

MSME forging unit reduces energy bill by 16% through energy efficiency measures

Background

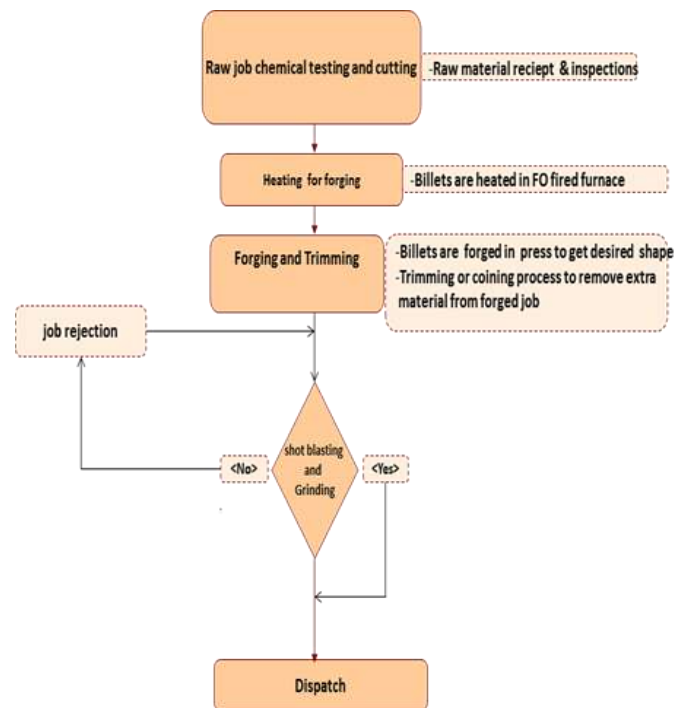
Pune, in Maharashtra, is a forging industry cluster. Large-scale units account for about 65–70% of the cluster’s forging production, while MSMEs account for the remaining 30–35%. There are over 50 MSMEs producing forged components, with 20 heat treatment MSMEs functioning as their vendors. The production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

Unit profile

M/s P23 is an MSME unit that manufactures forged components like rings, steel cups and bombshells for defence applications and the automobile industry, producing about 418 tpa. The annual energy bill of the unit was INR 74 lakhs, which was around 24% of total turnover. The annual energy consumption was around 96 tonnes of oil equivalent (toe), of which grid electricity accounted for 65% (63 toe) and furnace oil (FO) 35% (33 toe).

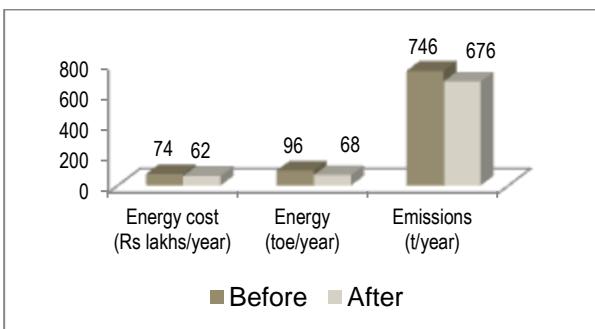
Process description

Steel rods are cut into billets, which are heated in an NG-fired furnace and forged with hammers and presses. The components are then subjected to various heat treatment processes, shot blasting and grinding to give the final products.



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

Overall Impact: post- implementation



Overall Impact
 16% reduction in total energy bill (i.e. annual savings of INR 12 lakhs) with a simple payback of 3.2 years

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 CO₂. This project is being co-implemented by Small Industries Development Bank of India (SIDBI) and Bureau of Energy Efficiency

INTERVENTIONS

Replacement of FO-fired forging furnace with energy efficient induction furnace

Baseline Scenario

The unit was operating an FO-fired forging furnace of capacity 400 kg per hour, which had an efficiency of only 5%.



Recommendation

The unit was advised to replace this furnace with an energy efficient induction billet heater of 300 kg/hour capacity and 125 kWh rating.

Implemented Scenario

As advised, the unit replaced its 400 kg/hour FO-fired furnace with a 125kW induction billet heater (300 kg/hour capacity). The new system consumes 46,781 kWh of electricity annually but saves 29,581 litres of FO.



Overall, the investment of INR 38.3 lakhs is saving INR 9.6 lakhs annually, giving a simple payback period of 4 years.

Use of air guns instead of air pipe for scale blowing operations

The unit was operating a 650-tonne press in which compressed air was used for scale blowing applications by means of a 6 mm pipe. As advised, the unit replaced the 6 mm pipe with a 4 mm pipe at virtually no cost, thereby reducing air losses as well as compressed air usage from 81 CFM to 36 CFM. This measure is saving 12,928 kWh of electricity annually, equivalent to INR 1 lakh.

Reduction in compressed air leakages

The unit's screw type air compressor was found to have five major leakage points. As advised, the unit eliminated these leakage points at virtually no cost. This measure is saving 16,524 kWh per year, equivalent to INR 1.3 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

Disclaimer: This case study has been compiled by TERI on behalf of SIDBI under WB-GEF Project. While every effort has been made to avoid any mistakes or omissions, these agencies will not be in any way liable for any inadvertent mistakes/omissions in the publication.

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