

# Replacing furnace oil fired forging furnace with induction billet heater in a forging industry

## Tags

**Type:** Unit case study

**Sub-sector:** Forging

**Location:** Pune

**Partners:** GEF, World Bank, SIDBI, BEE, TERI, Association of Indian Forging Industry (AIFI)

**Year:** 2012–14

## Cluster background

Pune (Maharashtra) is one of the important forging industry clusters located in India. There are more than 50 MSMEs in the cluster involved in the production of forged components, with 20 heat treatment MSMEs functioning as their vendors. The production capacity of MSME units is in the range of 500–3500 tonnes per annum (tpa). Large forging units account for about 65–70% of total production in the cluster, while MSMEs account for about 30–35%.

## Unit profile

The MSME forging unit **P1** manufactures forged components such as gears and spacers. The average production of the unit is about 930 tonnes per year. The total annual energy bill of the unit was Rs 125 lakhs, accounting for about 7% of the total turnover. The first step in the manufacturing process in the forging unit involves cutting of steel rods in the form of billets. The billets are heated in the furnace, forged with hammers and presses, trimmed, and subjected to heat treatment to give the final products.

## Energy consumption

The main energy consuming equipment used in the unit was a furnace oil (FO)-fired furnace. Other equipment included hammer, press, air compressor, pump, cooling tower, etc. The annual energy consumption was about 222 tonnes of oil equivalent (toe), of which FO accounted for 84% (186 toe), grid electricity 15% (33 toe), and diesel 1% (3 toe).

## Intervention

The unit was operating an FO-fired box type forging furnace of capacity 400 kg per hour, associated with a 1.25- tonne hammer. The efficiency of the furnace was evaluated and found to be less than 10%.





The unit replaced its inefficient FO-fired furnace with an energy efficient induction billet heater

L- FO-fired furnace; R- Induction billet heater

As per the recommendations of the energy audit, the foundry unit replaced its inefficient FO-fired forging furnace with an energy efficient (EE) induction billet heater of rating 200 kW (500 kg per hour capacity). The new system consumes 419,400 kWh of electricity annually but saves nearly 138 kL of FO. This investment of Rs 67.1 lakhs is saving Rs 42.1 lakhs annually. The simple payback period is 1.6 years. The GHG reductions with switch over from FO firing to electrical furnace are about 24 tonnes CO<sub>2</sub> per year.

