe (89%), natural gas (NG) 58 toe (8%) and grid electricity 22 toe (3%).

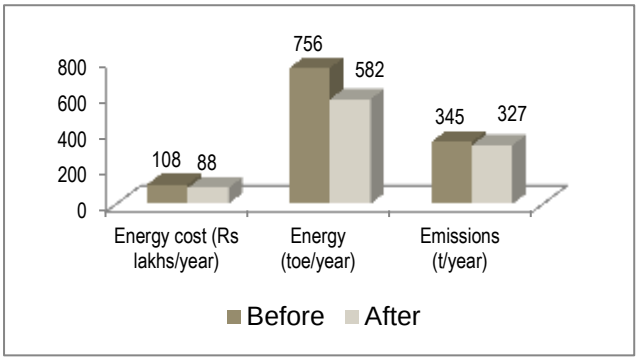
Process description

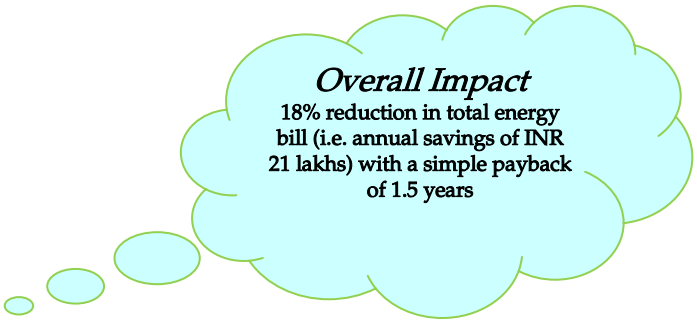
The manufacturing process involves reaction of the raw materials at a particular temperature, which is maintained through indirect heating by steam from a wood-fired boiler. The products of reaction are filtered, dried using an NG-based rotary dryer, pulverized and ground to give the final products.



The major energy consuming equipments used were a wood-fired 2-pass IBR boiler of capacity 1000 kg/hour, an NG-based single pass rotary dryer, electrical motors associated with various utilities, and lighting.

Overall Impact: post- implementation





This case study has been prepared under WB GEF Project titled "Financing Energy Efficiency at MSMEs in India". The project aims to identify, design & implement Energy Efficiency (EE) solutions in 500 MSMEs in 5 clusters with potential of EE investment of more than Rs. 100 crore and reduction in GHG emissions equivalent to 1.2 million tonne CO_2. This project is being co-implemented by Small Industries Development Bank of India (SIDBI) and Bureau of Energy Efficiency (BEE).

INTERVENTIONS

Replacement of existing 2-pass boiler with 3-pass boiler of larger capacity

Baseline Scenario

The existing wood-fired 2-pass IBR boiler of 1000 kg/hour capacity had an efficiency of only about 46% due to energy losses through dry flue gas and high flue gas temperature.

Recommendation

The unit was advised to replace the existing boiler with an energy efficient 3-pass IBR boiler of 2000 kg/hour capacity.

Implemented Scenario

As advised, the unit replaced the existing boiler with an energy efficient 3-pass IBR boiler of 2000 kg/hour capacity.

This investment of INR 26.7 lakhs is saving 476 tonnes of wood annually, equivalent to INR 15.5 lakhs. The simple payback period is 1.7 years.

Installation of waste heat recovery system in the rotary dryer

The exhaust temperature of the hot air from the rotary dryer was very high (694 ºC), indicating energy loss. As advised, the unit installed a shell and tube type 'economizer' (waste heat recovery device) to recover heat from exhaust air and use it to the pre-heat the boiler feed water. This investment of INR 1.6 lakhs is saving around 17.5 tonnes of firewood annually, equivalent to INR 0.6 lakh. The simple payback period is 2.9 years.

Installation of energy efficient burner system in rotary dryer

The efficiency of the rotary dryer was very low, at about 19%, because the existing burner system did not have a temperature-based system to regulate NG flow. As advised, the unit installed an energy efficient burner system in the rotary dryer and also applied proper insulation to the outer surface of the dryer. This investment of INR 1.6 lakhs is saving about 9800 SCM of NG annually, equivalent to INR 4.1 lakhs. The simple payback period is 0.4 years.

Replacement of existing lighting with energy efficient lighting system

The unit was using about 16 fluorescent tube lights (FTLs) of T-12 and T-8 type. As advised, the unit replaced these with energy efficient FTLs of T-5 type. This investment of INR 0.2 lakh is saving 1014 kWh of electricity annually, equivalent to INR 0.1 lakh. The simple payback period is 2.7 years.

Support provided under the project

- Walk-through & Detailed energy audit
- Identification of energy efficiency interventions in the unit
- Finalization of specifications for the energy efficiency interventions
- Identification of technology providers/vendors
- Facilitation for interactions between unit and technology providers;
- Technical support during commissioning
- Monitoring & Verification

For further information please contact:
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