Energy Efficiency in Steel Re-Rolling Mills

Millennium Development Goal:
Goal 7 – Ensure Environmental Sustainability

Targets:
Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources

Relevant India Development Goal:
As a signatory to the UN Framework Convention on Climate Change and the Kyoto Protocol, the Government of India supports international efforts in mitigating greenhouse gas emissions. According to the Integrated Energy Policy, India aims to reduce the energy intensity in India by 20 percentage points

Background

Steel production is an energy-intensive process. It takes nearly 56-66 litres of furnace oil (or 226-269 kg of coal) and 165-192 Kilowatt-hour (KWh) of electricity to produce one ton of steel. The production of one ton of crude steel from iron ore generates about 1.2 tons of solid waste and approximately 2.5 tons of carbon dioxide and other pollutants. Among India’s small and medium enterprises (SMEs), there are more than 1,800 steel re-rolling mills (SRRM), a majority (75 percent) of which is small-scale units. The SMEs engaged in steel re-rolling constitute an important link in the overall supply chain of steel, contributing more than 57 percent of steel produced in the country. However, these mills have grown haphazardly, utilizing outdated technologies, and are characterized by high production costs and low investment in upgrading technologies or research and development. The direct energy use in this sector includes fossil fuels (furnace oil, natural gas and coal) and electrical energy is estimated to account for 25-30 percent of the overall production costs.

Objectives

• Increase end-use energy efficiency of steel re-rolling mills sector
• Reduce associated emissions of greenhouse gases from this sector
• Enable the penetration of environmentally-sustainable, energy-efficient technologies to remove barriers in large-scale commercialization of energy-efficient technologies in the sector

Project Information

Area: Environment and Energy

Budget:
Total: US$ 14.03 million
US$ 6.75 million (Global Environment Facility)
US$ 7.28 million (Steel Development Fund, Government of India)

Duration: 2004-2012

Government Counterpart:
Ministry of Steel, Government of India

Implementing Partner(s):
Ministry of Steel, Government of India

Location(s):
Andhra Pradesh, Chhattisgarh, Gujarat, Haryana, Jammu and Kashmir, Karnataka, Kerala, Maharashtra, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal
Results so far

- Identification and popularization of 10 technology packages for intervention in the re-heating furnace and 19 eco-tech options to enable greater energy efficiency in rolling mill processes
- Significant savings through implementation of energy-efficient technologies in 29 SRRM units resulting in savings of 87,819,968 megajoules of energy conserved and reduction of 131,738 tons of carbon dioxide (tCO2). Post commissioning measurements have been conducted in 16 of them. This has resulted in:
  - Saving of 10,077 kilo litres furnace oil
  - 6,345 tons of coal
  - 13,706,205 KWh (units) of electricity
- Close to US$ 7.24 million has been invested in 16 units that undertook energy audits saving close to US$ 9.14 million in fuel costs. This includes private investment of about US$ 5.44 million by SRRMs, GEF funding of US$ 900,000 and government support of US$ 900,000
- National and state recognitions to several model SRRM units for energy efficiency. These include:
  - Rajasthan Energy Conservation Award, 2008-2009: Shree Prithvi steel Rolling Mills, Jaipur
  - Rajasthan Energy Conservation Award, 2009-2010: M/s MPK Steel Pvt. Ltd. Jaipur
  - Energy Conservation Award, 2009 by Puducherry Government: M/s Pulkit Steel Rolling Mills, and
  - National Energy Conservation Award, 2009-2010: Shree Prithvi steel Rolling Mills, Jaipur
- Greater awareness generated through training and capacity building programmes to internalize energy efficiency and conservation measures including:
  - 28 Performance Improvement Trainings (PIT) to enhance the capacities of 500 shop floor and managerial personnel
  - ISO 9001- 14001 to improve quality and environmental improvements completed in 10 units
  - 5S lean management trainings for improvement in work place completed in eight SRRM units and 10 under process
  - Standard Operating Practice (SOP) and Standard Management Practice (SMP) in place in five and in process in 10 other units
  - Electrical energy audits for energy saving and safer practices undertaken in 10 units
  - 68,000 bilingual training manuals for shop-floor and managerial personnel have been developed and distributed to SRRM units
- A range of knowledge products are utilized as awareness building tools including a portal (http://undpggefsteel.gov.in), project information packages, audio visuals and documentaries, newsletters and brochures

Looking to the Future

- Commission 50 SRRM model units with eco-tech packages
- Prepare project process document, video tutorials and case studies for dissemination
- Develop benchmarks through design of experiment for technology packages and eco-tech options
- Capacity building of domestic equipment manufacturers and consultants
- Develop 40 pipeline units (technical assistance is provided to units in making an assessment of energy consumption and potential to save energy) to enable adoption of energy efficiency measures

Last updated: September 2012