**The World Bank GEF Project - Environmentally Sustainable Development of the Iron and Steel Industry in China**

**Enterprise Demonstration (2nd Round) and Replication Activity**

**Terms of Reference (TOR)**

1. **Background**

On May 23, 2001, China signed the Stockholm Convention on Persistent Organic Pollutants (POPs) (hereinafter referred to as the Convention), which entered into force for China on Nov. 11, 2004. The Parties to the Convention are obliged, under the requirements of Article 5, to take actions to reduce or eliminate the release of unintentionally produced POPs (UPOPs) listed in Annex C and to promote the application of the best available techniques (BAT) and the best environmental practices (BEP). UPOPs include a particular group of substances such as polychlorinated dibenzo-*p*-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) (together referred to as dioxins, the most representative UPOPs), polychlorinated biphenyls (PCBs), hexachlorobenzene (HCB), pentachlorobenzene (PeCB), hexachlorobutadiene (HCBD) and polychlorinated naphthalenes (PCNs). The *National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants in China* (NIP, 2007) requires taking emission reduction actions for UPOPs such as dioxins.

China is both the largest producer and consumer of iron and steel in the world. Global crude steel production in 2020 was 1.876 billion tons, of which over 56%, 1.065 billion tons, was produced in China. The emissions of dioxins from iron ore sintering and electric arc furnace (EAF) in iron and steel industry (2004 national baseline, NIP) accounted for about 1/4 of China’s total emissions, of which about 1/3 was released to the atmosphere. Therefore, sintering and EAF are listed as key UPOPs industries which require priority action in the NIP, and are also listed as key dioxins pollution prevention and control industries in China in *the Guidance on Strengthening the Prevention and Control of Dioxins Pollution* (2010, MEP). It was estimated that the dioxins emissions from iron ore sintering in 2016 are about 1,522 g TEQ (Toxic Equivalent Quantity), while the dioxins emissions from EAF are about 363 g TEQ.

To help China fulfill its obligations under the Convention, the Ministry of Ecology and Environment of China (represented by FECO, the Foreign Environmental Cooperation Center), developed the GEF supported project “*Environmentally Sustainable Development of the Iron and Steel Industry in China*” with the support of the World Bank. The project aims to reduce UPOPs produced and released from the steel and iron industry in China, through the introduction, demonstration and replication of BAT/BEP, to strengthen the application of new technologies and enhance the regulatory capacity in the industry, and to promote environmentally sustainable development of the industry. While reducing the emission of UPOPs in the iron and steel industry, the project will also advance the realization of ultra-low emission in the steel and iron industry, synergistically reduce the release of other environmental pollutants, including mercury, facilitate the battle against pollution and help realize pollution and carbon reduction, and make contributions to protecting global human health and ecologic environment. In June 2020, the project was reviewed and approved by the 58th GEF Council, for inclusion into the GEF-7 project work plan. Currently, the GEF has approved the project preparation grant (PPG) for the project.

In accordance with project activity design of the World Bank GEF Project - Environmentally Sustainable Development of the Iron and Steel Industry in China (hereinafter referred to as the Project), the Project will conduct BAT/BEP demonstration targeting 2 iron ore sintering production lines and 1 electric arc furnace steelmaking production line and conduct BAT/BEP replication of achievements and experience targeting 20 production lines during the implementation stage (of the full-sized project). On April 7, 2021, FECO issued the “Call for Expression of Interest for Enterprise Demonstration Activity for The World Bank GEF Project - Environmentally Sustainable Development of the Iron and Steel Industry in China”. At present, 1 iron ore sintering production line has been preliminarily selected as a candidate demonstration production line. According to the project plan and design, it is necessary to select 2 more demonstration production lines (1 iron ore sintering production line and 1 electric arc furnace steelmaking production line) and 20 replication production lines. Therefore, the open call of enterprises for the project has hereby been initiated. FECO will conduct review and evaluation on the qualification of candidate enterprises and select eligible enterprises for World Bank no objection.

1. **Objectives**

In accordance with project activity design, conduct BAT/BEP upgrade targeting 2 demonstration production lines in this round (1 iron ore sintering production line and 1 electric arc furnace steelmaking production line) and 20 replication production lines in order to reduce UPOPs emissions. Expected dioxins emissions from the demonstrated iron ore sintering and electric arc furnace steelmaking production lines should meet standards of <0.05 - 0.2 ng TEQ/m3 (under normal operating conditions) and <0.1 ng TEQ/m3 (under normal operating conditions) respectively, with emissions of other pollutants reaching the ultra-low emission standards in order to facilitate pollution and carbon reduction synergistically.

