MSME foundry unit invests in energy efficiency measures—and saves double the amount each year!

Background

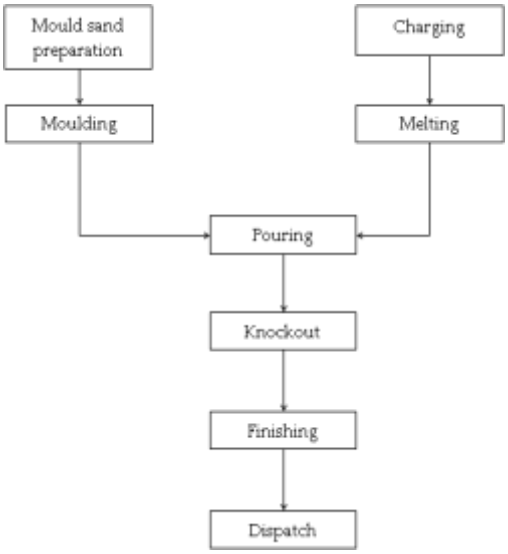
Kolhapur, in Maharashtra, is a foundry cluster. It has around 300 MSME foundries producing about 600,000 tonnes of castings annually, accounting for about 7–8% of India's total castings production. The production capacity of these units varies from less than 1000 tonnes to over 10,000 tonnes per annum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

Unit profile

M/s **K25** is an MSME unit manufacturing graded cast iron (CI) and spheroidal graphite iron (SGI) castings. The annual production is about 4762 tonnes. The total annual energy bill of the unit was about INR 234 lakhs. The total annual energy consumption was about 313 tonnes of oil equivalent (toe), in the form of grid electricity.

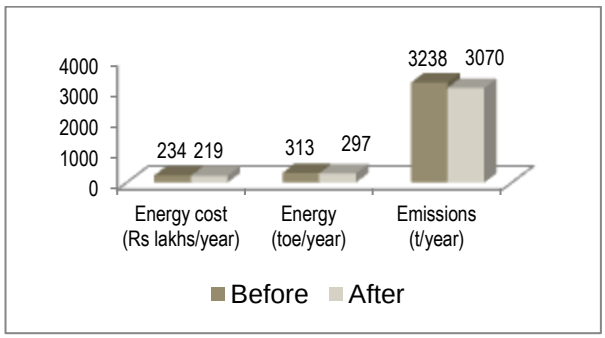
Process description

The major process steps are mould preparation, melting, pouring, knockout and finishing. Green sand is prepared using sand mixer and manually moulded. The charge is melted in an electrical induction furnace. The liquid metal is poured into moulds, which are left to cool and then 'knocked out' manually to yield the castings. The sand is reused, and the castings are subjected to shot blasting and machining to give the finished products.



The major energy consuming equipments used were the electrical induction furnace and electrical motors associated with process equipment such as reaction vessels, pumps, etc.

Overall Impact: post- implementation



Overall Impact

6% reduction in total energy bill (i.e. annual savings of INR 15 lakhs) with a simple payback of 0.5 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 CO_2. 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 crucible

Baseline Scenario

The unit's induction furnace had a circular opening, 400 mm in diameter. In the absence of a lid, radiation losses of 23.1 kWh per batch were taking place.

Recommendation

The unit was advised to install a hydraulically operated lid mechanism for the furnace.

Implemented Scenario

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

This investment of INR 2.8 lakhs is saving 144,147 kWh annually, equivalent to INR 11.3 lakhs. The simple payback period is 0.3 year.

Reducing leakage losses in compressed air system

The unit was using two screw type air compressors. The specific energy consumption (SEC) of these compressors was high, at 0.210 and 0.214 kW per cfm respectively. The reason was leakages of 35% in the compressed air piping system. As advised, the unit reduced the leakages to about 5%. At no cost, this measure is saving 15,058 kWh annually, equivalent to INR 1.2 lakhs.

Replacement of two existing air compressors with one VFD air compressor

The two installed screw air compressors were being under-utilized as their installed capacities (112 & 133.5 cfm) were much more than the unit's requirements for compressed air (110–120 cfm). As advised, the unit replaced these two compressors with a single VFD air compressor of 134 cfm capacity. This investment of INR 4.6 lakhs is saving 29,666 kWh annually, equivalent to INR 2.3 lakhs. 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

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

Global Environment Facility