MSME casting unit invests Rs 9 lakhs in energy efficiency measures—and saves Rs 10 lakhs annually!

Background

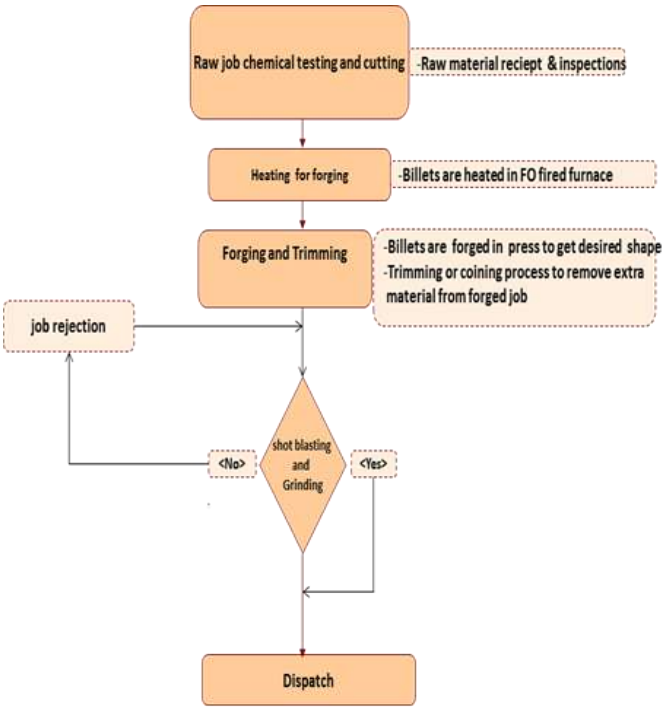
Pune, in Maharashtra, is a forging industry cluster. Large-scale units account for about 65–70% of the cluster's forging production, while MSMEs account for the remaining 30–35%. There are over 50 MSMEs producing forged components, with 20 heat treatment MSMEs functioning as their vendors. The production capacity of these units varies from 500 tonnes to over 3500 tonnes per annum (tpa).

Unit profile

M/s **P25** is an MSME unit that manufactures auto components like connecting rods and gear blanks through forging process, producing about 2458 tpa. The annual energy bill of the unit was INR 296 lakhs, which was around 30% of total turnover. The annual energy consumption was around 508 tonnes of oil equivalent (toe), of which furnace oil (FO) accounted for 82% (415 toe) and grid electricity 18% (93 toe).

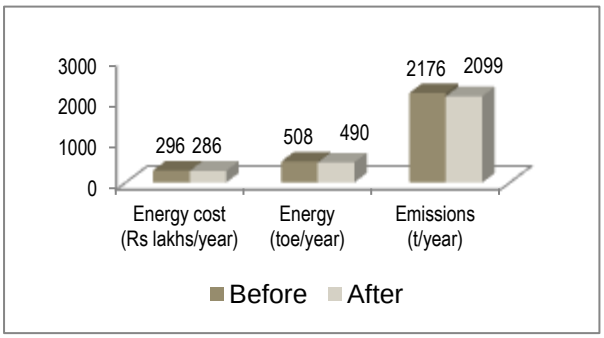
Process description

The manufacturing process involves the cutting of steel rods in the form of billets. The billets are heated in Fo-fired forging furnaces, forged with hammers and presses, subjected to heat treatment, and shot-blasted and ground to give the final products.



The major energy consuming equipments used were three FO-fired forging furnaces, two FO-fired heat treatment furnaces, and electrical motors associated with process equipment such as air compressor, pumps, etc.

Overall Impact: post- implementation



Overall Impact

4% reduction in total energy bill (i.e. annual savings of INR 10 lakhs) with a simple payback of 0.9 year

This case study has been prepared under WB GEF Project titled "Financing Energy Efficiency at MSMEs in India". The project aims to identify, design & implement Energy Efficiency (EE) solutions in 500 MSMEs in 5 clusters with potential of EE investment of more than Rs. 100 crore and reduction in GHG emissions equivalent to 1.2 million tonne CO_2. This project is being co-implemented by Small Industries Development Bank of India (SIDBI) and Bureau of Energy Efficiency

INTERVENTIONS

Installation of recuperators for two forging furnaces

Baseline Scenario

In two of the unit's FO-fired forging furnaces (each of capacity 250 kg/hour, associated with 1.5 tonne hammer and 4 tonne hammer), the inlet air temperature at burner was found to be very low (40° C).

Recommendation

The unit was advised to install a recuperator for each of these furnaces, to increase the inlet air temperature to 150° C and thereby improve furnace efficiency.

Implemented Scenario

As advised, the unit installed a recuperator for each of these two forging furnaces.

The total investment on this measure was INR 6.2 lakhs, resulting in a saving of 8990 litres of FO annually, equivalent to 4.7 lakhs. The simple payback period is 1.7 years.

Relining of one forging furnace

The forging furnace associated with 1.5 tonne hammer showed high surface heat losses (28,071 kCal/hour) due to poor insulation. As advised, the unit relined this furnace to minimize surface heat losses. This investment of INR 3.1 lakhs is saving 6061 litres of FO per year, equivalent to INR 3.1 lakhs. The simple payback period is 1 year.

Elimination of return water pump

The unit had a 3 HP return water pump which ran for 24 hours daily to supply water from cooling tower-3 to cooling tower-1. As advised, the unit stopped using this pump (as the water can be directly transferred from cooling tower 3 to cooling tower 1). At no cost, this measure is saving 13,424 kWh of electricity annually, equivalent to INR 1 lakh.

Optimization of compressed air generation pressure

The unit's screw air compressor was being operated with a set air pressure of 7.5 bar (unload) to 6.7 bar (load). As advised, the unit reset the air pressure to 6.5 bar as required by the process. At no cost, this measure is saving 24,099 kWh of electricity per year, equivalent to INR 1.7 lakhs.

Support provided under the project

- Walk-through & Detailed energy audit
- Identification of energy efficiency interventions in the unit
- Finalization of specifications for the energy efficiency interventions
- Identification of technology providers/vendors
- Facilitation for interactions between unit and technology providers;
- Technical support during commissioning
- Monitoring & Verification

For further information please contact:

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