

MSME foundry unit reduces energy bill by 14% through energy efficiency measures – recovers investment in 6 months!

Background

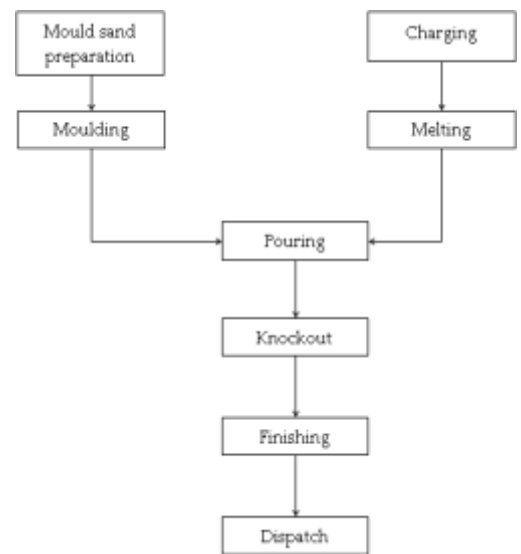
Kolhapur, in Maharashtra, is a foundry cluster. It has around 300 MSME foundries producing about 600,000 tonnes of castings annually, accounting for about 7–8% of India’s total castings production. The production capacity of these units varies from less than 1000 tonnes to over 10,000 tonnes per annum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

Unit profile

M/s K16 is an MSME unit manufacturing graded cast iron (CI) and spheroidal graphite iron (SGI) castings. The annual production is about 1041 tonnes. The total annual energy bill of the unit was about INR 112 lakhs. The total annual energy consumption was about 131 tonnes of oil equivalent (toe), in the form of grid electricity.

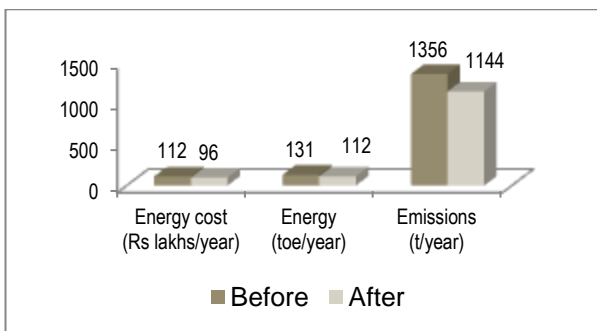
Process description

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
 14% reduction in total energy bill (i.e. annual savings of INR 16 lakhs) with a simple payback of 0.5 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 air compressor

Baseline Scenario

The unit's screw air compressor, of 226.72 CFM rated capacity, had a high specific power consumption of 0.204 kW per CFM. Most of the time, it was operating on no load.

Recommendation

The unit was advised to replace the existing compressor with a low capacity screw air compressor (111.20 CFM).

Implemented Scenario

As advised, the unit replaced the existing compressor with a 111.2 CFM screw air compressor. This reduced the unloading time from 76% to 50%.

This investment of INR 5.1 lakhs is saving 72,807 kWh annually, equivalent to INR 5.3 lakhs. The simple payback period is one year.

Energy efficient lighting

As advised, the unit replaced its existing 40W FTLs having copper ballasts with 28W FTLs having electronic ballasts, and 250W MVLs with metal halide lamps. This investment of INR 0.4 lakh is saving 4320 kWh per year equivalent to INR 0.3 lakh, with a simple payback period of 1.3 years.

Lid mechanism for induction furnace

The unit's induction furnace had a circular opening (400 mm diameter) without a lid. As a result, radiation losses were high (34.81kWh per batch). As advised, the unit installed a hydraulically operated lid mechanism for the furnace opening. This investment of INR 2.8 lakhs is saving 74,674 kWh, equivalent to INR 5.5 lakhs. The simple payback period is 0.5 year.

Reducing compressed air leakages

The unit's air compressor showed leakage of 25%, which was very high. As advised, the unit arrested the leakages at no cost. This measure is saving 62,640 kWh annually, equivalent to INR 4.6 lakhs.

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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