

MSME foundry unit invests Rs 4 lakhs on energy efficiency measures – and saves Rs 28 lakhs yearly in energy bill!

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).

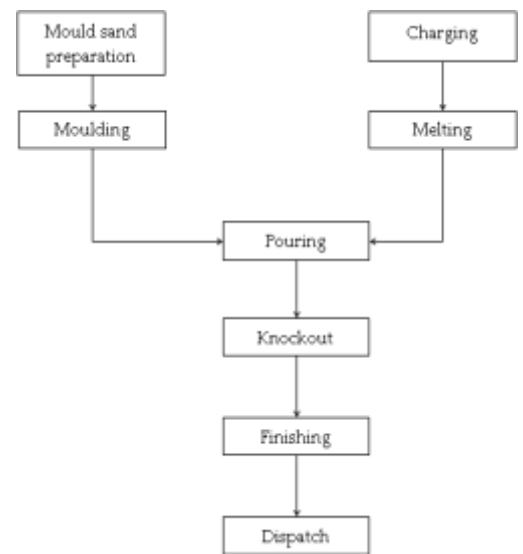
Unit profile

M/s K21 is an MSME unit manufacturing graded cast iron (CI) castings. The annual production is about 7092 tonnes. The total annual energy bill of the unit was about INR 365 lakhs. The total annual energy consumption was about 568 tonnes of oil equivalent (toe), comprising grid electricity 54% (308 toe) and coke 46% (260 toe).

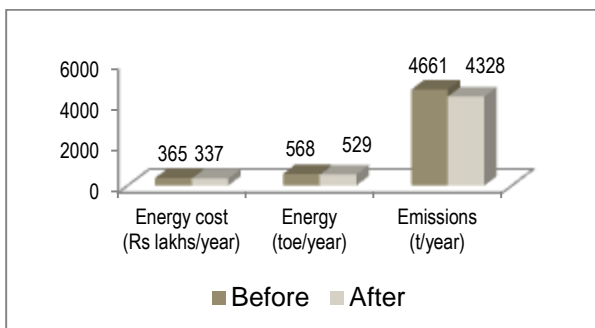
Process description

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 a coke-based cupola furnace/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 a coke-based cupola furnace, an electrical induction furnace, and electrical motors associated with process equipment such as reaction vessels, pumps, etc.



Overall Impact: post- implementation



Overall Impact
9% reduction in total energy bill (i.e. annual savings of INR 28 lakhs) with a simple payback of barely 3 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

INTERVENTIONS

Improving cupola operating practices

Baseline Scenario

The coke-based cupola furnace had a coke-to-metal ratio of 1:10.4 which was much lower than the design ratio (1:12). This was mainly due to poor operating practices.

Recommendation


The unit was advised to introduce better cupola operating practices and thereby reduce coke consumption.

Implemented Scenario

As advised, the unit adopted improved cupola operating practices in areas like: fuel bed, sand bed and coke bed preparation; lighting up; charging methods; tapping and slagging; melting; lining repair; etc.

This measure, at no cost, is saving about 21 tonnes of coke annually, equivalent to INR 5.5 lakhs.

Other energy efficiency measures

No.	Energy efficiency measure	Investment (lakhs INR)	Annual savings (lakhs INR)	Simple payback period (years)
2	Replacement of impeller of cupola blower	0.1	0.6	0.1
3	Lid mechanism for induction furnace crucible 	2.8	11.9	0.2
4	Rejection control by improving process response study	–	3.4	–
5	Arresting leakage loss of compressed air	–	4.8	–
6	Replacement of soft water pump with energy efficient pump	1.2	1.4	0.9
7	Replacement of mercury vapour lamp with metal halide lamp	0.03	0.03	1.0
8	Utilization of tum blast machine for foundry return	–	0.7	–
Totals		4.1	22.8	0.2

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

