

12% reduction in energy bill of a forging MSME unit through Energy Efficiency Measures

Background

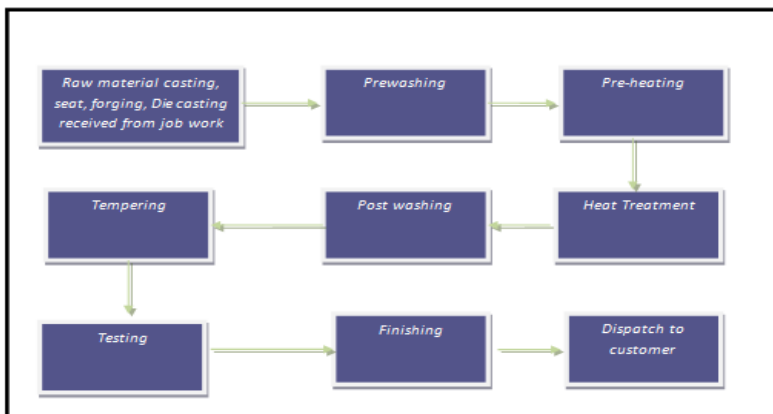
Faridabad is a mixed cluster in Haryana having over 12000 MSMEs majorly manufacturing various kinds of automobile parts, sheet metal components and fabrics. There are majorly 15 industrial segments in the cluster with a high range of products from soaps to tractors.

Unit Profile

M/s ABC is a MSME unit engaged in manufacturing of heat treatment and forging components producing about 1300 tpa. Total Energy bill of the unit was Rs. 147 lakh per annum which was around 9% of total turnover. About 62% of the unit's energy bill was on account of Grid Electricity and remaining 38% accounted for Diesel-DG.

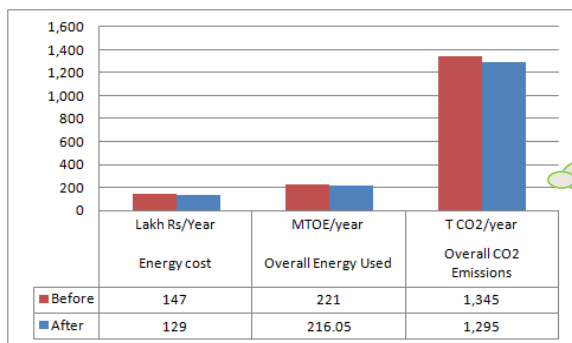
Process description

The manufacturing process involves the receiving of raw material as forged parts, die casted parts for the purpose of heat treatment. The raw material is pre washed by water at 60C to remove dust particles from the components. The raw materials are pre heated in the tempering furnace itself to be fed to quenching furnace. The raw materials are then passed through quenching furnaces where four processes of carburizing, nitriding, hardening and quenching are done. The heat treated products are allowed to pass through water to remove excess oil sticking to the pieces. The pieces are sent to tempering furnace where there are further heat treated to get desired properties. The pieces are finally sent tested at different parameters and finished using bench grinder and shot blasting machine and finally dispatched.



Diesel and Grid Electricity were used to operate major energy consuming equipments in the unit i.e. furnaces and other utilities i.e. shot blasting machines, pumps, motors associated with and other machines, and lighting.

Overall Impact - Post implementation



Overall Impact
 12% reduction in Total Energy bill (i.e. savings of INR 17 lakh p.a.) Simple payback of 14 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 CO₂. This project is being co-implemented by Small Industries Development Bank of India (SIDBI) and Bureau of Energy Efficiency (BEE).

INTERVENTIONS

Replacement of the Compressors with Single Screw Compressors

Baseline Scenario

Free air delivery test of both the compressors was done. The SEC of #1 compressor was found out to be 0.55 kW/CFM, for #2 compressor it was around 0.22 kW/CFM and for #3 compressor SEC was 0.32 kW/SCM and the electricity consumption by compressors was 42,155 kWh, 39,204 kWh and 81,359 kWh per annum with the average power consumption of 11.71 kW, 10.89 kW and 22.6 kW respectively. High SEC results into high electricity consumption and poor efficiency of the compressor.

Recommendation

The unit was advised to replace the #1 reciprocating compressor by a single big screw compressor with #2 compressor as a stand by.

Implemented Scenario

Based on the project's recommendation, the unit replaced #1 reciprocating compressor by screw compressor.

Newly installed compressor consumes 28,495 kWh of electricity per annum.

The Investment of Rs.13.6 lakh made by the unit has resulted in monetary savings in energy cost of Rs.4.8 lakh per year with simple payback period of 34 months.

Installation of capacitor bank to improve power factor

The average power factor of the unit was low, at 0.840. As suggested, the unit has installed an additional capacitor bank to improve the power factor to about 0.99. This has helped the unit to reduce distribution losses and voltage fluctuation besides avoiding penalty.

Replacement of Window AC with Star Rated AC

The unit had 1.5 ton window AC in control room having SEC 1.05 kW/Ton. With the suggested recommendation, the unit has replaced window AC with 5 star rated AC. This has resulted in an annual energy saving of 1620 kWh of electricity, equivalent to about Rs. 15,000 per year with simple payback period of 25 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

Disclaimer: This case study has been compiled by DESL on behalf of SIDBI under WB GEF Project. While every effort has been made to avoid any mistakes or omissions, any agency would not be in any way liable to any person by reason of any mistake/ omission in the publication.

For Further Information please contact at

Energy Efficiency Centre, Small Industries Development Bank of India (SIDBI), Ground Floor, E-1, Videocon Tower, Jhandewalan Extension, Rani Jhansi Road, New Delhi-110055, India, Ph. 011 23682473-77, www.sidbi.in

