

MSME chemical unit invests Rs 16 lakhs in energy efficiency measures—and saves Rs 28 lakhs on annual energy bill!

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).

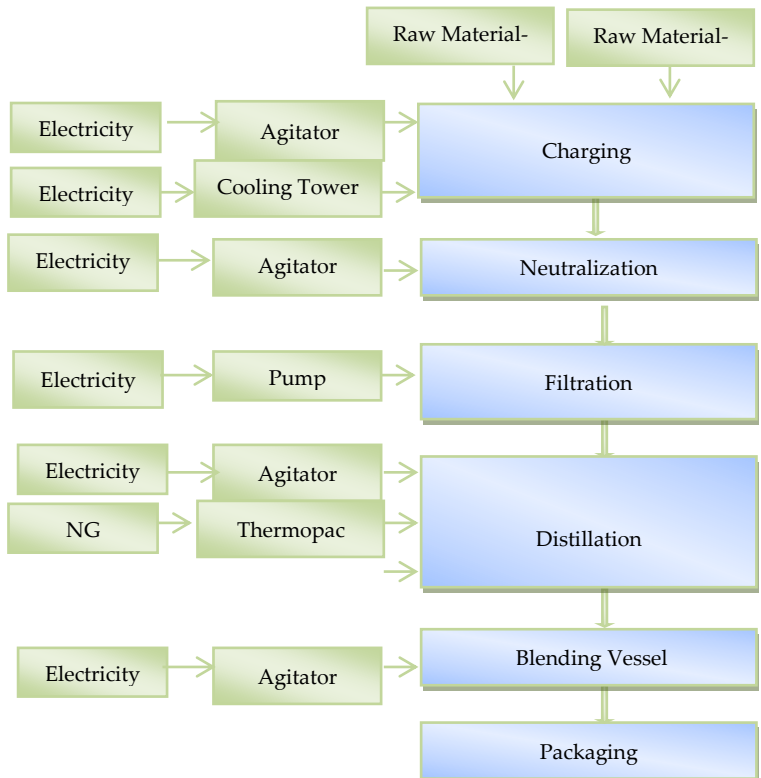
Unit profile

M/s **A15** is an MSME unit manufacturing industrial solvents and lubricants. The annual production is about 2600 tonnes. The total annual energy bill of the unit was about INR 98 lakhs, which was around 19% of total turnover. The total annual energy consumption was about 215 tonnes of oil equivalent (toe), of which natural gas (NG) accounted for 94% (201 toe) and grid electricity 6% (14 toe).

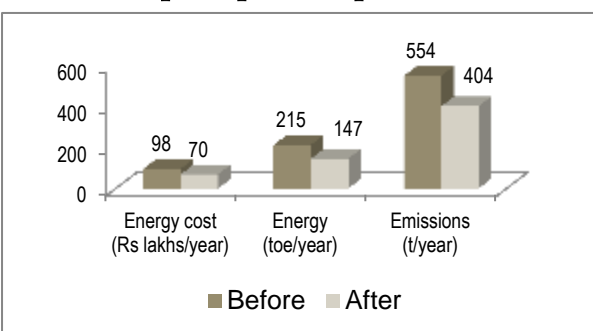
Process description

The manufacturing process involves reaction of the raw materials at a particular temperature, which is maintained through indirect heating by hot oil from a thermic fluid heater (TFH) or cooling by chilled water from a cooling tower. The reaction products are filtered and then. The vapours are condensed to the liquid product by passing through a water-cooled condenser.

The main energy consuming equipments used were three NG-fired TFHs with heating capacities of 600,000, 400,000 and 200,000 kcal/hour; and electrical motors associated with agitator, cooling tower pumps, and other utilities.



Overall Impact: post- implementation



Overall Impact
 28% reduction in total energy bill (i.e. annual savings of INR 28 lakhs) with a simple payback of 7 months

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 existing packing in distillation column with high efficiency packing

Baseline Scenario

The unit was separating methanol and water in a 600 mm diameter distillation column. The existing packing in the column required high energy input to get the desired process parameters.

Recommendation

The unit was advised to replace the existing packing with Sulzer high efficiency structured packing, so as to reduce heat losses and improve heat and mass transfer.

Implemented Scenario

As advised, the unit replaced the existing distillation column packing with Sulzer high efficiency structured packing.



This investment of INR 7.9 lakhs is saving 56,426 SCM of NG annually, equivalent to INR 21 lakhs. The simple payback period is just five months. annually in energy cost, with simple payback period of 2.1 years.

Replacement of existing agitator system

The existing anchor-type agitator system required heating of batch materials to about 110 °C, consuming about 80 SCM of NG and taking about five hours per batch. As advised, the unit replaced the existing system with a high efficiency EKATO agitator which works at room temperature and reduces batch time to 90 minutes. This investment of INR 4.5 lakhs is saving 16,000 SCM of NG and 750 kWh of electricity annually, equivalent to INR 5 lakhs. The simple payback period is 0.9 year.

Installation of VFD enabled process cooling water circulation pump

The existing cooling water circulation pump had a low efficiency (57%), with a rewind motor. As advised, the unit replaced it with an efficient VFD enabled process cooling water system. This investment of INR 3.4 lakhs is saving 15622 kWh of electricity annually, equivalent to INR 1 lakh. The simple payback period is 3.3 years.

Preventive maintenance of TFH burner to optimize oxygen level in flue gas

The TFH of 600,000 kcal/hour capacity showed a high excess air level (49–106%), which indicated energy loss. As advised, the unit adjusted the damper position to reduce the amount of excess air level. This investment of INR 0.1 lakh is saving 12,146 SCM of NG annually, equivalent to INR 1.5 lakhs. The simple payback period is 0.1 year.

**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

