

Replacing inefficient transformer with energy efficient transformer in a cast iron foundry unit

Tags

Type: Unit case study

Sub-sector: Foundry

Location: Kolhapur

Partners: GEF, World Bank, SIDBI, BEE, TERI, IIF–Kolhapur chapter, Kolhapur Engineering Association

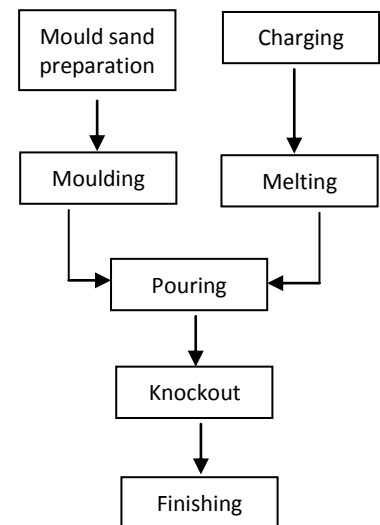
Year: 2012–14

Cluster background

Kolhapur (Maharashtra) is one of the important foundry clusters in India. The cluster has around 300 MSME foundries producing about 600,000 tonne of castings annually, primarily ferrous (iron) castings for the automotive sector, and 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

The MSME foundry unit **K8** manufactures 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 127 lakhs, which was around 19% of total turnover. The major process steps involved in the production of castings include mould preparation, melting, pouring, knockout and finishing. Green sand is prepared using sand mixer and the moulding is done manually. The charge material is melted in an electrical induction furnace. The molten metal is poured into moulds, which are cooled down and knocked out manually to remove the castings. The castings are subjected to finishing operations such as shotblasting and machining. The sand from the moulds is sent for reuse in moulding process.



Production process in a foundry

Energy consumption

The major energy consuming equipment was the electrical induction furnace. The other equipment in the unit include transformer, cooling tower, pump, air compressor, etc. The annual energy consumption was around 150 tonnes of oil equivalent (toe) in the form of grid electricity.

Intervention

During the energy audit, it was found that the efficiency of the transformer was very low. As per the recommendation of the energy audit, the unit replaced the inefficient transformer with an energy efficient (EE) transformer having the following specifications: no load loss—2.1 kW; full load losses @ 75degrees—10.63 kW.



Energy efficient transformer

The unit replaced its inefficient transformer with an energy efficient transformer

The EE transformer helped in reducing the annual electricity consumption by about 38,515 kWh equivalent to a monetary saving of Rs 3.1 lakhs. The investment required for the energy efficient transformer was Rs 16.7 lakhs with a simple payback period of 5.5 years. The estimated annual greenhouse gas (GHG) reductions are 34 tonnes of CO₂.

