

MSME foundry unit invests Rs 17 lakhs on energy efficiency measures – and saves nearly Rs 20 lakhs annually!

Background

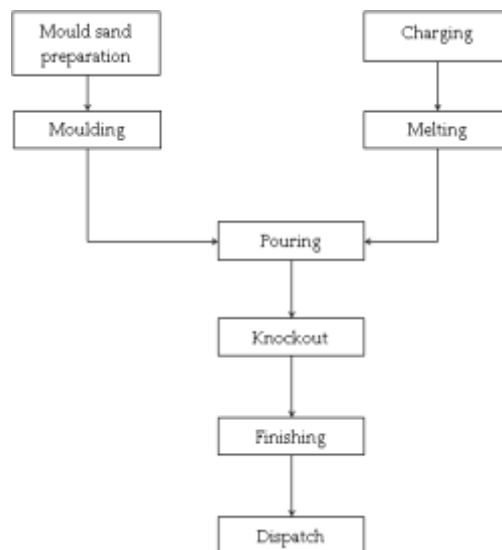
Kolhapur, in Maharashtra, is a foundry cluster. It has around 300 MSME foundries producing about 600,000 tonnes of castings annually, accounting for about 7–8% of India’s total castings production. The production capacity of these units varies from less than 1000 tonnes to over 10,000 tonnes per annum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

Unit profile

M/s K10 is an MSME unit manufacturing graded cast iron (CI) and spheroidal graphite iron (SGI) castings. The annual production is about 5939 tonnes. The total annual energy bill of the unit was about INR 369 lakhs, which was around 10% of total turnover. The total annual energy consumption was about 493 tonnes of oil equivalent (toe), in the form of grid electricity.

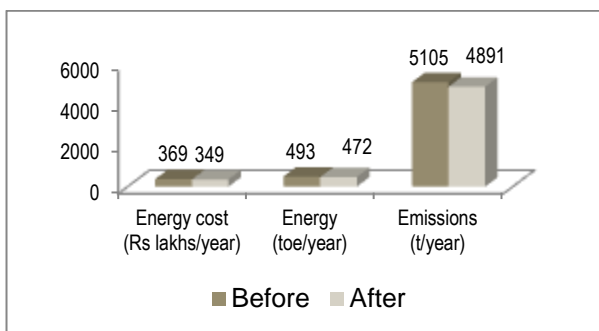
Process description

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
 5% reduction in total energy bill (i.e. annual savings of INR 20 lakhs) with a simple payback of 0.9 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

Replacement of old induction furnace and crucible with new system

Baseline Scenario

The unit was operating two induction furnaces, of which the 350 kW furnace and its 500 kg crucible were old. The specific energy consumption (SEC) of this furnace was 635 kWh per tonne melt.

Recommendation

The unit was advised to replace this furnace with a new energy efficient induction furnace, along with a new crucible.

Implemented Scenario

As advised, the unit replaced its old 350 kW induction furnace and crucible with a new energy efficient induction furnace along with a new crucible having a better magnetic shield.

This investment of INR 7.9 lakhs is saving 118,780 kWh annually, equivalent to INR 9.7 lakhs. The simple payback period is 0.8 year.

Replacement of existing air compressor with fixed speed compressor for base load and new VFD air compressor for variable load

The unit's existing air compressor's motor had been rewound thrice, and its SEC was high (0.414kW/cfm). The unit had an unused 127.5 cfm air compressor in fairly good condition. As advised, the unit is using the 127.5 cfm compressor for base load, and has installed a new 225 cfm air compressor with VFD for variable load. This investment of INR 8.5 lakhs is saving 108,930 kWh annually, equivalent to INR 8.9 lakhs. The simple payback period is one year.

Energy efficient lighting

As advised, the unit replaced its existing 250W mercury vapour lamps (MVLs) with metal halide lamps, and its 40W fluorescent tube lights (FTLs) having copper ballasts with 28W FTLs having electronic ballasts. This investment of INR 0.6 lakh is saving 5508 kWh per year, equivalent to INR 0.4 lakh. The simple payback period is 1.4 years.

Use of ladle covers to reduce radiation losses, temperature drop

The unit uses a number of ladles for pouring. None of the ladles had covers, resulting in radiation losses and drops in temperature, and consequently requiring higher tapping temperature. As advised, the unit is using covers for the ladles (ceramic wool/glass wool). This investment of INR 0.1 lakh is saving 7320 kWh per year, equivalent to INR 0.6 lakh. The simple payback period is 0.2 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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