



# PROJECT IDENTIFICATION FORM (PIF).

PROJECT TYPE: Full-sized Project  
 TYPE OF TRUST FUND: GEF Trust Fund

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## PART I: PROJECT INFORMATION

Project Title:	UPOPs Reduction through BAT/BEP and PPP-based Industry Chain Management in Secondary Copper Production Sector in China		
Country(ies):	People's Republic of China	GEF Project ID: <sup>1</sup>	
GEF Agency(ies):	UNDP (select) (select)	GEF Agency Project ID:	5383
Other Executing Partner(s):	Foreign Economic Cooperation Office, Ministry of Environmental Protection	Submission Date:	2014-08-07
GEF Focal Area(s):	Chemicals and Wastes	Project Duration (Months)	60
Integrated Approach Pilot	IAP-Cities <input type="checkbox"/> IAP-Commodities <input type="checkbox"/> IAP-Food Security <input type="checkbox"/>		Corporate Program: SGP <input type="checkbox"/>
Name of parent program:	[if applicable]		

## A. INDICATIVE FOCAL AREA STRATEGY FRAMEWORK AND OTHER PROGRAM STRATEGIES<sup>2</sup>:

Objectives/Programs (Focal Areas, Integrated Approach Pilot, Corporate Programs)	Trust Fund	(in \$)	
		GEF Project Financing	Co-financing
(select) CW-2 Program 3 (select)	GEFTF	12,600,000	52,450,000
(select) (select) (select)	(select)		
(select) (select) (select)	(select)		
(select) (select) (select)	(select)		
(select) (select) (select)	(select)		
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(select) (select) (select)	(select)		
(select) (select) (select)	(select)		
(select) (select) (select)	(select)		
Total Project Cost		12,600,000	52,450,000

## B. INDICATIVE PROJECT DESCRIPTION SUMMARY

**Project Objective: Reduction and elimination of PCDD/Fs, HCB and PCNs releases through the introduction of BAT/BEP in the secondary copper production sector in China.**

Project Component	Financing Type <sup>3</sup>	Project Outcomes	Trust Fund	(in \$)	
				GEF Project Financing	Co-financing
1. Institutional strengthening and capacity building	TA	1.1 Improved legal framework for secondary copper production sector  1.2 Capacity of enterprises, industries and local Environmental Protection Bureaus (EPBs) strengthened to facilitate effective management and monitoring of the secondary copper sector  1.3 Enhanced coordination with other international environmental conventions	GEFTF	1,500,000	6,000,000
2. Demonstration of BAT/BEP technologies and PPP- based industry chain management	TA	2.1 BAT/BEP demonstration conducted  2.2 Circular economy, PPP and centralized park based approach demonstrated for the	GEFTF	8,500,000	38,250,000

<sup>1</sup> Project ID number will be assigned by GEFSEC and to be entered by Agency in subsequent document submissions.

<sup>2</sup> When completing Table A, refer to the GEF Website, [Focal Area Results Framework](#) which is an Excerpt from [GEF-6 Programming Directions](#).

<sup>3</sup> Financing type can be either investment or technical assistance.

		secondary copper industry			
		2.3 Evaluation and dissemination of demonstration results			
3. National Replication Programme	TA	3.1 Replication and promotion of demonstration results and experience 3.2 Promotional events for public awareness raising	GEFTF	1,500,000	6,000,000
4. Monitoring and Evaluation	TA	4.1 Monitoring and evaluation 4.2 Knowledge sharing and information dissemination	GEFTF	500,000	1,000,000
	(select)		(select)		
	(select)		(select)		
	(select)		(select)		
	(select)		(select)		
	(select)		(select)		
	(select)		(select)		
Subtotal				12,000,000	51,250,000
Project Management Cost (PMC) <sup>4</sup>			GEFTF	600,000	1,200,000
<b>Total Project Cost</b>				1,200,000,01 2,600,000	5,125,000, 052,450,00 0

If Multi-Trust Fund project :PMC in this table should be the total and enter trust fund PMC breakdown here ( )

<sup>4</sup> For GEF Project Financing up to \$2 million, PMC could be up to 10% of the subtotal; above \$2 million, PMC could be up to 5% of the subtotal. PMC should be charged proportionately to focal areas based on focal area project financing amount in Table D below.

**C. INDICATIVE SOURCES OF CO-FINANCING FOR THE PROJECT BY NAME AND BY TYPE, IF AVAILABLE**

Please include confirmed co-financing letters for the project with this form.

