

# MSME foundry unit invests in energy efficiency measures – and recovers investment in five months!

## Background

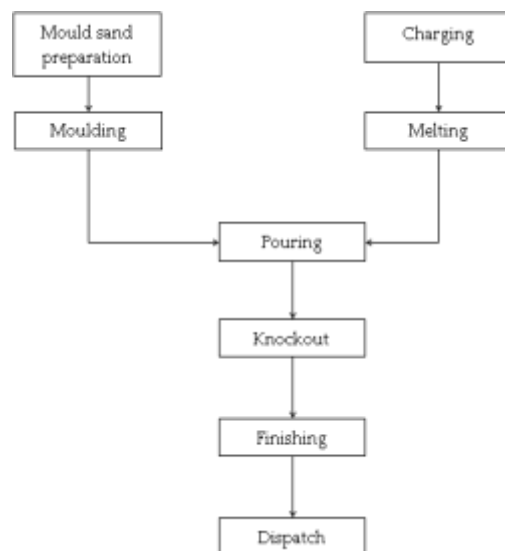
Kolhapur, in Maharashtra, is a foundry cluster. It has around 300 MSME foundries producing about 600,000 tonnes of castings annually, accounting for about 7–8% of India’s total castings production. The production capacity of these units varies from less than 1000 tonnes to over 10,000 tonnes per annum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

## Unit profile

M/s K12 is an MSME unit manufacturing graded cast iron (CI) and spheroidal graphite iron (SGI) castings. The annual production is about 1170 tonnes. The total annual energy bill of the unit was about INR 91 lakhs. The total annual energy consumption was about 113 tonnes of oil equivalent (toe), in the form of grid electricity.

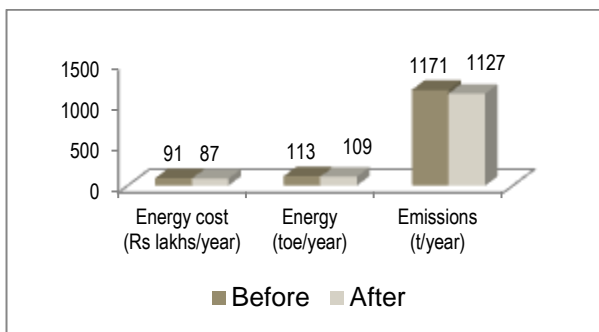
## Process description

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 two electrical induction furnaces, and electrical motors associated with process equipment such as reaction vessels, pumps, etc.

## Overall Impact: post- implementation



**Overall Impact**  
 4% reduction in total energy bill (i.e. annual savings of INR 4 lakhs) with a simple payback of 0.4 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 CO<sub>2</sub>. This project is being co-implemented by Small Industries Development Bank of India (SIDBI) and Bureau of Energy Efficiency

## INTERVENTIONS

### Manual lid covers for crucibles of induction furnaces

#### Baseline Scenario

The unit was operating two induction furnaces, each of 125 kW rated capacity (100 kg crucible capacity). Both furnaces had 220 mm diameter openings without lids, through which heat was lost.

#### Recommendation

The unit was advised to install duralin manual lid covers to reduce heat losses.

#### Implemented Scenario

As advised, the unit installed duralin manual lid covers on both induction furnaces.

This investment of INR 0.7 lakh is saving 39,321 kWh annually, equivalent to INR 3 lakhs. The simple payback period is 0.2 year.

### Energy efficient lighting

As advised, the unit replaced its 40W FTLs having conventional copper ballasts with 28W FTLs having electronic ballasts, and 125W/250W mercury vapour lamps and sodium vapour lamps with metal halide lamps of 150W, 125W and 70W. This investment of INR 0.3 lakh is saving 2946 kWh annually, equivalent to INR 0.2 lakh. The simple payback period is 1.2 years.

### Providing glass wool cover for ladle

The ladle used for pouring the melt was not covered with any insulation materials. This resulted in heat losses, temperature drop and consequently need for higher tapping temperature. As advised, the unit provided glass wool insulation cover on the ladle to reduce heat losses. This investment of INR 0.5 lakh is saving 7147 kWh annually, equivalent to INR 0.6 lakh. The simple payback period is 0.9 year.

### Improving sand properties to reduce sand content in runners and risers

It was found that 20–25% of input material charged in the induction furnaces comprised runners and risers (foundry returns), which contained about 3% sand due to insufficient cleaning. This resulted in slag formation and energy loss. As advised, the unit has improved the quality of sand and thereby reduced the sand content in runners and risers at no cost. This measure is saving INR 0.04 lakh annually.

#### 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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