

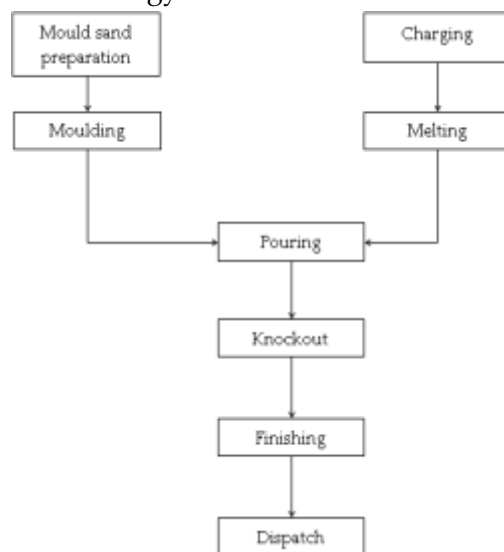
MSME foundry unit cuts energy costs through energy efficiency measures – and recovers investment in just 3 months!

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 K23 is an MSME unit manufacturing graded cast iron (CI) and spheroidal graphite iron (SGI) castings. The annual production is about 7849 tonnes. The total annual energy bill of the unit was about INR 595 lakhs. The total annual energy consumption was about 832 tonnes of oil equivalent (toe), in the form of grid electricity.

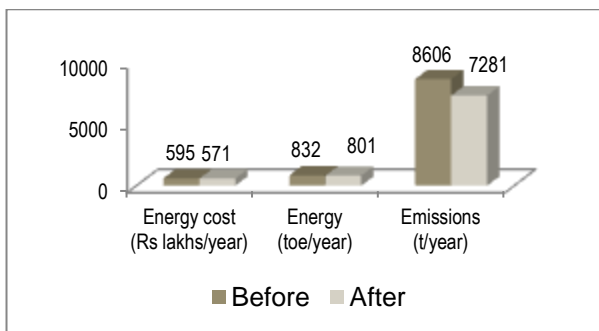


Process description

The major process steps are mould preparation, melting, pouring, knockout and finishing. 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, and electrical motors associated with process equipment such as reaction vessels, pumps, etc.

Overall Impact: post- implementation



Overall Impact

4% reduction in total energy bill (i.e. annual savings of INR 24 lakhs) with a simple payback of 0.3 year (i.e. 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

1. Lid mechanism for induction furnace

Baseline Scenario

The unit's induction furnace had a circular opening of 400 mm diameter without lid. As a result, radiation losses were high (32.7 kWh per batch).

Recommendation

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

Implemented Scenario

As advised, the unit installed a lid mechanism for its induction furnace to minimize radiation losses.



This investment of INR 3.5 lakhs is saving 141,961 kWh annually, equivalent to INR 8.7 lakhs. The simple payback period is 0.4 year.

2. Improving furnace utilization by better operating practices

The unit was found to be using excessive time in processes like sampling, spectro-analysis, alloying and pouring, thus under-utilizing the furnace. As advised, the unit trained its personnel and implemented better operating practices, thus reducing the cycle time. At no cost, this measure is saving 41,781 kWh annually, equivalent to INR 2.6 lakhs.

Other energy efficiency measures

No.	Energy efficiency measure	Investment (lakhs INR)	Annual savings (lakhs INR)	Simple payback period (years)
3	Improving power factor and demand reduction	2.4	3.2	1.8
4	Reduction in rejections by improving process response study	-	2.6	-
5	Arresting leakage in compressed air system	-	6.5	-
6	Reduction in pressure setting of air compressor	-	0.8	-
	Totals	2.4	13.1	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.

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