

MSME chemical unit reduces energy bill by 28% through adoption of 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).

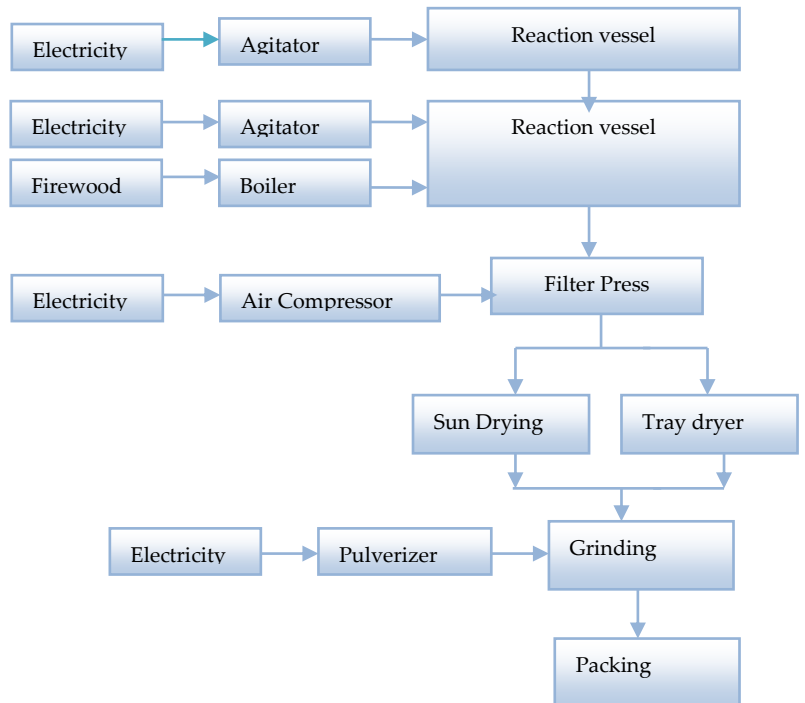
Unit profile

M/s A20 is an MSME unit manufacturing pigments like alpha blue and beta blue. The annual production is about 22 tonnes. The total annual energy bill of the unit was about INR 7 lakhs, which was around 10% of total turnover. The total annual energy consumption was about 40 tonnes of oil equivalent (toe), of which firewood accounted for 90% (36 toe) and grid electricity 10% (4 toe).

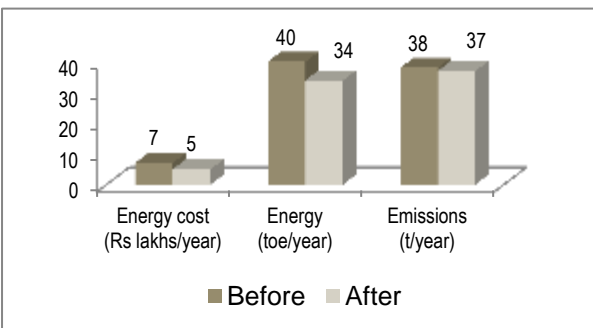
Process description

The manufacturing process involves reaction of the raw materials at a particular temperature, which is maintained through indirect heating by steam from a boiler. The reaction products are filtered, dried in tray dryers or in the sun, and then pulverized and ground to give the final products.

The main energy consuming equipments used were a wood-fired steam boiler, a wood-fired hot air generator, and electrical motors associated with process equipment such as agitators, pumps, etc.



Overall Impact: post- implementation



Overall Impact
 28% reduction in total energy bill (i.e. annual savings of INR 2 lakhs) with a simple payback of 2.9 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

Enhancing the in-house capacity for classification of pigments

Baseline Scenario

The blue pigments manufactured by the unit are classified in various grades on completion of final process. The classification/ grading/ sieving of final products was being outsourced, which led to higher production cost, manpower cost and yield loss during material shifting and transport.

Recommendation

The unit was advised to enhance in-house capabilities for classification/grading/sieving of products by installing a classifier unit.

Implemented Scenario

As advised, the unit installed a classifier unit for in-house classification/grading/sieving of products.



This investment of INR 4.7 lakhs not only brought cost benefits but also improved product quality. The annual saving is INR 1.2 lakhs, and the simple payback period is 3.9 years.

Installation of damper control mechanism in boiler

The unit was operating a wood-fired boiler of 300 kg/hour capacity. Its efficiency was only about 42%, due to high flue gas and surface heat losses. As advised, the unit installed a damper control mechanism to optimize combustion efficiency of the boiler. This investment of INR 0.6 lakh is saving around 14.6 tonnes of firewood annually, equivalent to INR 0.5 lakh. The simple payback period is 1.2 years.

Insulation of boiler and fire chamber

Temperature profiles of the boiler and fire chamber showed high levels of heat losses due to poor insulation of surfaces and leakages. As advised, the unit arrested the leakages in the fire chamber and connecting duct and applied the appropriate insulation. This investment of INR 0.2 lakh is saving 6.1 tonnes of firewood annually, equivalent to INR 0.2 lakh. The simple payback period is one year.

Installation of material transfer pump

The unit uses concentrated sulphuric acid as raw material. The acid was being transferred from the main storage tanks to a day tank using a low efficiency pump. As advised, the unit has replaced the existing system with an energy efficient pump. This investment of INR 0.2 lakh is saving 324 kWh of electricity annually, equivalent to INR 0.1 lakh. The simple payback period is 2 years.

Installation of capacitor bank

Analysis of electricity bills showed that the average power factor was only about 0.83. As advised, the unit installed a fixed type capacitor bank of rating 10 kVAR and 5 kVAR at the incomer to optimize the power factor. This investment of INR 2400 is saving about INR 1900 annually, with a simple payback period of 1.2 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.

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