



**SGP** The GEF  
Small Grants  
Programme



# LOCAL OWNERSHIPS ENERGY EFFICIENCY MEASURES IN FOUNDRY UNITS



**CEE**  
Centre for Environment Education





## Project Background

The Institute of Indian Foundrymen (IIF) is a registered Society having approximately 3,000 members drawn from cross sections of foundrymen. The institute is a member of the Engineering Export Promotion Council (EEPC) India, Confederation of Indian Industries (CII) and World Foundry Organisation.

The Institute is primarily engaged in training, education and other promotional activities servicing the Indian foundry/metal casting industry through its offices across India by undertaking the following actions:

- Publishing monthly technical journal covering various aspects of the foundry industry;
- Conducting technical seminars, training programs and examinations in the foundry technology recognized by AICTE, Government of India;
- Collection and dissemination of information on energy efficiency, reduction in pollutants and other environmental issues affecting industries; and
- Conducting Annual Foundry Congress and International Foundry Exhibition showcasing latest developments in greener, energy efficient technologies by promoting use of energy efficient processes and thereby promoting energy conservation, etc.

## Name of the Organisation

The Institute of Indian Foundrymen (IIF), New Delhi

## Beneficiaries

Juneja Iron and Steels, Sharp Chucks, Laxmi Auto, RG Industries and Ramco Industries, Hindmurti

## SGP Grant

Rs.19,72,500 – (Rs.12,12,400 Received amount till date)

## Co-Financing

Rs.13,50,000 - Industry for taking up measures  
Rs. 3,50,000 – Local NGOs  
Rs. 3,50,000 – Cash contribution for tool-kit publication

## Geographical Areas

The districts of Jalandhar and Ludhiana in the State of Punjab

## Project Time Period

June 2007 to March 2012

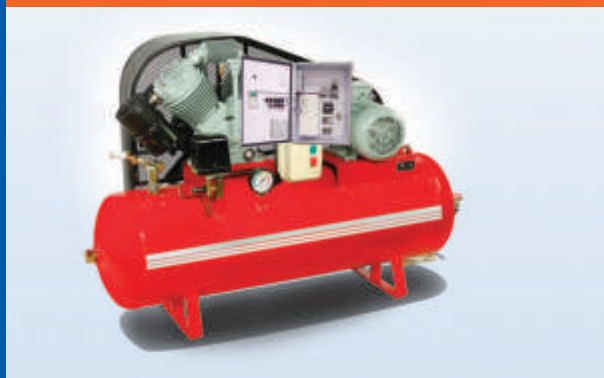
## Project Partners

SME Foundries in Jalandhar  
Petroleum Conservation Research Association (PCRA) (Under Ministry of Petroleum & Natural Gas)

Keeping in view their objectives, they approached the GEF UNDP SGP to seek a mutual partnership in taking forward energy efficient methods through focused energy audits. Several rounds of discussions led to this project.

There are about 4,500 units across India out of which 90% are SMEs and approximately 2,500-3,000 units are using cupolas. Therefore, there was a large potential to improve the energy efficiency and cut down GHG emissions by adopting energy efficient cupolas, by proper measurements and controls of various parameters and demonstrating opportunities in various operational areas of foundries, like proper sizing of equipment and reduction in rejections and rework. These result in interventions that can be replicated in other clusters.

This GEF SGP project has been undertaken by the Institute in order to develop and demonstrate processes and resource materials by analyzing the potential of energy savings in various operational areas of foundries by detailed energy audits highlighting the scope and pay-back period on investments. These were recommended in areas of melting and operation of auxiliary equipment used in foundries, such as cooling towers, compressors, pumps, motors, induction



1. Conduct awareness programmes through seminars/workshops to sensitize the MSME units about potential of savings in various operational areas.
2. To bring out publications on topics such as efficiency in induction melting, ready reckoner on cupola and tool kits giving specific examples of possibilities, with facts and figures.
3. To conduct detailed energy audits in 5-7 units and to prepare detailed report giving specific recommendations on energy savings with investments required and return on investments.
4. Analyse and review the operation of operating cupolas in 5-7 units. Develop energy efficient cupolas for adoption by the small and medium units based on actual case, suiting the units' needs and demonstrate the outcome after installation of modified cupola furnace in terms of energy saving and reduction in carbon dioxide emission. Also highlight possible potential areas, with facts and figures, by detailed energy audits for consideration by MSME foundries in the districts of Jalandhar and Ludhiana and demonstrate reduction in consumption of coke and GHG for adoption by these units.



melting etc. The operational areas of foundries where recommendations were made are - inefficient use and selection of cupola and other equipment to improve the processes and design modifications and propagate the possibility of saving 7-10% of energy during melting and also by suggesting modifications on existing cupola at nominal cost thereby reducing the consumption of met-coke and GHG and improving the bottom line.

