

Fuel switch from furnace oil to natural gas in forging furnaces

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 unit **P4** undertakes heat treatment of forged automobile and engineering components (job works). The average production of the unit is about 918 tonnes per year. The total annual energy bill of the unit was Rs 62 lakhs, accounting for about 42% of the total turnover. The components requiring heat treatment are cleaned and degreased, fitted on to appropriate fixtures, and then subjected to heat treatment processes like hardening, tempering, nitriding and annealing to give the final products.

Energy consumption

The main energy consuming equipment used in the unit were nine heat treatment furnaces, of which three furnaces were electrical and six furnaces were fired by furnace oil (FO). Other energy consuming equipment included electrical motors associated with process equipment such as air compressor, pumps, etc. The annual energy consumption was around 106 tonnes of oil equivalent (toe), of which furnace oil (FO) accounted for 83% (88 toe), grid electricity 15% (16 toe), and diesel 2% (2 toe).

Intervention

During the energy audit, three of the six FO-fired heat treatment furnaces were found to operate at low levels of efficiency, calculated at 4.7%, 7.8%, and 8.8%. With natural gas (NG) being readily available in the cluster,



the units switched over from FO to NG as fuel for these three heat treatment furnaces, as recommended by the energy audit.



The unit switched over from FO to natural gas (NG) as fuel for three heat treatment furnaces

L: FO-fired furnace; R: NG-fired furnace

The three NG-fired heat treatment furnaces together consume about 83,260 standard cubic metres (SCM) of NG annually, while avoiding consumption of about 89,630 litres of FO. The fuel switchover in the three furnaces required an upfront investment of Rs 22.1 lakhs, and is saving Rs 13.3 lakhs annually. The simple payback period is 1.7 years. The GHG reductions with switch over from FO firing to NG firing in the three heat treatment furnaces are about 113 tonnes CO₂ per year.

