

MSME foundry unit slashes energy bill by 24% through energy efficiency measures

Background

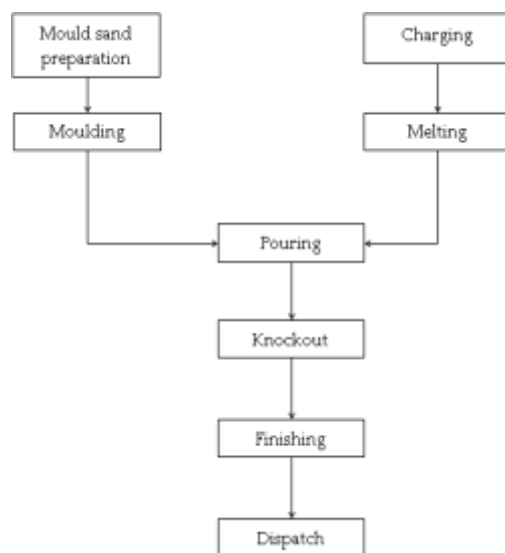
Kolhapur, in Maharashtra, is a foundry cluster. It has around 300 MSME foundries producing about 600,000 tonnes of castings annually, accounting for about 7–8% of India’s total castings production. The production capacity of these units varies from less than 1000 tonnes to over 10,000 tonnes per annum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

Unit profile

M/s K8 is an MSME unit manufacturing graded cast iron (CI) and spheroidal graphite iron (SGI) castings. The annual production is about 1315 tonnes. The total annual energy bill of the unit was about INR 127 lakhs, which was around 19% of total turnover. The total annual energy consumption was about 150 tonnes of oil equivalent (toe), in the form of grid electricity.

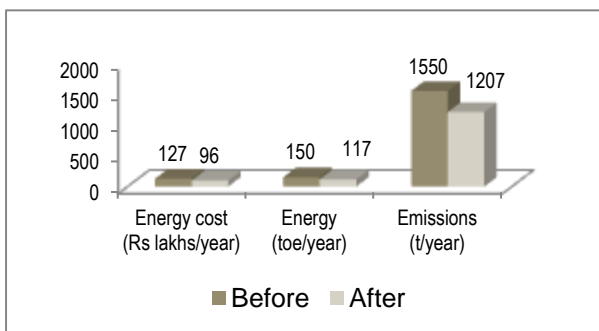
Process description

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
 24% reduction in total energy bill (i.e. annual savings of INR 31 lakhs) with a simple payback of 2.2 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 transformer with low loss transformer

Baseline Scenario

The efficiency of the unit's existing transformer was found to be very low.

Recommendation

The unit was advised to replace the existing transformer with a low-loss transformer (specifications: no load loss – 2.1 kW; full load losses @ 75degrees – 10.63 kW).

Implemented Scenario

As advised, the unit replaced its existing transformer with a low-loss transformer with the recommended specifications.



This investment of INR 16.7 lakhs is saving 38,515 kWh annually, equivalent to INR 3.1 lakhs. The simple payback period is 5.5 years.

Replacement of existing soft water pumps

The unit's two furnace coil cooling pumps had low efficiencies (12% and 8%). As advised, the unit replaced them with a new pump of 59.5% efficiency. This investment of INR 0.7 lakh is saving INR 0.9 lakh annually. The simple payback period is 0.8 year.

Replacement of existing induction furnace

The unit's existing 250 kW induction furnace (300 kg crucible capacity) had a specific energy consumption (SEC) of 743 kWh/tonne of melting, which was high for this category of furnaces. As advised, the unit replaced this furnace with a new 550 kW induction furnace of 500 kg crucible capacity. This investment of INR 35.8 lakhs is saving 253,763 kWh of electricity annually, equivalent to INR 20.2 lakhs. The simple payback period is 1.8 years.

Replacement of existing raw water pump

As advised, the unit replaced its existing raw water pump with an energy efficient pump at a cost of INR 0.7 lakh, saving INR 1.7 lakhs annually with a simple payback period of 0.41 year.

Replacement of existing screw air compressor

The unit's existing screw air compressor was operating in unload position for 58% of the time. As advised, the unit replaced it with a new variable frequency drive (VFD) air compressor to minimize the unload power consumption. This investment of INR 11.9 lakhs is saving 55,716 kWh annually, equivalent to INR 4.4 lakhs. The simple payback period is 2.7 years.

Energy efficient lighting

As advised, the unit replaced its existing 40W copper ballast FTLs with 28W electronic ballast FTLs and 250W MVLs with 150W metal halide lamps. This investment of INR 0.3 lakh is saving 0.3 lakh annually, with a simple payback period of one 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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