‘Supplier database of advanced energy efficient technologies for steel re rolling mills’

1. Background:
The secondary steel sector comprises about 1800 small and medium-scale steel re-rolling mill (SRRM) units. A typical SRRM unit will comprise a re-heating furnace for heating ingot/billet or scrap plate and a rolling mill to give heated ingot/billet the desired shape. Coal/furnace oil is used in re-heating furnace and electricity is used in rolling mill. Energy costs form 30 to 40% of conversion cost\(^1\) in a SRRM.

The United Nations Development Programme (UNDP) with support from Australian aid program (AusAid) and the Ministry of Steel (MoS), Government of India (GoI) is implementing a project titled “Upscaling energy efficient production in small scale steel industry in India” to encourage steel mills to adopt energy efficiency measures. In addition, the project plans to trial advanced energy efficient technologies for steel re rolling mills termed ‘SG technologies’ [Second Generation technologies] in SRRM units. SG technologies are either entirely innovation to the sector such as ‘waste heat based power generation’ or those that are not yet popular in the SRRM sector such as ‘oxygen analysis based VFD controller for re-heating furnace’. However, these energy efficient measures are expected to provide significant potential for energy saving. After two consultations, discussions with experts and field visits, the project has identified following five SG technology measures for implementation in SRRM units.

1. **Power generation through waste heat recovery from flue gas:** Re-heating furnace in SRRM units is equipment used to heat the billet/ingot to rolling temperature of 1200 °C. Fuels burnt in the re-heating furnace generate flue gas at a temperature exceeding 600 to 700 °C in most SRRM units. Some units have provided recuperator that captures heat from flue gases that is used to heat the air and the pre-heated air is supplied for combustion. But, still the temperature of flue gas after recuperator is in the range of 300 to 350 °C. At present this is being released to atmosphere. It is possible to capture this heat for useful purposed. The equipment makes use of heat content in these flue gases to generate power for captive consumption.

\(^1\) Conversion cost: Conversion cost is the total expenditure incurred by SRRM unit for converting raw material (ingot/billet/scrap) into finished product. For SRRM sector, conversion cost varies from Rs. 3,000 to Rs. 5,000 per tonne of finished steel.
2. **Effective furnace atmosphere control through automation:** In most of the SRRM units various parameters of re-heating furnace like temperature in various zones, furnace draft and air fuel ratio is regulated manually. Such manual regulation can be replaced by an integrated automation solution which will ensure optimum air fuel ratio and better control of various operating parameters of re-heating furnace. Automation system will consist of online measuring equipment/devices and controllers for regulation in closed loop through feedback system.

3. **High performing insulation for re-heating furnace:** Currently refractory bricks with high alumina and magnesite bricks backed up by insulation bricks are used as lining material in re-heating furnace. Most of the re-heating furnaces in India operate only for duration of 10 to 12 hours a day. Such intermittent operation lead to high fuel consumption for raising temperature of re-heating furnace to desired level during every cold start. Hence, high performing insulation is being explored to conserve energy consumed in such restarting and also to reduce heat losses through walls of re-heating furnace.

4. **Coal drying using waste heat available in flue gas:** Pulverized coal is used fuel in re-heating furnace in SRRM sector. Moisture content in coal is as high as 25 to 30% in rainy season. Such high moisture content takes away useful heat through ‘latent heat of vapourization’ in re-heating furnace. Hence, drying mechanism is being explored to dry the coal to reduce moisture content by utilizing waste heat available in flue gas.

5. **Energy efficiency in motion control for SRRM:** A typical SRRM unit consist of electrical drives, hydraulic and pneumatic driven equipment. Most of these drives are inefficient and substantial scope exists for improving efficiency of these motion control devices in SRRM sector. Hence innovative options are being explored to enhance efficiency of these motion control devices in SRRM sector.

UNDP intend to strengthen the supply chain of second generation technologies by seeking details from suppliers having ‘ready products', technical know-how and adequate implementation experience for any of the above technology resulting into significant energy efficiency. A format for submitting the details is placed at Annexure – I. The details are being asked for creating database on suppliers of second generation technologies. The profiles will be shared with selected SRRM units who have been selected for implementation of second generation technologies. UNDP reserves the right to compile database as found applicable.

Interested suppliers may send details as per Annexure – I to <steel.india@undp.org>. Last date for receipt of details is 3rd November 2014, 5.30 pm.

The hard copies of the Annexure - I may be sent to the “Programme Officer, Energy & Environment Unit, United Nations Development Programme, 55, Lodi Estate, New Delhi – 110 003”. Please write on envelope “Details of SG technologies under Steel Upscaling Project”
### General details

1. **Name of the supplier (organisation)**

2. **Name of the contact person along with address, email & contact number**

3. **Annual turnover in Rs. Lakh of organisation**

### Technical know how

1. **Name of product**

2. **How does it work?**  
   [Basic operating principle - *Please enclose a brief write up with process description, equipment specification & energy saving potential*]

3. **Details of IPR, if any**

4. **What are the conditions for its functioning?**  
   [Pre-requisites for successful operation of technology -range of operating parameters, capacity, space availability etc.]

### Implementation experience

1. **Where is it implemented?**  
   [Sectors in which technology was implemented]

2. **Name the places where it is demonstrated?**  
   [Details of firms in which technology was successfully implemented and currently operational - *Please enclose details of firm along with details of contact person*]

3. **What are the benefits?**  
   Details of technology implemented  
   *Please enclose a brief write up on earlier scenario & post implementation scenario, why a need was felt for technology intervention & date of implementation*

4. **What is the impact on energy saving?**  
   Impact of technology intervention on energy consumption saving in thermal & electrical
<table>
<thead>
<tr>
<th>Consumption in terms of Megajoules per tonne of steel or kg coal per ton of steel or liters of furnace oil per ton of steel or kWh per ton of steel</th>
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<tbody>
<tr>
<td><strong>D. Training</strong></td>
</tr>
<tr>
<td>1. Whether risks associated with operation of technology identified (Yes/No)</td>
</tr>
<tr>
<td>2. Whether any training programme developed for operational staff for technology (Yes/No)</td>
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</tbody>
</table>

Authorised signatory

Company seal

Date: