

CASE STUDY

Non-ferrous foundry in Bokaro installs simple lid mechanism on its induction furnace - and saves ₹3 lakhs annually!

BACKGROUND

Bokaro, in the state of Jharkhand, is an important mixed engineering cluster of industries in Eastern India. There are many ferrous and non-ferrous foundries in the cluster. Electric induction furnaces are mainly used by these foundries for melting. Retrofitting the melting furnaces with simple lid mechanism is a low investment measure that will lead to energy and CO₂ savings.

Baseline

A non-ferrous foundry unit was using an induction melting furnace of the following specifications.

Parameters	Value
Year installed	2008
Rating, kW	250
Crucible capacity, kg	750
Number of melts per day	8
Cycle time, minutes	55-60

The furnace was not fitted with a lid mechanism leading to heat losses due to radiation through the top opening. Also, as can be seen from the figure, large-sized charge materials were being fed into furnace. Charging of such large materials lowers the capacity utilization of the furnace and extends the melting time. A photograph of the electric induction furnace is shown in figure 1.



Figure 1: Charging into the furnace

It was recommended to install simple locally fabricated lid mechanism on the furnace. Additionally, the unit was advised to charge smaller sized charge materials (approximately below 1/3 the crucible diameter).

ENERGY SAVINGS

Installation of lid mechanism and charging of smaller size feed material will lead to a saving of about 25 kWh per tonne of melt. The annual energy saving from the recommended measure will be 45,000 kWh which is equivalent to monetary savings of ₹3.0 lakh per annum. The investment in locally fabricated lid mechanism will be about ₹1 lakh. The payback on investment will be 4 months. The GHG emission reduction from the recommended measure will be about 37 tCO₂ per annum. Importantly, the practice of charging smaller sized raw materials into the furnace will improve the productivity as cycle time will get reduced.

The energy-savings is depicted in Figure 2.

Installation of lid mechanism will have co-benefits such as improved work environment and reduced pollution in the workplace.

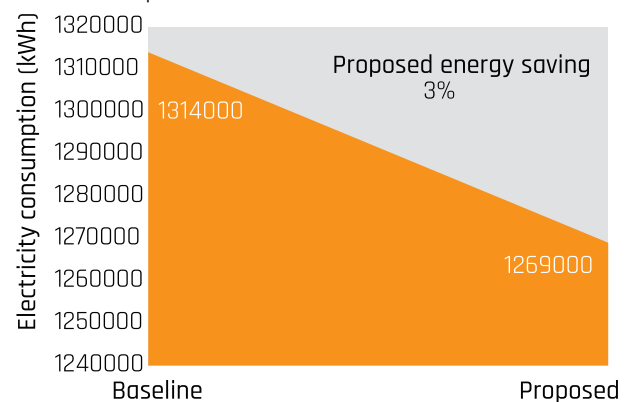


Figure 2: Energy savings

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