

**Terms of Reference  
For  
Detailed Study on Clean Technology Opportunities in Sponge Iron  
Sector**

**Capacity Building and Industrial Pollution Management Project  
(CBIPMP)**

**1. Background :**

The Ministry of Environmental & Forests, Govt. of India (MoEF) is implementing a project on Capacity Building and Industrial Pollution Management (CBIPMP) with financial and technical assistance from the World Bank. The project has been taken up for implementation in the States of Andhra Pradesh and West Bengal as pilot project for its likely replication in other states. West Bengal Pollution Control Board is the implementing agency for the Project for the State of West Bengal.

**2. Project Objective :**

The development objective of the project is to strengthen environmental institutions for capacity building for addressing pollution remediation including technical assistance for supporting the Environment Compliance Assistance Centre (ECAC) to promote knowledge exchange and environmental information sharing, technical assistance for meeting regulatory standards, introduction of small scale clean technologies, stakeholder participation and community outreach with a view to enhance a sustainable environmental management .

The project also aims to make investments in environmentally sound remediation and environmental improvements including rehabilitation of orphan hazardous waste sites and municipal dumpsites to support the development of a policy, institutional and methodological framework for the establishment of a National Policy Program for Rehabilitation of polluted sites.

**3. Project description :**

The West Bengal component of the project specifically includes the following components :

- l) Strengthening of Environmental Institutions : Building Capacity for addressing pollution remediation :
  - a) Strengthening of the Environment Compliance Assistance Centre. The ECAC shall serve as an entrepreneur's first stop where all proponents can approach for comprehensive environmental compliance related information. The ECAC will archive the best environmental practices of different industrial sectors and create awareness through dissemination of information regarding environmental regulations, norms and standards, economic instruments etc. through the web-based information network system. The centre will act as a platform for hosting dissemination forums both nationally as well as on an international level.
  - b) Technical Support for inventorisation of hazardous wastes, identification and assessment of contaminated sites, assessment of MSW dumpsites and upgradation of the Board's laboratory

- c) Upgrading information management Systems of West Bengal pollution Control Board
  - d) Training
- II) Investment in priority remediation and environmental improvements: Rehabilitation of abandoned contaminated sites
- a) Remediation of seven identified orphan hazardous dump sites in Hooghly district
  - b) Remediation of Dhapa MSW site
- III) Project Management

#### **4. Duration of the Project :**

Five (5) years (October 2010 - September 2015)

#### **Environmental Compliance Assistance Center at WBPCB (ECAC)**

ECAC was set up by WBPCB in 2008, with the help of an AECEN small grant and matching seed money from WBPCB, with the objective of assisting industries to establish, operate and attain voluntary environmental compliance in a cost effective manner, by providing appropriate technological and legal/administrative information, primarily through web based services. ECAC is also mandated to identify and prioritise the industrial sectors which needs assistance for achieving compliance. ECAC endeavours to provide national and international best practices in specific industrial sectors to the interested entrepreneurs, in addition to routine information on legal and administrative matters. To this end, the ECAC collaborates with its strategic partners and deploys program resources to support information collection and dissemination, technical assistance and training. An information system and web module has already been created, which needs further expansion and strengthening.

ECAC is also to hold consultation workshops, exchange visits and trainings for the stakeholders including interested entrepreneurs. It is envisioned that in due course the Centre will function as an independent entity providing a wide range of support and assistance to industries of diverse natures in the State that will help them attain improved environmental compliance.

Initially two critically polluting sectors have been identified for key focus in the state based on the current industrial developmental trend - the Sponge Iron (SI) Industry and the Small and Medium Enterprises in the Chemical and Petrochemical Industry (SME / CPI). It is intended to assimilate international best practices for the identified sectors so as to assist in achieving voluntary compliance through capacity building. In order to achieve this objective, WBPCB intends to commission a detailed study on clean technology opportunities in Sponge Iron Industry Sector.

#### **5. Objectives of the Study**

Sponge iron industrial sector occupies an important position in the state because of its economic as well as pollution potential. This unique position of this industrial sector warrants need for exploring better technologies for this sector in addition to compilation of information.

The study would also assess the feasibility of various clean technology options including the following and provide a detailed road map for implementation of recommended CT measures.

- a. Replacement of injection coal by partially steam-reformed CBM in conventional coal based SI plant in a DRI process.
- b. A technological and environmental assessment for exploring feasibility of CBM based DRI process for horizontal kilns.
- c. Use of CBM in initial kiln start up cycle in conventional coal based SI plant in a DRI
- d. Study of ways and means of minimizing generation of dolochar
- e. Sustainable use of dolochar in an environment friendly manner
- f. Study of ways and means of controlling re-suspension of dust from different transfer points
- g. Effective water management in dry and arid regions where SI industries have come up.