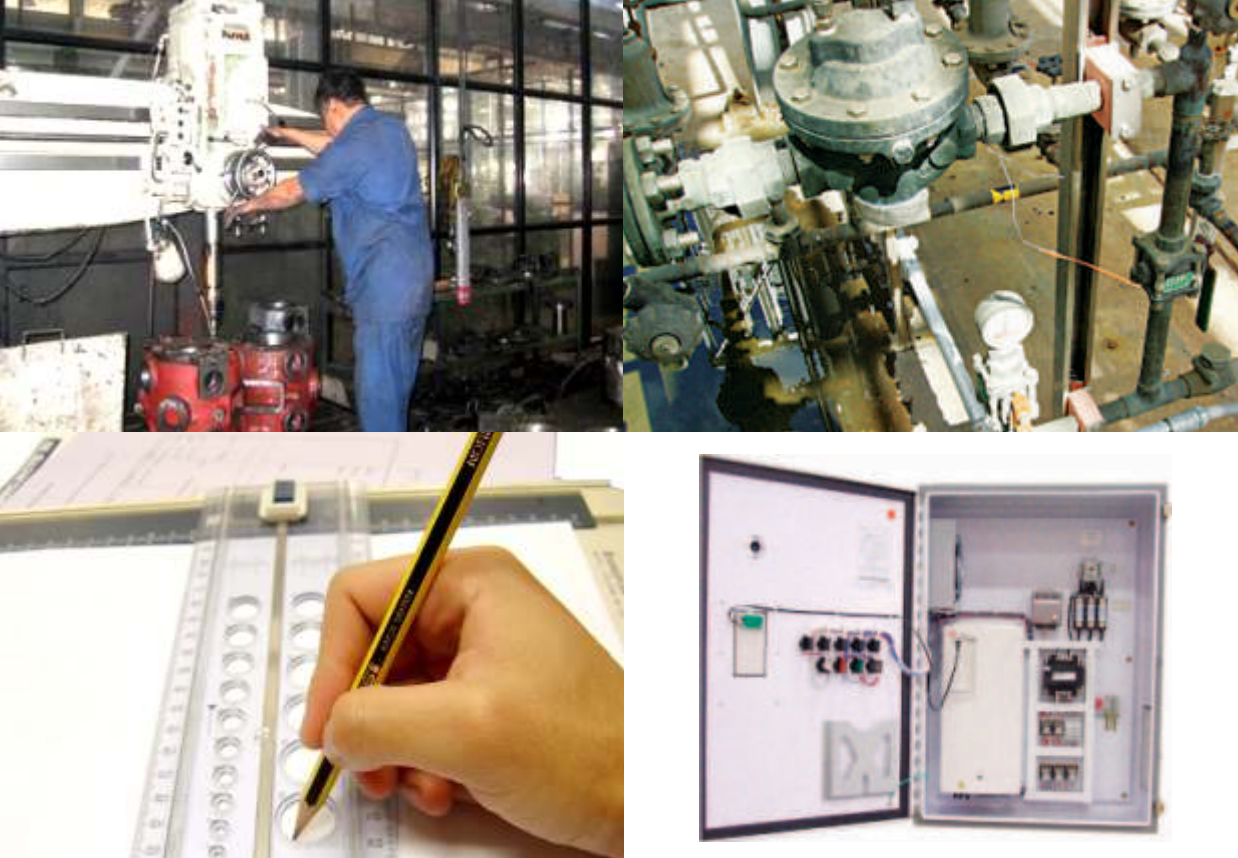
## Project Aims

The Institute, through this project, aims to demonstrate reduction in GHG emissions by using energy-efficient design or cupolas and by adopting recommended measures in various operational areas of foundries, as mentioned above, for replication by other members.

The intent of the project is to systematically take forward the following steps:







## Project Strategy

### The project has three phased strategy

- Conduct awareness programmes to sensitize the SME foundry units about possible potential for improved efficiency in various operational areas through meetings and workshops based in the cities.
- Identify the group of small scale enterprises in the foundry industry who were willing to take up the detailed energy audits. The identification was carried out with the help of meetings, seminars and workshops and one to one meetings. Each detailed energy audit was carried out with the help of experts and costs were shared by GEF SGP and the respective enterprises.
- Encourage the appropriate technology-mix in the energy efficiency measures, i.e. detailed design of energy efficient cupolas. And highlight and recommend possible improvements in various operational areas by adopting more efficient equipment and by proper measurements and controls giving break up of pay-back period of investments.
- Develop a toolkit on the opportunities for energy efficiency in the Foundry industry.

