

## **Innovative Clean Air Foundries in India: CTI Achieves another Sustainability Milestone**

**USAID/India's Clean Technology Initiative (CTI) Project**, launched in May 2003, worked with Agra foundry industries to develop a clean air, natural gas-based, cupola furnace that would be affordable for the industry yet protect the environment, public health and historic landmarks. The project demonstrates how the innovative integration of Economic, Engineering and Environmental solutions benefits long-term sustainability.

Air pollution is a significant concern for India's foundry industries. Over the past few years the Supreme Court of India has closed more than one hundred small business foundry industries to stop damage to the environment, public health and protect the Taj Mahal, one of the world's and India's most precious cultural resources.

The foundry production process traditionally uses coal/coke as the primary fuel source which results in high emissions of sulfur oxide (SO<sub>x</sub>) and particulate matter. These emissions cause serious health and environmental concerns and extensive damage to the white marble of the Taj Mahal, potentially resulting in the long-term destruction of this cultural heritage and tourist destination.

As the foundries in Agra worked to find suitable natural-gas based technology, thousands of people awaited a solution that would allow them to return to their jobs. Given the urgency of environmental and economic concerns, CTI was engaged to work closely with industry and industry associations, including Indian and international experts, to identify the best solution based on worldwide practices and technologies. A comprehensive study was conducted of available technologies worldwide seeking those which meet industry performance needs and local regulatory requirements. The comprehensive results of this study indicated potential new solutions that went beyond previous local development efforts of clean air cupola furnaces. The range of potential new solutions instilled confidence in the industry's leaders that an economically and environmentally solution was within reach.

On November 14, 2006, the CTI project achieved an historic milestone with the commissioning of the first environmentally-friendly cokeless cupola, using Taft technology. The first unit successfully produced high-quality, low-cost molten metal efficiently, thus improving the business opportunities for the participating business.

### **Environmental Benefits**

This technology achieves the following environmental benefits:

- 1) The suspended particulate matter (SPM) is now measured at less than 50 mg/m<sup>3</sup> (without the wet cap scrubber) as opposed to 150mg/ m<sup>3</sup> (for Agra and for other areas it is 450mg/ m<sup>3</sup>) for cupola furnace up to 3 TPH capacity. With wet cap, the SPM could be reduced to less than 40 mg/m<sup>3</sup>.
- 2) The Greenhouse Gas SO<sub>x</sub> will drop well below the prescribed limit (50-100 mg/Nm<sup>3</sup>) of 300 mg/Nm<sup>3</sup>.
- 3) Greenhouse Gas CO<sub>2</sub> emissions will be greatly reduced compared to coal/coke-operated furnaces; allowing the opportunity for Clean Development Mechanism (CDM) or "carbon credits<sup>1</sup>."
- 4) With the availability of this technology, the choices of raw material mix are no longer limited to pig iron and cast iron (CI) scrap but now also include steel scrap. The ability to use steel scrap improves the quality of the resulting molten metal and the end product mix and can now be marketed to higher-value markets such as those for auto components etc., In addition this technology also increases the product's recycle/reuse potential, thereby increasing its long-term embedded value after its use.

### **Impact**

The development of environmentally friendly and affordable technology allows for the survival of not only the hundred-plus industries in Agra and the more-than ten thousand workers who have returned to work, but the thousands of foundry industries operating across India, which is a global hub for casting components. They have found a viable option for sustainability that the local businesses across the country can afford to implement improving air quality and working conditions.

---

<sup>1</sup> The Clean Development Mechanism (CDM) is one of the mechanisms under the Kyoto Protocol, an international and legally binding agreement to reduce greenhouse gases emissions world wide. CDM as defined in Article 12 of the Kyoto Protocol provides for Annex I Parties to implement project activities that reduce emissions in non-Annex I Parties, in return for certified emission reductions (CERs). The CERs generated by such project activities can be used by Annex I Parties to help meet their emissions targets under the Protocol. Article 12 also stresses that such projects are to assist the developing country host Parties in achieving sustainable development and in contributing to the ultimate objective of the Convention