#### **6. Duration of the Assignment :**

Six (6) months from the date of award

#### **7. Scope of Work of consultant on Sponge Iron manufacturing sector :**

The consultant shall conduct the following tasks :

- i. Undertake a detailed study for the SI sector in the state of West Bengal vis-à-vis the country - This shall include the profile of industries, products, manufacturing process, environmental practices, etc.
- ii. Identify challenges of environmental compliance faced by the sponge iron manufacturing sector in India. - This shall include the detailed description of the environmental practices / technologies, issues / constraints associated with each of them vis-a-vis the industry in India and abroad.
- iii. Outline existing compliance assistance provided by the WBPCB and other govt. organisations to the sponge iron manufacturing sector.
- iv. Prepare a comprehensive database for the SI manufacturing industries in West Bengal - The data base should include key parameters such as industry, production capacity, various sources of environmental pollution, current practices, compliance status, issues / concerns, etc. The data base should be web enabled and shall be in a form that can be up dated on a regular basis.
- v. Analyse cleaner technology options - such the ones indicated in section 5 and other international practices and evaluate the feasibility of implementing them by the industries in west Bengal
- vi. Prepare a detailed implementation plan for each of the recommended CT measures along with cost estimates.
- vii. Prepare a road map for technological bridge - with universities, strategic partners, SI industry associations and other relevant government institutions for better compliance in the SI sector and implementation of CT measures and the technology transfer and preparation of a road map for national and international technology transfer in this sector.

It will be the sole responsibility of the firm to obtain necessary data and reports from all relevant sources with approval of WBPCB.

All measurements and field level sampling / analysis shall be conducted by the firm in any govt. approved institution or any recognised laboratory of the Central Pollution Control Board / West Bengal Pollution Control Board. At least ten industries will be sampled depending on the kiln capacity for the main pollutant which is Particulate Matter (PM). At least five industries should be sampled for analysing the composition of Dolochar with respect to volatile matter and unburnt carbon.

## **8. Deliverables**

The entire assignment is expected to follow all the guidelines of World Bank and necessary approvals as required must be taken from Project Director. All deliverables shall be provided in colour hardcopy (3 copies for draft versions and 10 copies for final version) and in electronic form also. After submission of all draft reports or draft final report, the consultant / firm / national institution / national laboratory shall organise a workshop involving all stakeholders to present the findings and seek comments. All recommendations shall be incorporated / implemented by the consultant / firm / national institution / national laboratory in the final report.

- Twenty (20) percent of the lump-sum amount shall be paid upon submission of 1<sup>st</sup> interim report having information database through primary survey – within 2 months of the award of contract: 3 hard copies and electronic version.
- Thirty (30) percent of the lump-sum amount shall be paid upon submission of report having incorporated the comments and findings of the workshop involving all stakeholders within 4 months of award of contract; 3 hard copies and electronic version
- Thirty (30) percent of the lump-sum amount shall be paid upon submission of Draft final report – within 5 months of the award of contract: 3 hard copies and electronic version. This would incorporate the recommendation on the comments and findings of the workshop involving all stakeholders. This would be discussed with Project Director and ECAC Expert Committee for inputs and clearance.
- Twenty (20) percent of the lump-sum amount shall be paid upon submission of Final Report – within 6 months of the date of award of contract: 10 hard copies and electronic version

## **9. Procedure for Review of reports**

The reports submitted by the consultant / firm / national institution / national laboratory would be sent to the Project Director. The consultant would be required to make presentation of all the reports as per the delivery schedule to

the PIU / ECAC Expert Committee and all concerned stakeholders and seek its comments. All recommendations shall be incorporated / implemented by the consultant / firm.

### 10. Qualifications of consultant / firm:

The consultancy is aimed for a firm having experts with appropriate qualifications and experience of working in the sector. The consulting firm should be in a position to offer team of three key members comprising the Team Leader, Senior Project Manager and Senior Industrial Engineering consultant.

#### Qualifications and experience of the team members

Particulars / Position	Minimum requirements	Desired attributes
Team Leader: will be responsible for overall leadership to the assignment, interactions with agencies and institutions, quality control and report delivery.	➤ Master's degree in Metallurgical Engineering/ Environmental Engineering/Chemical Engineering,/ Civil Engineering or related discipline	<ul style="list-style-type: none"> <li>• minimum of 15 years experience in industrial environmental issues and 5 years of the specific expertise in environmental compliance issues in sponge iron sector.</li> <li>• Should have demonstrated expertise in the field of Sponge Iron Industry.</li> </ul>
Senior Project Manager: Will be responsible for work program management and interactions with local agencies/ industries including management of market survey.	Masters level qualifications from a recognized university in Metallurgical Engineering/ Environmental Engineering/ Chemical Engineering/ Civil Engineering or related discipline.	<ul style="list-style-type: none"> <li>• minimum of 10 years overall experience</li> <li>• Experience in primary metallurgical industry.</li> </ul>
Industrial Engineer	Bachelor degree in Metallurgical Engineering/ Environmental Engineering/ Chemical Engineering/ Civil Engineering or related discipline	<ul style="list-style-type: none"> <li>• minimum 4 years experience in handling industrial pollution issues or products.</li> <li>• Experience in primary metallurgical industry.</li> </ul>

The firm can combine more than one expertise and could include other technical specialists as required to perform the scope of work envisaged in the TOR.

The firm should mobilize adequate staff and resources to complete the assignment within the stipulated time frame. The comprehensive details of such staff and resources and their deployment schedule shall be provided in the technical proposal.