### Progress in Project Activities

**Identification of small scale enterprises:** Two workshops and three seminars were conducted between July '08 and March '10. More than 10 meetings were held with potential Foundry units for project implementation. The organization also observed the National Energy Conservation Day in Delhi on 14th Dec '08. A program on energy efficiency in foundry cluster in Jalandhar was conducted on 4th and 5th of July '08. Identification of nearly 40 potential and interested foundry units towards training for energy efficient cupola was done with the help of these seminars and meetings. Various foundry units were contacted in Jalandhar and Ludhiana and based on the interest shown, the ones selected for the interventions are Juneja Iron & Steel, Laxmi Auto, Sharp Chucks, Ramco, RG Industries and Hindmurti till date.

**Energy Audits:** Detailed energy audits were done in association with Petroleum Conservation Research Association, in three foundry units namely Laxmi Auto Industries and Juneja Iron & Steel Company and Sharp Chucks. A walk-in audit was also done in Varindra. A detailed report has been submitted to the respective foundries for implementation of the measures.

Besides this, Ramco, RG Industries, Hindmurti and Juneja Iron & Steel had shown interest in changing over to better options for melting instead of conventional cupola. The detailed review was carried out of their existing melting furnaces and accordingly detailed engineering design for DBC with fabrication drawings were made and submitted to these units.

Ramco and Hindmurti Industries have already installed and commissioned cupolas as per modified design and these have been successfully commissioned resulting in improved efficiency and reduction in CO2 emissions as per reports submitted already.

## Project Benefits and Impacts

- Improved awareness among nearly 40 foundry units consisting of small and medium scale industries through seminars and workshops so as to propagate the ideas and actions leading to energy conservation and hence mitigate climate change.
- Improved energy efficiency in foundry operations of the units, like Laxmi Auto, Ramco, Hindmurti, which can be replicated by the foundry cluster so as to lead to reduction in GHG emissions.
- As an outcome of the project, the Institute worked on three publications that have since been published and released:
- Ready Reckoner on Cupola on 3rd Feb'10.
- Energy Conservation Opportunities in Foundries on 10 Feb '11.
- Induction Furnace on 7th March '11 (Principle, melting practice, energy conservation and safety).
- IIF's Western region has also now undertaken project on energy efficiency.
- Based on the experience and the learning developed during the course of this project, a Toolkit on Energy Conservation Opportunities in Foundry Industry was developed. The toolkit was released by Hon'ble Minister, Mr. Pawan Bansal during the 59th Indian Foundry Congress held at Chandigarh in Feb 2011.

## OUTCOME

- Ramco: Reduction in coke consumption: 10522 Kg/Year; Reduction in CO2 : 29321 Kg/Year**
- Hindmurti: Reduction in Coke consumption: 1,80,000 Kg/PA; Reduction in CO2 : 486514 Kg/PA**
- Laxmi Auto: 45,000 Kwh/PA; CO2 Reduction: 36,900 Kg/PA**

- It is very essential to select the proper type & size of furnaces, auxiliaries and operate & maintain the equipment scientifically with proper measurements and controls that can help in reducing the energy consumption and thereby reducing the carbon emissions and providing better and healthier place for the workmen.
- This toolkit has been developed for the benefit of all stakeholders especially the SMEs using cupolas, other type of furnaces for melting and various energy-intensive auxiliaries and also for best operational practices that are believed will be useful to the practicing foundrymen and will help them to adopt best practices and do their bit in conservation of energy and natural resources. More than 3,000 copies have been distributed during the Indian Foundry Congress held at Chandigarh in Feb 2011.



THE INSTITUTE OF INDIAN FOUNDRYMEN  
Foundry Informatics Centre New Delhi  
**A K Anand, Director**  
67, Institutional Area Tughlakabad, New Delhi-110062  
Tel.: 011-29960601 Fax : 011-29958028  
E-mail : fic@indianfoundry.org

**National Co-ordinator**  
GEF UNDP Small Grants Programme  
Centre for Environment Education, Delhi,  
C-40 South Extension-II, New Delhi-110049,  
Ph.: 011-26262878-80  
Email: prabhjot.sodhi@ceeindia.org  
Website: www.sgpindia.org, www.ceeindia.org