

MSME chemical unit reduces energy bill by 19% through investing in energy efficiency measures

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).

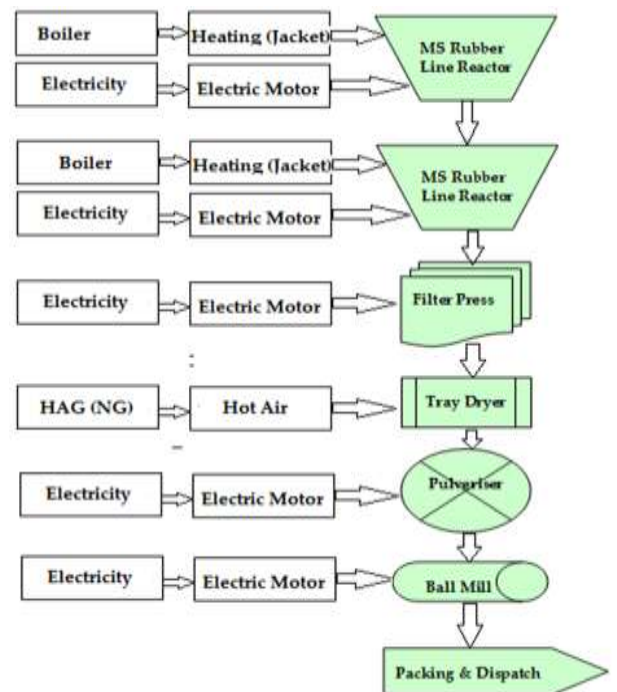
Unit profile

M/s **A23** is an MSME unit that manufactures azo dyes such as acid orange, acid red, etc., producing about 150 tpa. The annual energy bill of the unit was INR 20 lakhs, which was around 12% of total turnover. The annual energy consumption was around 141 tonnes of oil equivalent (toe), of which wood accounted for 127 toe (90%), natural gas (NG) 12 toe (9%) and grid electricity 2 toe (1%).

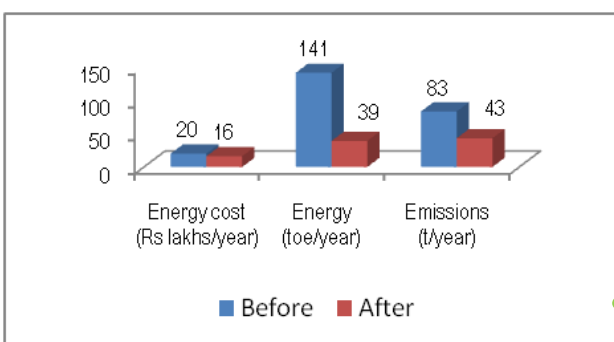
Process description

The raw materials are charged in a reaction vessel and made to react at a specific temperature, which is maintained through indirect heating by steam from a wood-fired boiler. After reaction, the contents are crystallized by filter press. The crystals are separated in the form of wet cakes, dried in tray dryers by means of hot air from an NG-based hot air generator (HAG), pulverized and powdered in a ball mill to give the final products.

The major energy consuming equipments used were a wood-fired steam boiler of 300 kg/hour capacity, NG-based HAG, electrical motors associated with pumps, agitators, etc., and lighting.



Overall Impact: post- implementation



Overall Impact
19% reduction in total energy bill (i.e. annual savings of INR 4 lakhs) with a simple payback of 1.7 years

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 CO₂. This project is being co-implemented by Small Industries Development Bank of India (SIDBI) and Bureau of Energy Efficiency (BEE).

INTERVENTIONS

Replacement of wood-fired boiler with energy efficient NG-fired boiler

Baseline Scenario

The unit was operating a wood fired boiler with a capacity of 300 kg/hour of steam. Its efficiency was only about 15%, far below the average efficiency of boilers of the same category. The main reasons were uncontrolled combustion, lack of waste heat recovery, poor insulation, leakages in the main furnace shell and the use of poor quality fuel.



Recommendation

The unit was advised to replace the wood-fired boiler with an NG-fired boiler with capacity of 800 kg/hour steam.

Implemented Scenario

As advised, the unit replaced the existing wood-fired boiler with an NG-fired boiler of 800 kg/hour steam capacity. This investment of INR 5.4 lakhs has increased annual electricity consumption by 14,147 kWh and NG by 23,348 SCM, but saves 360 tonnes of firewood annually.



Overall, the annual savings are INR 3.6 lakhs, giving a simple payback period of 1.5 years.

Installing power factor correction system at main incomer

Analysis of electricity bills showed that the average power factor at the main incomer was 0.825. As advised, the unit installed fixed type capacitor banks of 10 KVAR capacity to improve the power factor to about 0.950–0.980. This investment of INR 2775 is saving about INR 1000 annually. The simple payback period is 2.9 year.

Replacement of inefficient air compressor with energy efficient air compressor

The existing air compressor had a specific energy consumption (SEC) of 0.40 kW per cubic foot per minute (CFM), which was high. Also, it was in poor condition. As advised, the unit replaced it with a reciprocating, tank-mounted air compressor of 25 CFM capacity having an SEC level of 0.19 per kW. This investment of INR 0.9 lakhs is saving 3018 kWh annually, equivalent to INR 0.24 lakh. The simple payback period is 3.8 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

Disclaimer: This case study has been compiled by TERI on behalf of SIDBI under WB-GEF Project. While every effort has been made to avoid any mistakes or omissions, these agencies will not be in any way liable for any inadvertent mistakes/omissions in the publication.

For further information please contact:

Energy Efficiency Centre, Small Industries Development Bank of India (SIDBI), Ground Floor, E-1, Videocon Tower, Jhandewalan Extension, Rani Jhansi Road, New Delhi-110055, India, Ph. 011 23682473-77, www.sidbi.in