1. **Task assignments**

To achieve the above objectives, the enterprise is required to carry out the following tasks:

1. Development of implementation plan

By referring to the requirements of BAT/BEP guidance of the Stockholm Convention and China’s industrial (best) available technical guidance, and considering the requirements of the World Bank on environment, health and safety guidance, develop a demonstration implementation plan for iron ore sintering and/or electric arc furnace production line(s) of the enterprise according to the expected emission standards on dioxins and the ultra-low emission standards on other pollutants, in view of pollution and carbon reduction, and taking into consideration the actual condition of the enterprise as well as the cost.

Considerations regarding the following requirements need to be reflected: comparative life-cycle assessments of new/alternative technologies should first be undertaken while taking into account synergies and trade-offs with other air quality and climate mitigation objectives, and the most feasible approaches/measures/technologies for improved smelter processing should be identified. Anticipated costs will be evaluated as one of the basis for optimization. Both investment and technical assistance supporting the activities for the enterprise are going to provide support on the upgrading and reconstruction of existing equipment for pollution control without increasing the footprint or in other ways influencing the production capacity of the enterprise. According to BAT/BEP guidance of the Stockholm Convention, BAT/BEP practices include the combination of raw material choosing and preparation, better management of sintering operation for more stable and consistent working condition, exhaust gas recirculation, selective catalytic reduction, activated carbon absorption and other auxiliary measures (meanwhile, avoiding secondary pollution from the waste catalyst or waste carbon). Contents meeting the requirements of the environmental and social management framework (ESMP) in accordance with the requirements of the World Bank and project management framework should be reflected.

1. Project preparation at early stage

Taking meeting BAT/BEP requirements as the target and according to the project demand, conduct feasibility study and environmental impact assessment, and the reports should be approved by competent authority in China.

Selected enterprise needs to conduct resource efficiency and clean production (RECP) audit, identify the baseline of pollutant emission of the applied production line, determine the pollutant reduction technology, improve the technique efficiency of energy consumption, optimize the logistics of productivity, and raise the awareness of staff and management personnel on target pollutants. According to the requirements of the World Bank and project management framework, develop environmental and social assessment / environmental and social management plan, and related documents should be cleared by the World Bank.

1. Implementation and monitoring of activities

Conduct the upgrading and reconstruction of production line(s) and carry out demonstration activities according to the demonstration implementation plan approved by the World Bank and the requirements in the environmental and social assessment / environmental and social management plan formulated based on the World Bank’s requirements. Submit financial and technical reports periodically and provide cooperation in project monitoring and evaluation in line with the requirements of the World Bank and project management framework.

Conduct pilot operation in accordance with national regulations, optimize and improve the system in line with BAT/BEP target and requirements during the process of pilot operation in order to gather experience for formal operation. During the pilot operation stage, under the circumstance of design conditions and operating parameter, detect emission concentrations of key pollutants and pollutants of high concern (eg. particulate matters, SO2, NOx, CO, fluoride, dioxins, PCBs, HCBs, PeCB, and mercury) in main links of the process respectively, get a general and clear picture of the generation and emission features of UPOPs such as dioxins in different links and under different pollution control measures; based on detection results, propose improvement measures for BAT/BEP to be used to guide emission control of dioxins.

The construction project should be inspected for acceptance according to China’s procedures for project construction and management regulations before the construction is put into operation. After passing the engineering acceptance inspection, the enterprise should operate in a standardized way in accordance with China’s applicable regulations and BAT/BEP requirements.

1. Acceptance inspection of demonstration project and experience summary and replication

After the engineering acceptance inspection, performance evaluation (of UPOPs, other pollutants and carbon emissions) will be conducted in order to ensure meeting the expected target of emission reduction and that it could be used as a basis for the formulation and revision of authoritative guidance. Activities also include the evaluation of cost effectiveness of technology, recording and assisting in replication of the outcome, participating in relevant training and workshop, in order to share experience and lessons-learned.

In addition, the enterprise should convene local authorities, technical experts, technological support institutes, BAT/BEP formulation institutes and other parties to conclude and report the progress of the construction periodically, and report to FECO and the World Bank on the project progress and operation as well as self-evaluation, at regular intervals. According to the requirements of FECO, the enterprise should participate in relevant workshops and training, cooperate to conduct activities under the project in a timely manner, and provide recommendations and support.

