

MSME casting unit cuts energy bill by 26% through energy efficiency measures – recovers investment in less than 2 years!

Background

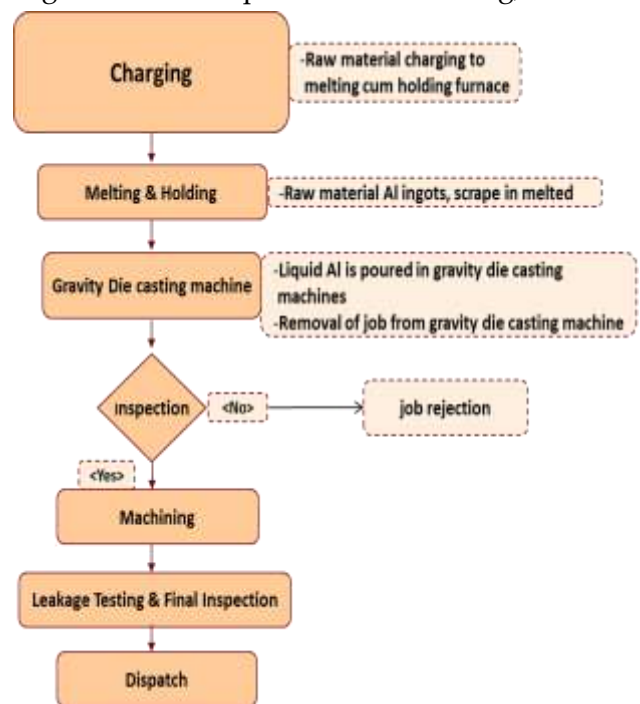
Pune, in Maharashtra, is a forging industry cluster. Large-scale units account for about 65–70% of the cluster’s forging production, while MSMEs account for the remaining 30–35%. There are over 50 MSMEs producing forged components, with 20 heat treatment MSMEs functioning as their vendors. The production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

Unit profile

M/s P22 is an MSME unit that manufactures aluminium castings for auto components like housing, air manifolds, elbows, and so on, producing about 142 tpa. The annual energy bill of the unit was INR 39 lakhs, which was around 16% of total turnover. The annual energy consumption was around 53 tonnes of oil equivalent (toe), of which furnace oil (FO) accounted for 51% (27 toe) and grid electricity 49% (26 toe).

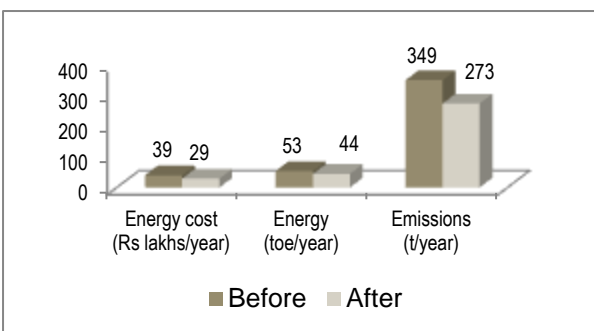
Process description

Aluminium ingots are charged into an FO-fired melting furnace, from which the molten aluminium is drawn into an electrical holding furnace, and then poured into a gravity die casting machine to make the castings. The castings are then machined as per specifications to give the final products.



The major energy consuming equipments used were two FO-fired melting furnaces, two electrical holding furnaces, and electrical motors associated with process equipment such as air compressor, pumps, etc.

Overall Impact: post- implementation



Overall Impact
 26% reduction in total energy bill (i.e. annual savings of INR 10 lakhs) with a simple payback of 1.6 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 all old air compressors with new energy efficient air compressor

Baseline Scenario

The unit was operating three reciprocating air compressors of 7.5 kW rating, having design capacities of 35 CFM, 35 CFM and 27 CFM. These were running for 22 hours a day.



Recommendation

The unit was advised to replace the existing air compressors with a single energy efficient screw air compressor of 40 HP rating and capacity 203 CFM.

Implemented Scenario

As advised, the unit replaced the three existing air compressors with a single energy efficient inverter type screw air compressor of 40 HP rating and capacity 203 CFM.



This investment of INR 10.9 lakhs is saving 71,878 kWh of electricity annually, equivalent to INR 6 lakhs. The simple payback period is 1.8 years.

Improvement of power factor to unity

The average power factor was 0.88. As advised, the unit installed appropriate capacitors to maintain the PF at unity. This investment of INR 3.9 lakhs is saving electricity worth INR 2.1 lakhs annually. The simple payback period is 2 years.

Relining of melting furnace

The unit's FO-fired melting furnace was low in efficiency due to high surface heat losses. As advised, the unit relined the furnace to minimize surface heat losses and also improve the working atmosphere in the vicinity of the furnace. This investment of INR 1.1 lakhs is saving about 2702 litres of FO annually, equivalent to INR 1.4 lakhs. The simple payback period is 0.8 year.

Applying insulation over the holding furnace

The unit's electrical holding furnace was open at its top where loading/unloading took place, resulting in high radiation losses. As advised, the unit provided insulation (lid) over the opening of the furnace to curtail radiation losses. This investment of INR 0.1 lakh is saving 5015 kWh of electricity annually, equivalent to INR 0.4 lakh. The simple payback period is 3 months.

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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