

Optimizing combustion air supply in an NG-fired forging furnace

Tags

Type: Unit case study

Sub-sector: Forging

Location: Pune

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

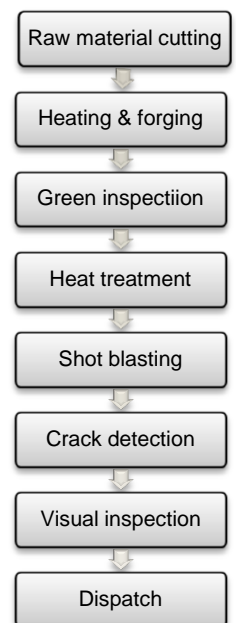
Year: 2012–14

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 **P11** manufactures forged components such as gears and shafts. The average production of the unit is about 1160 tonnes per year. The total annual energy bill of the unit was Rs 119 lakhs, which was around 23% 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 forging 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 were three natural gas (NG)-fired forging furnaces. Other equipment included hammer, press, air compressor, pump, etc. The annual energy consumption was around 259 tonnes of oil equivalent (toe), of which natural gas (NG) accounted for 90% (234 toe) and grid electricity 10% (25 toe).

Intervention

During the energy audit, it was found that one of the NG-fired forging furnaces, of capacity 250 kg/hour, was operating at only 7% efficiency because the existing blower was not providing optimal combustion air supply.



Combustion air blower: L- Low capacity; R- Optimum capacity

The unit replaced low capacity blower supplying combustion air to NG-fired forging furnace with an optimum capacity blower to avoid formation of carbon monoxide during combustion

As per the recommendations of the energy audit, the unit replaced the inefficient blower associated with the 200 kg NG fired forging furnace with a new, efficient blower that optimizes combustion air supply. This investment of Rs 0.4 lakhs is saving 11,668 standard cubic metres (SCM) of NG annually, equivalent to Rs 4.90 lakhs. The simple payback period is 0.09 years (i.e. barely one month). The GHG reductions with veneering of the normalizing furnace are about 20.4 tonnes CO₂ per year.