FIVE FORGING UNITS IN PUNE, PF02–PF06, ADOPT ENERGY CONSERVATION MEASURES

Tags	
Sub-sector:	Forging
Location:	Pune
Partners:	World Bank-GEF, SIDBI, BEE, AIFI, SB Engineers, TERI
Year:	2013

Background

One of the largest forging clusters in India is located in Pune. As reported earlier, TERI studied a number of MSME units in this cluster under the GEF–World Bank project titled 'Financing energy efficiency at MSMEs' being co-implemented by SIDBI and BEE, and identified specific energy conservation measures (ECMs) that could be adopted by the units. A number of units have since implemented some of the recommended ECMs [please see Sameeeksha Newsletters: 4(4), December 2013; 5(2), June 2014]. This case study summarizes how five MSME units in the Pune cluster have benefited by implementing the ECMs recommended for their compressed air systems.

Intervention

The five units, PF02 to PF06, have each replaced their existing low-efficiency air compressors with energy efficient air compressor systems. In each case, at the unit's request, TERI helped in estimating energy savings potential and measures to tap the potential savings. TERI also assisted in identifying vendors for procuring the necessary machinery/ equipment, facilitated interactions between the units and the vendors, finalized technology specifications, and provided technical support as and when required by the units during commissioning of the new compressed air system systems.

Investments, energy savings and other benefits

Table 1 summarizes the new energy efficient air compression systems installed in the five units, and their benefits in terms of energy and cost savings. The simple payback period on the investments ranges from 1.7 years to about 4 years. Figure 1 illustrates the extent of energy savings brought about by the adopted ECMs.

BEFORE Replacement of reciprocating air compressor with inverter type screw air compressor AFTER

Table 1. Implemented ECMs in the five forging units, and benefits

Unit	ECM	Energy savings (kWh/year)	Investment (Rs. Lakh)	Savings (Rs Lakh)	Simple payback (years)
PF02	Replacement of GA-15 air compressor with new inverter type (VFD) screw air compressor	31,645	6.0	2.3	2.6
PF03	Replacement of all existing reciprocating air compressors with new inverter type (VFD) screw air compressors	71,879	10.9	6.0	1.8
PF04	Replacement of CPC-50 screw air compressor with new inverter type air compressor	28,361	8.2	2.5	3.3
PF05	Replacement of all existing reciprocating air compressors with new screw air compressor	9,083	3.6	0.9	3.9
PF06	Replacement of existing reciprocating air compressor with new screw air compressor	105,835	13.5	8.1	1.7
Total		**246,803**	**42.2**	**19.8**	

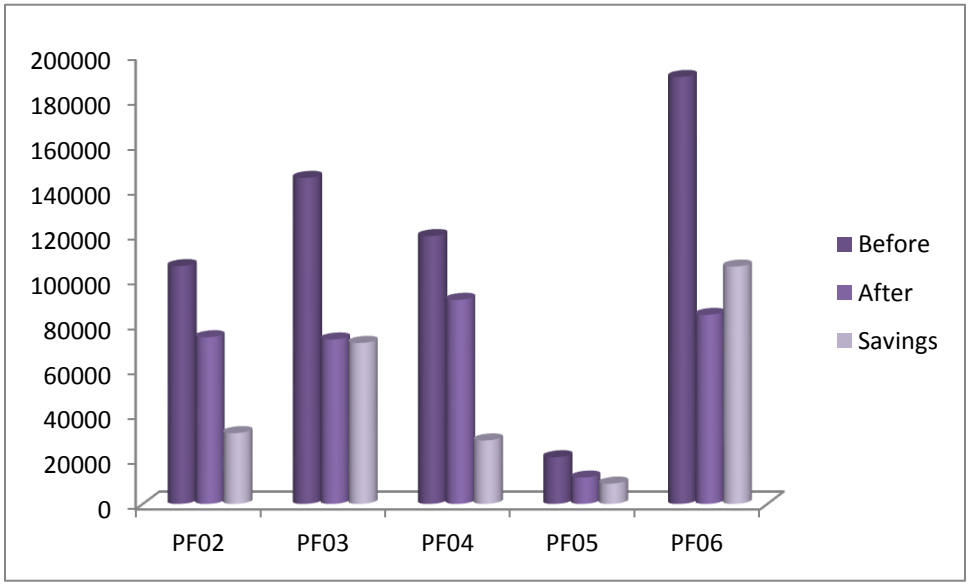

Figure 1. Energy savings in five forging units from ECMs

Key lessons

The experience of the TERI team while working with the unit—during the detailed energy audit as well as during implementation of the ECMs—clearly underlines the lesson that the key to successful implementation of an ECM lies in creating and strengthening understanding of how and why the ECM will bring benefits—not only at the level of the entrepreneur and/or top management, but also at the level of the operators and other factory floor personnel. Only through this understanding is the entrepreneur/management convinced to adopt the ECM and sustain it in the long term. Equally important, it is only through this understanding that operators and other factory floor personnel adopt proper operating practices so that the ECM yields the maximum benefits.

For instance, during the energy audit, the TERI team conducted a thermography profile of the heat treatment furnace-1 which revealed the high levels of heat loss from the surface, evidenced by spots at temperatures as high as 100–120 °C. The results were shared with the entrepreneur while explaining the proposed ECM (veneering technology), and helped him take a swift decision to adopt the ECM. Indeed, so impressed was the entrepreneur that, after the veneer modules were applied, he insisted on another thermography profile being conducted on the furnace. This was duly done—revealing, to the entrepreneur's satisfaction, that the earlier 'hot spots' on the surface' had now dropped to 70–80 °C! At the factory floor level, the TERI team made the plant staff aware of how they could achieve considerable fuel savings just by improving their operating practices—for instance, by maintaining the proper air–fuel NG ratio at the furnace burners. Earlier, the operators would increase the gas flow without adjusting airflow, and often increased flame length for faster heating. Now, they have learned how to optimize the air–fuel mixture (and thereby save NG) through observation of the flame colour and flame length.