1. **Outputs**

1. Outputs of the demonstration activity (in both Chinese and English) are as follows：

1. Implementation plan for project construction (dioxin emission reduction plan should be included);
2. Feasibility study report and approval document;
3. Domestic environmental impact assessment report (form) and approval document;
4. List of equipment and system and specification requirement related to this project;
5. Necessary project preliminary design and construction drawing design;
6. Environmental and social assessment / environmental and social management plan;
7. Work report on project construction progress at key time nodes;
8. Resource efficiency and clean production (RECP) audit of the selected enterprise at the start of the project;
9. Analysis report on the generation and control of key pollutants and pollutants of high concern (monitoring analysis report at the trial operation stage of the project should be included);

* Baseline analysis report under normal operating conditions before the start of the reconstruction;
* Analysis report upon completion of project activities;
* Analysis report for 6-month operation after the project activity acceptance.

1. Monitoring data and commissioned monitoring reports at each stage;
2. Various types of management manual (including operations manual[[1]](#footnote-1)) and internal management protocols;
3. Training plan and implementation report;
4. Recommendation and suggestion on BAT/BEP management regulation from the enterprise;
5. Summation of facility operation cost and all kinds of expenses, and analysis report;
6. Construction project acceptance inspection report;
7. Recommendations on project replication;
8. Annual and quarterly work plan;
9. Annual progress report;
10. Project work report, including work summary, technical summary, and project settlement.

2. Outputs of the replication activity (in both Chinese and English) are as follows：

1. Project implementation plan (ultra-low emission reconstruction plan and BAT/BEP upgrade plan for dioxins emission reduction should be included. Feasibility study report and approval document, domestic environmental impact assessment report (form) and approval document, list of equipment and system and specification requirement related to this project, training plan, necessary project preliminary design and construction drawing design should be attached);
2. Environmental and social assessment / environmental and social management plan (resource efficiency and cleaner production (RECP) audit should be attached);
3. Project work report, including work summary, technical summary, and project settlement, enterprise suggestions on BAT/BEP management regulation, summation of facility operation cost and all kinds of expenses and analysis report, construction project acceptance inspection report, recommendations on project replication, training work report, monitoring data and commissioned monitoring reports at each stage, analysis report on the generation and control of key pollutants and pollutants of high concern (monitoring analysis report at the trial operation stage of the project should be included, such as baseline analysis report under normal operating conditions before the start of the reconstruction, analysis report upon completion of project activities and analysis report for 6-month operation after the project activity acceptance), etc.
4. **Schedule**

The main part of the demonstration and replication project should start from the effective date of the Replication Activity Implementation Agreement until the enterprise has achieved all goals (within 24 months, in principle), during which period the enterprise should complete all project activities and submit a summary report.

1. **Budget**
2. Demonstration activity

No more than US$5 million of grant will be provided to support each demonstration production line, and a total of no more than US$8 million of grant will be provided to support the two demonstration production lines selected in this round. Grant funds can be used to develop and implement the implementation plan, including the provision of technical consulting services, goods and equipment reconstruction projects. The enterprise applying for the demonstration needs to provide co-financing of no less than 7 times of the grant to be applied for (including cash and in-kind provision of personnel, venues and equipment related to the ultra-low emission reconstruction invested after August 2019).

1. Replication activity

It’s planned to provide at least US$4 million of grant for 20 production lines (i.e. at least US$200,000 of grant can be applied for each production line). The grant can be used to carry out technical consulting services such as third-party monitoring, social environmental assessment, related training, and improvement of corporate management and operating systems, and part of the grant can be used to support the improvement and optimization of the replication production lines, such as dioxins emission control measures (BAT/BEP technology), dioxins monitoring facilities, etc., and training related management and operating personnel. The enterprise applying for replication activities needs to provide no less than US$5 million in co-financing (including cash and in-kind provision of personnel, venues and equipment related to the ultra-low emission reconstruction invested after August 2019). The remaining budget for demonstration will be reallocated to support the replication activities after the demonstration activity funds are determined.

1. Operations manual to be prepared for the facility to ensure proper operation of the facility based on BAT/BEP requirements. For example, the frequency and method of catalyst testing to determine its reactivity should be documented in an operations manual. [↑](#footnote-ref-1)