

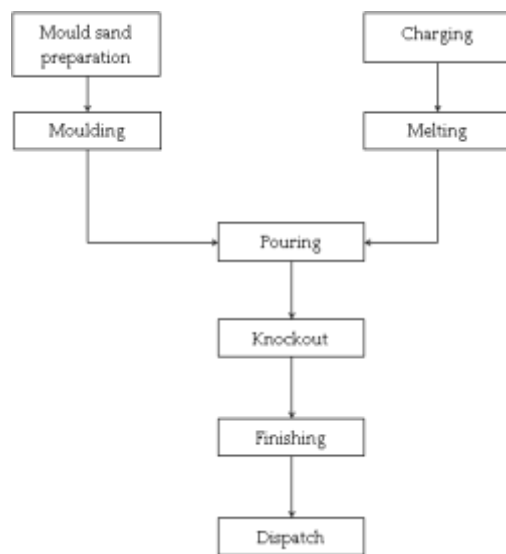
MSME foundry unit slashes energy bill by 27% through energy efficiency measures; recovers investment in barely two years

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 K5 is an MSME unit that manufactures graded cast iron (CI) castings, producing about 1976 tpa. The annual energy bill of the unit was INR 174 lakhs. The annual energy consumption was around 313 tonnes of oil equivalent (toe), comprising coke 98% (309 toe) and grid electricity 2% (4 toe).

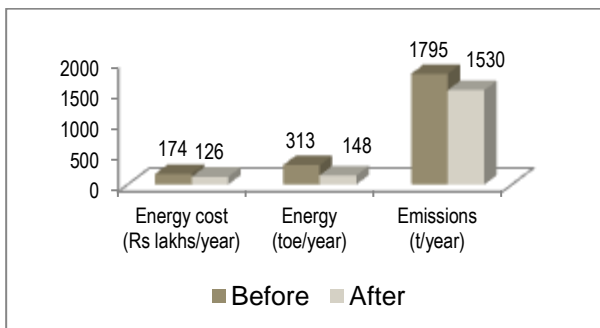


Process description

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-fired cupola 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 coke-fired cupola melting furnace and electrical motors associated with process equipment such as reaction vessels, pumps, etc.

Overall Impact: post-implementation



Overall Impact
 27% reduction in total energy bill (i.e. annual savings of INR 48 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 inefficient coke-fired cupola by induction furnace

Baseline Scenario

The unit was operating an old, inefficient coke-fired cupola melting furnace. It yielded a coke-to-metal ratio of 1: 5.88 which was far lower than the design ratio of 1 : 10. Also, it was not suitable to serve the unit's plans for product diversification.

Recommendations

The unit was advised to replace the cupola furnace with an energy efficient 1250 kW electrical induction furnace.

As advised, the unit replaced its existing 40W FTLs having copper ballasts with 28 W FTLs having electronic ballasts, and the existing mercury vapour lamps with metal halide lamps. This investment of INR 0.2 lakh is saving 2376 kWh annually, equivalent to INR 0.2 lakh per year. The simple payback period is one year.



Implemented Scenario

As advised, the unit replaced its existing cupola furnace with a 1250 kW induction furnace having 500/1500/2500 kg crucible capacity and capable of supplying power to all three crucibles at the same time.



This investment of INR 99.6 lakhs consumes about 16.72 lakh kWh of electricity annually, but saves 515 tonnes of coke. The net savings amount to INR 47.2 lakhs each year, giving a simple payback period of 2.1 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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