Optimizing compressed air generation pressure in a forging unit

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 **P7** manufactures forged auto components like gear blanks, flanges, shafts and clamps. The average production of the unit is about200 tpa. The annual energy bill of the unit was Rs 23 lakhs, which was around 95% of 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 was the furnace oil (FO)-fired forging furnace. Other equipment included hammer, press, air compressor, pump, etc. The annual energy consumption was around 44 tonnes of oil equivalent (toe), of which furnace oil (FO) accounted for 97% (43 toe) and grid electricity 3% (1 toe).

Intervention

The unit was operating an air compressor of rating 3.7 kW and design capacity 22.4 CFM to meet the compressed air requirement of processes. During the energy audit it was found that the operating pressure of the air compressor was set at 6 bar (unload), even though the required air pressure for processes was only 5 bar.

The unit optimized the compressed air generation pressure to match load requirements

As recommended by the energy audit, the unit reduced the set operating pressure of the air compressor from 6 bar (unload) to 5 bar (load). At no cost, this measure is saving about 718 kWh of electricity annually, equivalent to nearly Rs 5000. The payback is immediate. The GHG reductions with veneering of the normalizing furnace are about 0.6 tonnes CO_2 per year.