

MSME foundry unit invests Rs 16 lakhs in energy efficiency measures – and saves Rs 20 lakhs annually!

Background

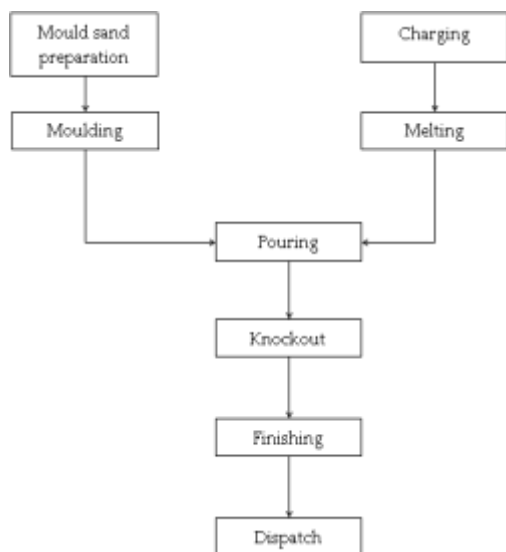
Kolhapur, in Maharashtra, is a foundry cluster. It has around 300 MSME foundries producing about 600,000 tonnes of castings annually, accounting for about 7–8% of India’s total castings production. The production capacity of these units varies from less than 1000 tonnes to over 10,000 tonnes per annum (tpa).

Unit profile

M/s K13 is an MSME unit manufacturing steel and stainless steel castings. The annual production is about 1363 tonnes. The total annual energy bill of the unit was about INR 168 lakhs. The total annual energy consumption was about 263 tonnes of oil equivalent (toe), comprising grid electricity 86% (226 toe) and diesel 14% (36 toe).

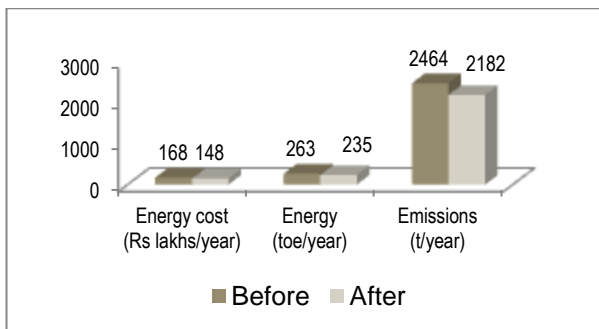
Process description

The major process steps are mould preparation, melting, pouring, knockout and finishing. Fresh sand is mixed with adhesives in a sand mixer and then pressed into mould casings. The charge is melted in an induction furnace. The liquid metal is poured into the moulds, which are left to cool and then ‘knocked out’ manually to yield the castings. The sand is reused. The castings are sent for shot blasting, machining, and heat treatment to give the finished products.



The major energy consuming equipments used were the electrical induction melting furnace, two diesel-fired heat treatment furnaces, and electrical motors associated with process equipment such as reaction vessels, pumps, etc.

Overall Impact: post- implementation



Overall Impact
 29% reduction in total energy bill (i.e. annual savings of INR 20 lakhs) with a simple payback of 0.8 year

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

INTERVENTIONS

Lid mechanism for induction furnace

Baseline Scenario

The unit was operating a 750 kg induction furnace. It was found that the circular opening of the furnace had no lid, resulting in radiation losses of over 100 kWh per batch.

Recommendation

The unit was advised to install a lid mechanism for the opening of the induction furnace.

Implemented Scenario

As advised, the unit installed a hydraulically operated lid mechanism for its induction furnace.

This investment of INR 2.8 lakhs is saving 156,227 kWh annually, equivalent to INR 9.9 lakhs. The simple payback period is 0.3 year.

Replacement of two inefficient air compressors with a VFD air compressor

As advised, the unit replaced its two existing air compressors, which were low in energy efficiency, with a single higher capacity screw air compressor (112.2 CFM) VFD, which has reduced the loading to about 25% and unload time by about 30%. This investment of INR 11.2 lakhs is saving 118,748 kWh annually, equivalent to INR 7.5 lakhs. The simple payback period is 1.5 years.

Replacement of two inefficient raw water pumps

The raw water pumps used for the coil PHE and panel PHE had low efficiencies of 36% and 35% respectively because their motors were rewound. As advised, these two pumps were replaced by energy efficient pumps matching the designed head and flow. This total investment of INR 1.3 lakhs is saving about 28,700 kWh annually, equivalent to INR 1.9 lakhs. The simple payback period is 0.7 year.

Replacement of inefficient soft water pump

The pump used for cooling of the furnace coil had an overall efficiency of only about 15%, which was lower than design parameters. To improve energy efficiency, the unit has changed the piping, and cleaned the pump's impeller and heat exchanger. This investment of INR 0.8 lakh is saving 11,670 kWh annually, equivalent to INR 0.7 lakh. The simple payback period is 1.1 year.

Energy efficient lighting

As advised, the unit replaced 29 fluorescent tube lights (FTLs) of 40W having conventional copper ballasts with 28W FTLs having electronic ballasts. This investment of INR 0.2 lakh is saving 1914 kWh annually, equivalent to INR 0.1 lakh. The simple payback period is two 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

