

MSME foundry unit invests Rs 13 in energy efficiency measures – and saves over Rs 6 lakhs year after year!

Background

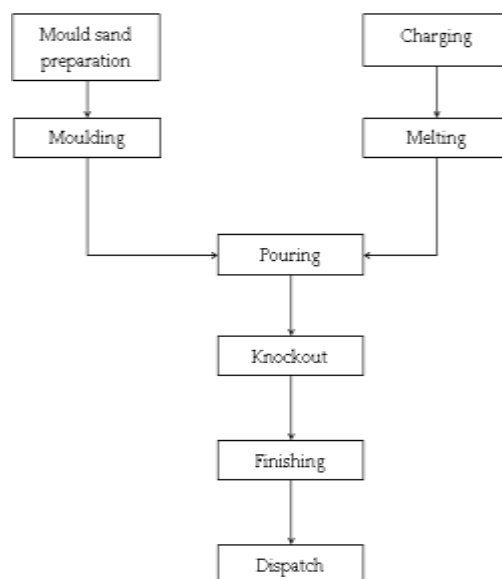
Kolhapur, in Maharashtra, is a foundry cluster. It has around 300 MSME foundries producing about 600,000 tonnes of castings annually, accounting for about 7–8% of India’s total castings production. The production capacity of these units varies from less than 1000 tonnes to over 10,000 tonnes per annum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

Unit profile

M/s K1 is an MSME unit that manufactures graded cast iron (CI) castings, producing about 430 tpa. The annual energy bill of the unit was INR 61 lakhs, which was around 5% of total turnover. The annual energy consumption was around 75 tonnes of oil equivalent (toe) in the form of grid electricity.

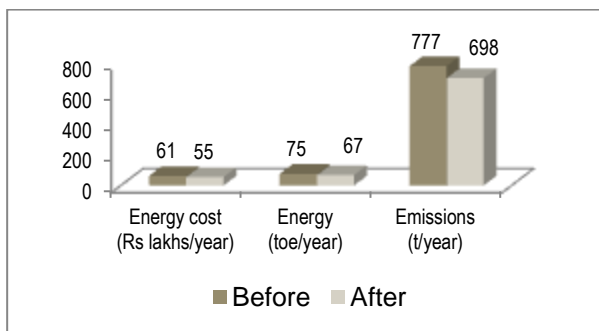
Process description

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
 10% reduction in total energy bill (i.e. annual savings of INR 6 lakhs) with a simple payback of 2.1 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 CO₂. This project is being co-implemented by Small Industries Development Bank of India (SIDBI) and Bureau of Energy Efficiency

INTERVENTIONS

Replacement of existing induction furnace by new induction furnace and cooling tower

Baseline Scenario

The unit was operating an induction furnace of 100 kW rated capacity (100 kg crucible capacity). The specific energy consumption (SEC) of the induction furnace was 850 kWh per tonne of melting, which was high for this category of furnaces.

Recommendation

The unit was advised to (1) replace the existing induction furnace with a new, energy efficient induction furnace of slightly higher rating and capacity, and (2) replace the existing cooling tower with a new, energy efficient cooling

Implemented Scenario

As recommended, the unit installed a new induction furnace of 175 kW capacity and 150 kg crucible capacity. It also replaced the existing cooling tower with a new energy efficient cooling tower. The SEC of the new system is 650 kWh per tonne.



This investment of INR 12.7 lakhs is saving 86,400 kWh of electricity annually, equivalent to INR 6.1 lakhs. The simple payback period is 2.1 years.

Replacement of existing raw water pump by energy efficient pump

The existing cooling water pump had a flow rate lower than the design flow rate, and its efficiency was only 27%. As advised, the unit replaced this pump with an energy efficient water pump. This investment of 0.3 lakh is saving 2277 kWh of electricity annually, equivalent to INR 0.2 lakh. The simple payback period is 1.6 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.

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