

# MSME chemical unit invests 17 lakhs in energy efficiency measures, saves 9 lakhs every year!

### Background

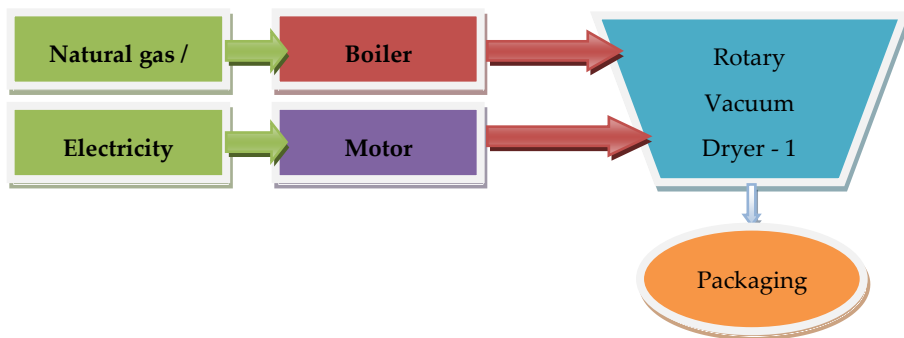
Ankleshwar is a chemical cluster in Gujarat. It has over 700 MSMEs manufacturing various kinds of chemicals (dyes and pigments—67%; pharma and pharma intermediates—27%; and pesticides and chlor-alkalis—6%). The production capacity of these units varies from 50 tonnes to over 10,000 tonnes per annum (tpa).

### Unit profile

M/s A1 is an MSME unit engaged in the manufacture of ammonium nitrate, producing about 10,200 tonnes per annum (tpa). The total annual energy bill of the unit was INR 76 lakhs, which was around 40% of total turnover. The total annual energy consumption was 380 toe, of which wood accounted for 76% (288 toe), natural gas (NG) 20% (75 toe), and grid electricity 4% (17 toe).

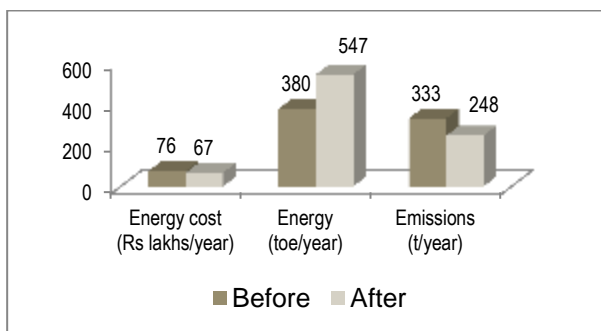
### Process description

The pre-prepared batch materials are charged in rotary vacuum dryers, where they are heated indirectly, using steam from boilers. The mixture is continuously stirred to ensure uniform heat transfer. The steam is recovered by condensers using water from cooling towers. The product is removed from the rotary vacuum dryers for packaging and dispatch.



The main energy consuming equipment used by the unit comprised two steam boilers (one wood-fired, the other NG-fired, each of 600 kg/hour steam generation capacity), and three cooling towers, each with capacity of 60 tonnes of refrigeration (TR) and operating on electricity.

### Overall Impact - Post implementation



**Overall Impact**  
 12% reduction in total energy bill (i.e. annual cost savings of INR 9 lakhs) with a simple payback of 1.9 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 CO<sub>2</sub>. This project is being co-implemented by Small Industries Development Bank of India (SIDBI) and Bureau of Energy Efficiency (BEE).*

## INTERVENTIONS

### Replacement of two existing non-IBR boilers with single IBR boiler of larger capacity

#### Baseline Scenario

The two existing boilers, each with steam generation capacity of 600 kg/hour, had operational efficiencies of 59% (NG-fired) and 56% (wood-fired). These efficiency levels were low compared to boilers of similar categories. The lower efficiencies were due to lack of waste heat recovery, use of incompatible burner (for NG firing) and poor insulation.



#### Recommendation

The unit was advised to replace the two existing boilers with a single wood-fired boiler of IBR type having steam generation capacity of 2000 kg per hour.

#### Implemented Scenario

Based on the project's recommendation, the unit replaced the two existing boilers with a single IBR wood-fired boiler of capacity 2000 kg per hour, with an efficiency of 74%. While electricity and wood consumption have increased by 65,700 kWh and 729 tonnes respectively, about 64,125 SCM of NG are being saved annually.



This investment of INR 14.62 lakhs is saving about INR 6.97 lakhs annually in energy cost, with simple payback period of 2.1 years.

#### Replacement of existing cooling towers

The three existing cooling towers, with individual pumps, were drawing constant power for both high and low loads. As suggested, they were replaced by a single cooling tower of 180 TR capacity. This investment of INR 2.86 lakhs is saving 35,153 kWh of electricity annually, equivalent to INR 2.26 lakhs. The simple payback period is 1.3 years.

#### Installation of power factor correction system at main incomer

Analysis of electricity bills showed an average power factor of 0.90 at main incomer. A power factor controller was installed to improve the power factor to about 0.95. This investment of INR 0.06 lakhs is saving INR 0.06 lakhs annually. The simple payback period is one 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

