45% reduction in energy bill of a automobile components MSME unit through Energy Efficiency Measures

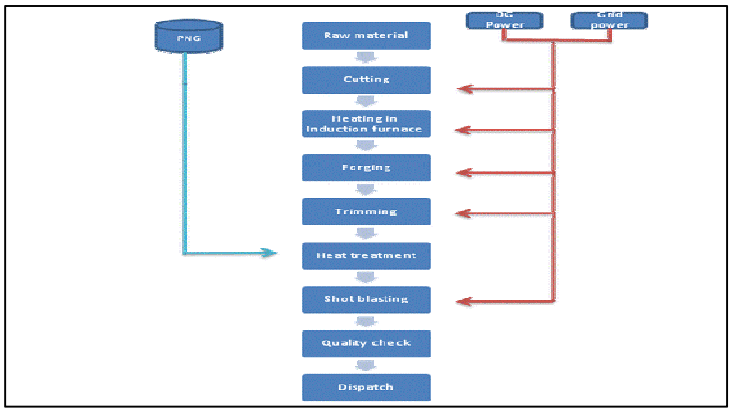
Background

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 a MSME unit engaged in manufacturing of automobile components producing about 2500 tpa. Total Energy bill of the unit was Rs.358 lakh per annum which was around 13% of total turnover. About 81% of the unit's energy bill was on account of Piped Natural Gas, 12% accounted for Grid electricity and remaining 7% accounted for HSD-DG.

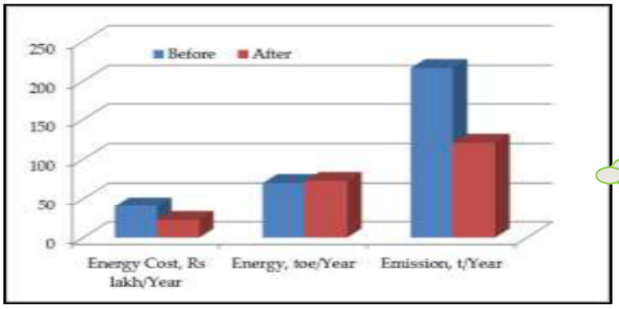
Process description



The manufacturing process involves the cutting of raw material to required dimensions by cutting and shearing machine. The cut stock is then heated in the induction heaters to raise its temperature from ambient temperature to forging temperature 1100 Deg C. The unit was previously using PNG fired forging furnaces (4 Nos); which have now been converted to induction heating. There were 2 induction heaters installed at the time of detailed energy audit and 1 more was under installation. The heated pieces are then forged with the help of multiple electrical hammers to shape the components as per the requirement and excess flash metal is trimmed in a shearing machine.The trimmed forged piece is being heated in the heat treatment furnace (PNG fired) in order to relieve stresses in the components. Finally it is being shot blasted or grinded as per the customer's requirement and dispatched after inspection.

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

Overall Impact - Post implementation



Overall Impact

45% reduction in Total Energy bill (i.e. savings of INR 27 lakh p.a.) Simple payback of 3 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

Performance optimization of Induction Furnace

Baseline Scenario

Specific energy consumption of induction furnace #1 150 kW was 0.97 kWh/kg which was higher than ideal specific energy consumption of this type of induction furnaces which was around 0.45-0.5 kWh/kg. High specific energy consumption for Induction heaters were due to lower productivity from induction furnace, bigger size of coil used for smaller diameter of pieces to be heated and stoppage or breakdown in hammer which results in wastage of heat and reheating of the pieces. Power factor on induction furnace 2 (200kW) is 0.79 which is low due to inappropriate size of induction coil for material coil to be heated

Recommendation
The unit was advised to use appropriate size of induction coil for material to be heated.

Implemented Scenario

Based on the project's recommendation, the unit installed appropriate size of induction coil.

Newly installed system consumes 0.7 kWh per kg of fuel.

The Investment of Rs.1.2 lakh made by the unit has resulted in monetary savings in energy cost of Rs.14 lakh per year with simple payback period of one months.

Leakage correction on compressed air network

The average leakage quantity detected was 0.203 Nm3/min. As suggested, the unit has changed the necessary joints/bends/valves to reduce air leakage. This has helped the unit to reduce the overall energy consumption.

Performance improvement of heat treatment furnace

Heat loss was observed at the entry and exit doors. With the suggested recommendation, the unit has replaced existing doors by proper designed casted and insulated doors. This has resulted in an annual energy saving of 8485 SCM of fuel, equivalent to about Rs. 3 lakh per year with simple payback period of 2 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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