

MSME foundry unit invests Rs 37 lakhs in energy efficiency measures – and saves Rs 58 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).

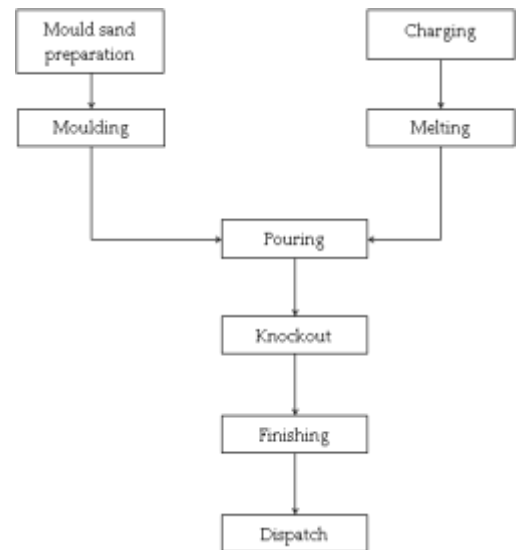
Unit profile

M/s K20 is an MSME unit manufacturing graded cast iron (CI) and spheroidal graphite iron (SGI) castings. The annual production is about 7200 tonnes. The total annual energy bill of the unit was about INR 662 lakhs. The total annual energy consumption was about 726 tonnes of oil equivalent (toe) in the form of grid electricity.

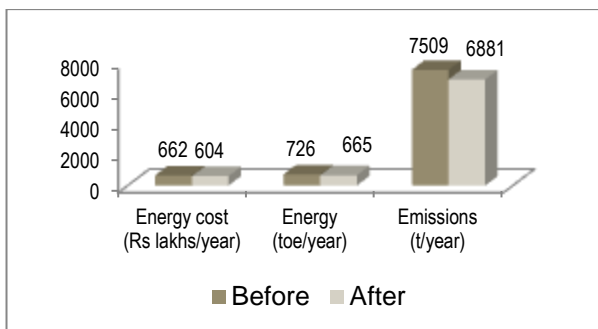
Process description

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
9% reduction in total energy bill (i.e. annual savings of INR 58 lakhs) with a simple payback of 0.6 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 one induction furnace with new energy efficient induction furnace

Baseline Scenario

One of the unit's two induction furnaces was of 1000 kW rated capacity (1000 kg crucible capacity). The specific energy consumption (SEC) of this furnace was 640 kWh/tonne melt, which was high for its category.

Recommendation

The unit was advised to replace this induction furnace with a new Insulated Gate Bipolar Transistor (IGBT) induction furnace.

Implemented Scenario

As advised, the unit replaced its existing 1000 kW induction furnace with a new 550 kW IGBT furnace of 500 kg crucible capacity and SEC of 530 kWh/tonne melt.

This investment of INR 35.8 lakhs is saving 474,021 kWh annually, equivalent to INR 37.2 lakhs. The simple payback period is one year.

Reduction of leakage losses in compressed air system

The unit was operating three air compressors. The leakages in the existing compressed air piping system were found to be as high as 88%. As advised, the unit arrested the leakages and brought them down to about 5%. This investment of INR 1.5 lakhs is saving 185,567 kWh annually, equivalent to INR 16.7 lakhs. The simple payback period is 0.1 year.

Reducing rejections by improving process response

As advised, the unit conducted a process response study to analyse and address the reasons for rejections, which were brought down by about 1% (from 6% to 5.0%). At no cost, this measure is saving 46,577 kWh annually, equivalent to INR 3.6 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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