

A FOUNDRY UNIT IN RAJKOT, RF004, IMPLEMENTS ENERGY CONSERVATION MEASURES

Tags

Sub-sector: Foundry

Location: Rajkot

Partners: SDC, TERI, Rajkot Engineering Association (REA)

Year: 2015

Background

The Rajkot engineering cluster has around 700 grey iron foundry units (about 10 large-scale, 50 medium-scale, and the remaining units in small & micro category). The cluster produces about 1500 tonnes of castings daily (about 0.46 million tonnes per annum) and provides direct employment to 30,000 people. The estimated annual turnover of the foundry cluster is about 4000 crore rupees. Under the TERI–SDC project titled ‘Scaling-up Energy Efficiency in Small Enterprises (ESEE), detailed energy audits (DEAs) were conducted on a number of foundry units in Rajkot to help identify energy conservation measures (ECMs) that could be adopted by the units. This case study summarizes how a foundry unit in the Rajkot foundry cluster has benefited by implementing some of the ECMs recommended by TERI.

Intervention

RF004 is a foundry unit set up in 2001, manufacturing cast iron components such as pump and motor bodies. The total liquid melting production of the unit during 2014–15 was 1018 tonnes while dispatched production was 682 tonnes. The total energy consumption during 2014–15 was 73.5 tonnes of oil equivalent (toe). Electricity is the main source of energy. TERI conducted a DEA on the unit in January 2015, based on which it identified eight ECMs for implementation by the unit, which would reduce annual energy consumption by about 2.2 toe, equivalent to nearly 3 lakh rupees. The unit has already implemented three of the ECMs, as summarized below. Implementation of other ECMs is under way.

Investments, energy savings and other benefits

Optimization of compressed air generation pressure

The unit uses one screw air compressor to meet the compressed air requirements of the plant. The DEA found that the operating pressure of the air compressor was set at higher levels (7.8 bar unload, 7.5 bar load) than the 6.5 bar pressure required for various processes. As recommended, the unit has reset the operating pressure level to 7 bar.

This no-cost measure is saving about 1217 kWh of electricity annually, equivalent to about 8000 rupees.

Replacement of existing raw water pump for coil cooling of induction furnace with energy efficient pump

The unit uses a raw water pump to circulate water for coil cooling of the 350 kW induction furnace. The DEA revealed that the efficiency of the existing pump was very low, at 30%. As recommended, the existing pump has been replaced with an energy efficient pump at an investment of 0.7 lakh rupees. This ECM is saving 8260 kWh (0.7 toe) annually, equivalent to 0.72 lakh rupees. The simple payback period is one year.

Energy efficient lighting

The DEA revealed that the unit was using mixed lighting for illuminating the plant, including fluorescent tube lights (FTLs), mercury vapour lamps (MVLs), compact fluorescent lamps (CFLs), and metal halide lamps (MHLs). As recommended, the unit has replaced all the 52W copper ballast FTLs with 20W LED tube-lights; 150W MHLs with 80W induction lamps; and 250W MVLs with 150W induction lamps. This ECM is saving about 3108 kWh (0.27 toe) annually, equivalent to 0.2 lakh rupees. The investment required was 0.96 lakh rupees, implying a simple payback period of 4.7 years.



(L) Existing lighting; (R) energy efficient lighting

ECMs implemented and estimated benefits

ECM	Annual energy saving		Cost saving (Rs lakh/year)	Investment (Rs lakh)	Payback (years)
	Electricity (kWh)	toe			
Optimization of compressed air generation pressure	1217	–	0.1	–	Immediate
Replacement of existing raw water pump with energy efficient pump	8260	0.7	0.7	0.7	1.0
Energy efficient lighting	3108	0.3	0.2	0.9	4.7
Total	12585	1.0	1.0	1.6	