

MSME foundry unit invests Rs 19 lakhs on energy efficiency measures – and recovers it within a year!

Background

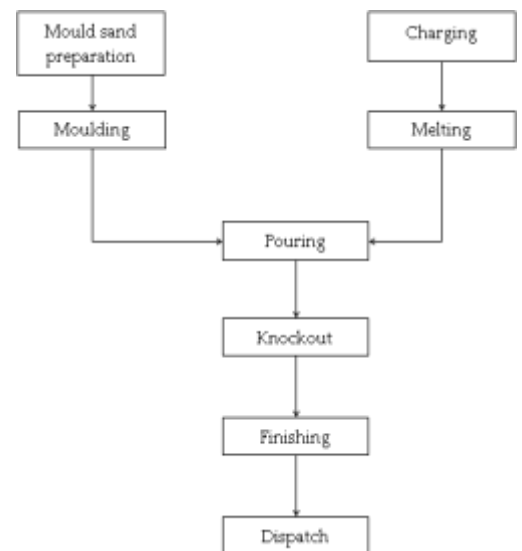
Kolhapur, in Maharashtra, is a foundry cluster. It has around 300 MSME foundries producing about 600,000 tonnes of castings annually, accounting for about 7–8% of India’s total castings production. The production capacity of these units varies from less than 1000 tonnes to over 10,000 tonnes per annum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

Unit profile

M/s K3 is an MSME unit manufacturing cast iron and spheroidal graphite iron (SGI) castings. The annual production is about 770 tonnes. The total annual energy bill of the unit was about INR 169 lakhs, which was around 14% of total turnover. The total annual energy consumption was about 211 tonnes of oil equivalent (toe) in the form of grid electricity.

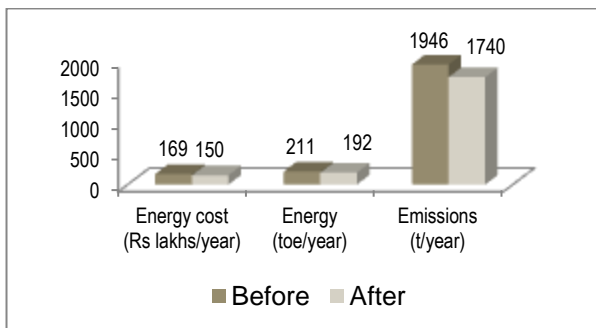
Process description

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 main energy consuming equipments used were an electrical induction furnace, and electrical motors associated with air compressor, pumps, and other utilities.

Overall Impact: post- implementation



Overall Impact
 11% reduction in total energy bill (i.e. annual savings of INR 19 lakhs) with a simple payback period of 1 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 CO₂. This project is being co-implemented by Small Industries Development Bank of India (SIDBI) and Bureau of Energy Efficiency

INTERVENTIONS

Down-sizing of existing induction furnace to meet process requirement

Baseline Scenario

The unit was operating an induction furnace of 350 kW rated capacity (500 kg crucible capacity). Its specific energy consumption (SEC) was relatively high, at 820 kWh/tonne of melting. Also, the unit produces small castings, and the large crucible capacity increased holding time and resulted in significant energy loss during holding.



Recommendation

The unit was advised to replace this furnace with a lower capacity induction furnace.

Implemented Scenario

As advised, the unit replaced the existing induction furnace with a new 100 kW induction furnace with 150 kg crucible capacity. The SEC of the new system is about 700 kWh/tonne of melting.



This investment of INR 10.5 lakhs is saving 169,039 kWh annually, equivalent to INR 13.9 lakhs. The simple payback period is 0.8 years.

Reducing leakage losses in compressed air system

The leakage in the existing compressed air piping system was measured to be 19%, which was very high. As advised, the unit identified and plugged the leakage points. At no cost, this measure is saving 34,690 kWh annually, equivalent to a INR 2.9 lakhs.

Replacement of existing air compressor with energy efficient air compressor

As advised, the unit replaced its existing reciprocating air compressor, which had a fixed pressure setting, with a new variable speed screw air compressor, which delivers compressed air as per process requirements. This investment of INR 8.5 lakhs is saving 25,970 kWh annually, equivalent to INR 2.1 lakhs. The simple payback period is 4 years.

Energy efficient lighting

As recommended, the unit replaced the existing 40W fluorescent tube lights (FTLs) and 250W mercury vapour lamps (MVLs) with 28W FTLs and 150W metal halide lamps respectively. This investment of INR 0.2 lakh is saving 2232 kWh per year, equivalent to about INR 0.2 lakh. The simple payback period is 1 year.

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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