3.5% reduction in energy bill of a forging MSME unit through Energy Efficiency Measures

Background

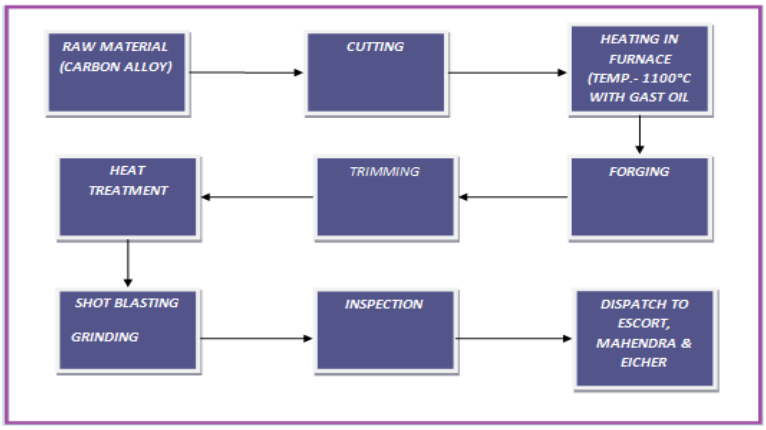
Faridabad is a mixed cluster in Haryana having over 12000 MSMEs majorly manufacturing various kinds of automobile parts, sheet metal components and fabrics. There are majorly 15 industrial segments in the cluster with a high range of products from soaps to tractors.

Unit Profile

M/s ABC is an MSME unit engaged in manufacturing of forged auto components producing about 1000 tpa. Total Energy bill of the unit was Rs.406 lakh per annum which was around 15% of total turnover. About 79.5% of the unit's energy bill was on account of Piped Natural Gas, 12.2% accounted for Grid electricity and remaining 8.3% accounted for Diesel-DG.

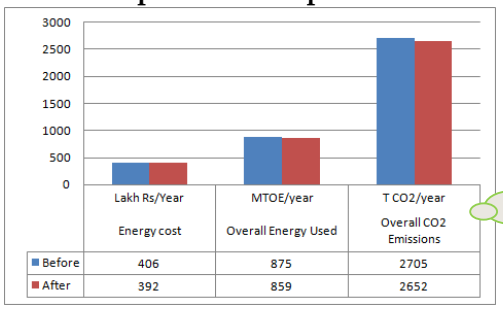
Process description

The manufacturing process involves the procurement of raw materials from different sources followed by their cutting into pieces. The pieces are then fed into the furnace for forging at a temperature of 1100°C. This forge material is trimmed for Smoothness and then hardening is done in the furnace at 900-925°C. Hard material is shot blasted, then grinding and dispatch to Escort, Eicher and Mahindra & Mahindra.



Piped natural Gas and Grid Electricity were used to operate major energy consuming equipments in the unit i.e. hammers, shearing machines and other utilities i.e. pumps, motors associated with equipments, and lighting.

Overall Impact - Post implementation



	Lakh Rs/Year Energy cost	MTOE/year Overall Energy Used	T CO2/year Overall CO2 Emissions
Before	406	875	2705
After	392	859	2652

Overall Impact

3.5% reduction in Total Energy bill (i.e. savings of INR 13.6 lakh p.a.) Simple payback of 8 months

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 (BEE).

INTERVENTIONS

Reduction in Opening losses of Furnace-1

Baseline Scenario

The air to furnace was directly fed from the ambient surroundings of furnace which was in the range of 37^{0}C at the time of measurement. It will vary as per the season and numbers of furnaces are in operation. The avergae opening area of the furnace was around 0.27 m^2 (for material feeding and material removal) and the respective opening losses were at 13%. The average operating efficiency of furnace is around 33% which is low resulting from large amount of heat loss from the openings.

Recommendation

The unit was advised to install doors on both openings to reduce the opening area to 80%.

Implemented Scenario

Based on the project's recommendation, the unit installed doors on both openings.

Newly installed doors loose 3600 kg of fuel per annum.

The Investment of Rs.1 lakh made by the unit has resulted in monetary savings in energy cost of Rs.3.6 lakh per year with simple payback period of three months.

Installation of PF controller to improve power factor

The average power factor of the unit was low, at 0.770. As suggested, the unit has installed a PF controller to improve the power factor to about 0.99. This has helped the unit to reduce distribution losses and voltage fluctuation besides avoiding penalty.

Reduction in furnace skin temperature

The average skin temperature measured on furnace was around 118^{0}C. With the suggested recommendation, the unit has insulated the furnace. This has resulted in an annual energy saving of 2600 SCM of fuel, equivalent to about Rs. 99,000 per year with simple payback period of four months.

Support provided under the Project

- Walk Through & Detailed Energy Audit
- Identification of Energy Efficiency Interventions in the unit
- Finalization of the specifications for the Energy Efficiency Interventions
- Identification of technology providers/vendors
- Facilitation for an interactions between the unit and technology providers;
- Technical support during commissioning
- Monitoring & Verification

For Further Information please contact at

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