

## A FOUNDRY UNIT IN RAJKOT, RF005, 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**

RF005 is a foundry unit set up in 1996, manufacturing grey iron and spheroidal graphite (SG) castings for auto components, elevators, textile machinery and engineering industry. The total production of the unit during 2014–15 was about 477 tonnes. The total energy consumption during 2014–15 was 258 tonnes of oil equivalent (toe). Electricity and furnace oil (FO) are the main sources of energy. TERI conducted a DEA on the unit in April 2015, based on which it identified five ECMs for implementation by the unit. The unit has already implemented two of the ECMs, as summarized below.

### **Investments, energy savings and other benefits**

#### *Relining of oil-fired melting furnace to reduce the surface heat losses*

The unit uses an FO-fired tilting bell type melting furnace. The DEA revealed that the refractory lining of this furnace was damaged, and also, that its average surface temperature was 180° C — an indicator of high heat losses and low efficiency. As recommended, the unit has relined the furnace to curtail heat losses, thereby not only reducing specific energy consumption but also improving the working conditions near the furnace. Against an investment of one lakh rupees, this ECM is saving about 1396

litres of FO (1.4 toe) annually, equivalent to 0.56 lakh rupees. The simple payback period is 1.8 years.



(L) Damaged lining in existing FO-fired furnace; (R) furnace after relining

### *Optimization of compressed air generation pressure*

The DEA found that the operating pressure of the air compressor was set at higher levels (7 bar unload, 5 bar load) than the 6 bar pressure required for various processes. As recommended, the unit has reset the operating pressure level to 6 bar. This no-cost measure is saving about 678 kWh of electricity annually, equivalent to 5000 rupees.

### **ECMs implemented and estimated benefits**

ECM	Annual energy saving		Cost saving (Rs lakh/year)	Investment (Rs lakh)	Payback (years)
	Fuel units	toe			
<b>Relining of oil- fired melting furnace</b>	1396 litres FO	–	0.56	1.0	1.8
<b>Optimization of compressed air generation pressure</b>	678 kWh	–	0.05	–	Immediate
<b>Total</b>			<b>0.61</b>	<b>1.0</b>	