

MSME forging unit halves energy bill through energy efficiency measures!

Background

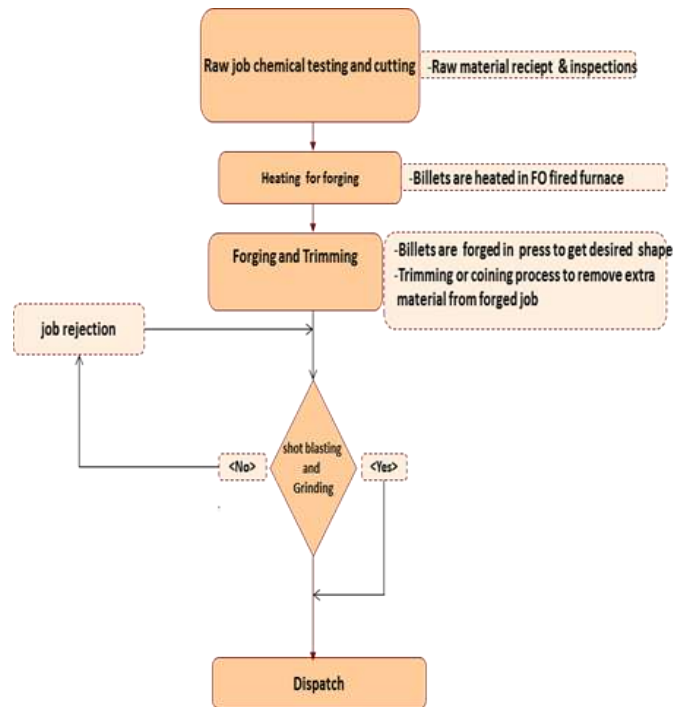
Pune, in Maharashtra, is a forging industry cluster. Large-scale units account for about 65–70% of the cluster’s forging production, while MSMEs account for the remaining 30–35%. There are over 50 MSMEs producing forged components, with 20 heat treatment MSMEs functioning as their vendors. The production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

Unit profile

M/s P7 is an MSME unit that manufactures forged components like gear blanks, flanges, shafts and clamps, producing about 200 tpa. The annual energy bill of the unit was INR 23 lakhs, which was around 95% of total turnover. 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).

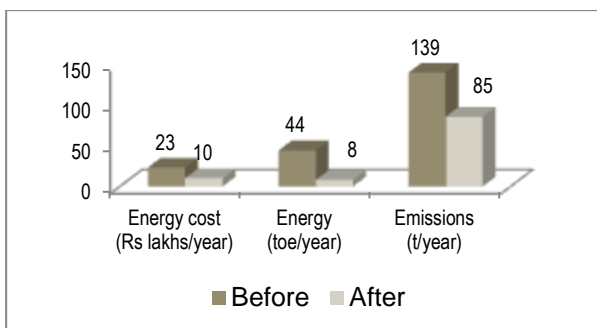
Process description

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



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

Overall Impact: post-implementation



Overall Impact

57% reduction in total energy bill (i.e. annual savings of INR 13 lakhs) with a simple payback of 2.7 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 induction billet heater

Baseline Scenario

The unit was operating an FO-fired forging furnace of capacity 250 kg per hour, associated with a 0.75 tonne hammer. The furnace efficiency was below 7%.



Recommendation

The unit was advised to replace the existing FO-fired furnace with an induction billet heater of rating 200 kW (500 kg per hour capacity).

Implemented

As recommended, the unit replaced its existing FO-fired furnace with an energy efficient induction billet heater of rating 200 kW (500 kg/hour heating capacity). The new system consumes 79,505 kWh of electricity annually, but saves about 43,092 litres of FO.



This investment of INR 35 lakhs saves INR 12.9 lakhs annually. The simple payback period is 2.7 years.

Optimization of compressed air generation pressure

The unit was operating an air compressor of rating 3.7 kW and design capacity 22.36 CFM to meet the compressed air requirement of processes. As advised, the unit reduced the set operating pressure of the air compressor from 6 bar (Unload) to 5 bar (Load), as the required pressure of the processes is 5 bar. At no cost, this measure is saving about 718 kWh of electricity annually, equivalent to nearly INR 5000.

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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