7% reduction in energy bill of a forging MSME unit through Energy Efficiency Measures

Background

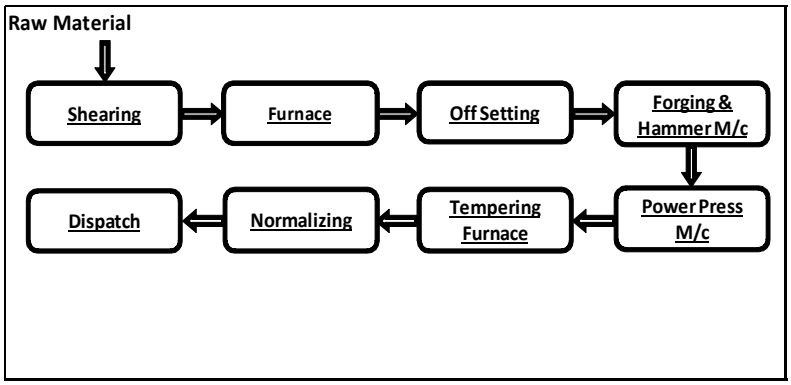
Faridabad is a mixed cluster in Haryana having over 12000 MSMEs majorily manufacturing various kinds of automobile parts, sheet metal components and fabrics. There are majorly 15 industrial segments in the cluster with a high range of products from soaps to tractors.

Unit Profile

M/s ABC is an MSME unit engaged in manufacturing of forged components i.e. carbon steel forged flanges, gear blanks and suspension components. Total Energy bill of the unit was Rs.117.7 lakh per annum which was around 6% of total turnover. About 72% of the unit's energy bill was on account of Grid electricty and remaining 28% accounted for Diesel-DG.

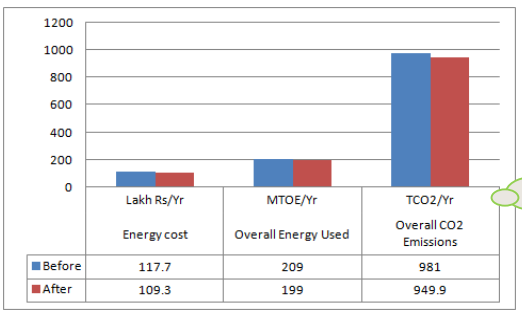
Process description

The manufacturing process involves the procurment of raw material in the shape of rounds of various types of steel as per the specification given by customer. The raw material is sized in the shearing machine or band saw machine. The sized material is heat treated in the induction heater furnace. The forging Hammer shapes the hot piece. The tempering furnace brings the piece to the required hardness. Finally Normalizing operation is done to relieve the stresses.



Diesel and Grid Electricity were used to operate major energy consuming equipments in the unit i.e. band saw, furnace, hammer, power press and other utilities i.e. pumps, motors associated with equipments, and lighting.

Overall Impact - Post implementation



Overall Impact

7% reduction in Total Energy bill (i.e. savings of INR 8 lakh p.a.) Simple payback of 16 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 Skin Loss in Hardening Furnace

Baseline Scenario

The temperature of the walls of hardening furnace was high as 96^{0}C which was quite higher & resulting in heat loss from the hardening furnace. The average heat loss from the furnace surface was 38310 kcal/hr with the fuel consumption of 4 kg/hr. The total wall area of the surface was around 72 m^2. Inadequate insulation on the furnace walls leading to high skin loss and poor performance of the furnace.

Recommendation

The unit was advised to provide refractory for the furnace to reduce the heat loss from the skin.

Implemented Scenario

Based on the project's recommendation, the unit provided refractory for the furnace .

Newly installed refractory allows the heat loss of 14900 kcal/hr.

The Investment of Rs.5.4 lakh made by the unit has resulted in monetary savings in energy cost of Rs.3 lakh per year with simple payback period of 24 months.

Installation of APFC with capacitor bank to improve power factor

The average power factor of the unit was low, at 0.730. As suggested, the unit has installed a fixed capacitor bank along with an APFC to improve the power factor to about 1.00. This has helped the unit to reduce distribution losses and voltage fluctuation besides avoiding penalty.

Reduction in Heat loss due in Normalizing Furnace

The average heat loss due to the opening was 19344 kcal/hr. With the suggested recommendation, the unit reduced the opening area to minimize the heat loss to 0.7%. This has resulted in an annual energy saving of 4435 kg of fuel, equivalent to about Rs. 2.1 lakh per year with simple payback period of 3 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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