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Amount (\$)
Recipient Government	Ministry of Environmental Protection	Grants	2,000,000
Recipient Government	Ministry of Environmental Protection	In-kind	3,000,000
Recipient Government	Local government and Local Environmental Protection Bureaus of demonstration regions	Unknown	10,000,000
Private Sector	Secondary copper production enterprises	Unknown	36,000,000
GEF Agency	UNDP	In-kind	100,000
Others	To be identified	Unknown	1,350,000
<b>Total Co-financing</b>			<b>52,450,000</b>

**D. INDICATIVE TRUST FUND RESOURCES REQUESTED BY AGENCY(IES), COUNTRY(IES) AND THE PROGRAMMING OF FUNDS <sup>a)</sup>**

GEF Agency	Trust Fund	Country/Regional/Global	Focal Area	Programming of Funds	(in \$)		
					GEF Project Financing (a)	Agency Fee (b) <sup>b)</sup>	Total (c)=a+b
UNDP	GEFTF	People's Republic of China	Chemicals and Wastes	POPS	12,600,000	1,134,000	13,734,000
(select)	(select)		(select)	(select as applicable)			0
(select)	(select)		(select)	(select as applicable)			0
(select)	(select)		(select)	(select as applicable)			0
(select)	(select)		(select)	(select as applicable)			0
<b>Total GEF Resources</b>					<b>12,600,000</b>	<b>1,134,000</b>	<b>13,734,000</b>

a) Refer to the [Fee Policy for GEF Partner Agencies](#).

**E. PROJECT PREPARATION GRANT (PPG)<sup>5</sup>**

Is Project Preparation Grant requested? Yes  No  If no, skip item E.

**PPG AMOUNT REQUESTED BY AGENCY(IES), TRUST FUND, COUNTRY(IES) AND THE PROGRAMMING OF FUNDS**

GEF Agency	Trust Fund	Country/Regional/Global	Focal Area	Programming of Funds	(in \$)		
					PPG (a)	Agency Fee <sup>6</sup> (b)	Total c = a + b
UNDP	GEF TF	People's Republic of China	Chemicals and Waste	POPS	300,000	27,000	327,000
(select)	(select)		(select)	(select as applicable)			0
(select)	(select)		(select)	(select as applicable)			0
<b>Total PPG Amount</b>					<b>300,000</b>	<b>0</b>	<b>327,000, 327,000</b>

<sup>5</sup> PPG requested amount is determined by the size of the GEF Project Financing (PF) as follows: Up to \$50k for PF upto \$1 mil; \$100k for PF up to \$3 mil; \$150k for PF up to \$6 mil; \$200k for PF up to \$10 mil; and \$300k for PF above \$10m. On an exceptional basis, PPG amount may differ upon detailed discussion and justification with the GEFSEC.

<sup>6</sup> PPG fee percentage follows the percentage of the Agency fee over the GEF Project Financing amount requested.

## F. PROJECT'S TARGET CONTRIBUTIONS TO GLOBAL ENVIRONMENTAL BENEFITS<sup>7</sup>

Provide the expected project targets as appropriate.

Corporate Results	Replenishment Targets	Project Targets
1. Maintain globally significant biodiversity and the ecosystem goods and services that it provides to society	Improved management of landscapes and seascapes covering 300 million hectares	ha
2. Sustainable land management in production systems (agriculture, rangelands, and forest landscapes)	120 million hectares under sustainable land management	ha
3. Promotion of collective management of transboundary water systems and implementation of the full range of policy, legal, and institutional reforms and investments contributing to sustainable use and maintenance of ecosystem services	Water-food-ecosystems security and conjunctive management of surface and groundwater in at least 10 freshwater basins;	Number of freshwater basins
	20% of globally over-exploited fisheries (by volume) moved to more sustainable levels	Percent of fisheries, by volume
4. Support to transformational shifts towards a low-emission and resilient development path	750 million tons of CO <sub>2e</sub> mitigated (include both direct and indirect)	metric tons
5. Increase in phase-out, disposal and reduction of releases of POPs, ODS, mercury and other chemicals of global concern	Disposal of 80,000 tons of POPs (PCB, obsolete pesticides)	<i>11.88 g TEQ of dioxin will be reduced through demonstration activities under this project</i>
	Reduction of 1000 tons of Mercury	metric tons
	Phase-out of 303.44 tons of ODP (HCFC)	ODP tons
6. Enhance capacity of countries to implement MEAs (multilateral environmental agreements) and mainstream into national and sub-national policy, planning financial and legal frameworks	Development and sectoral planning frameworks integrate measurable targets drawn from the MEAs in at least 10 countries	Number of Countries:
	Functional environmental information systems are established to support decision-making in at least 10 countries	Number of Countries:

## **PART II: PROJECT JUSTIFICATION**

### **PROJECT OVERVIEW**

**A.1. PROJECT DESCRIPTION. BRIEFLY DESCRIBE: 1) THE GLOBAL ENVIRONMENTAL AND/OR ADAPTATION PROBLEMS, ROOT CAUSES AND BARRIERS THAT NEED TO BE ADDRESSED; 2) THE BASELINE SCENARIO OR ANY ASSOCIATED BASELINE PROJECTS, 3) THE PROPOSED ALTERNATIVE SCENARIO, WITH A BRIEF DESCRIPTION OF EXPECTED OUTCOMES AND COMPONENTS OF THE PROJECT, 4) INCREMENTAL/ADDITIONAL COST REASONING AND EXPECTED CONTRIBUTIONS FROM THE BASELINE, THE GEFTF, LDCF, SCCF, AND CO-FINANCING; 5) GLOBAL ENVIRONMENTAL BENEFITS (GEFTF) AND/OR ADAPTATION BENEFITS (LDCF/SCCF); AND 6) INNOVATIVENESS, SUSTAINABILITY AND POTENTIAL FOR SCALING UP.**

#### **1) The Global Environmental Problems, Root Causes and Barriers that need to be addressed**

##### Global Environmental Problems

1. Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/Fs) are listed in the Stockholm Convention Annex C as unintentionally produced Persistent Organic Pollutants (UPOPs). They occur as byproducts of many

<sup>7</sup> Provide those indicator values in this table to the extent applicable to your proposed project. Progress in programming against these targets for the projects per the *Corporate Results Framework* in the [GEF-6 Programming Directions](#), will be aggregated and reported during mid-term and at the conclusion of the replenishment period. There is no need to complete this table for climate adaptation projects financed solely through LDCF and/or SCCF.

industrial and agricultural processes, such as metallurgical processes, the incineration of chlorine-containing substances and the manufacture of organochlorines.

2. In basic secondary copper production processes, the raw materials used are copper-containing materials (e.g. electronic fragments, copper alloy, brass and iron copper scraps) or metallic copper contained in copper residues such as slag and ash from primary smelting processes.

3. Direct drying or combustion of these raw materials will produce a variety of pollutants (PCDD/Fs, CO<sub>x</sub>, NO<sub>x</sub>, dust and metal compounds, as well as organic carbon compounds).

4. China's secondary copper production is becoming increasingly important owing to the increased demand for copper metal and decreasing copper mine resources in the world. Increased production, combined with low technology production and primary pretreatment approaches, predominantly practiced in small and medium scale enterprises, is drastically increasing the release of UPOPs in China. In turn such releases are not only impacting the workers in this sector, who are predominantly women and children, but also surrounding communities, impacting the environment and human health at local as well as global level.

5. Based on prognosis, the average annual growth rate of the secondary copper production in the period 2009–2015 will reach 19.8%, reaching 3.8 million tons of copper in 2015.

6. Jicheng Hu et al. (2013) detected PCDD/Fs in all the environmental media, including ambient air, water, soil and sediment. UPOPs were also directly released into the workplace during secondary smelting processes. The total estimated daily intakes of PCDD/Fs and dl-PCBs for workers were determined to be in the range of 0.15–9.91 pg and 0.13–8.59 pg based on WHO-TEQ/kg of body weight (bw) for moderate and light activities, respectively<sup>8</sup>. The daily inhalation doses for workers exceeded the tolerable daily intake recommended by the World Health Organization.

7. Relevant studies have indicated<sup>9</sup> that PCDD/Fs emissions from secondary copper smelters are higher than those from primary copper smelters, iron foundries, secondary aluminum smelters and even waste incinerators.

8. According to data from the China National Resources Recycling Association (CNRRA), in 2010 there were 210 enterprises with 379 secondary copper smelting facilities, with a total output of secondary copper of 2.41 million tons.

9. As part of the preparation of China's NIP (2007), a UPOPs inventory ("National Dioxin Inventory of China") based on the UNEP toolkit<sup>10</sup> was undertaken. The estimated total PCDD/Fs emission from secondary copper smelting was estimated at 1,133.8 g TEQ/a<sup>11</sup>, including atmospheric emissions of 403 g TEQ and fly ash emissions of 730.8 g TEQ, respectively.

10. In addition to PCDD/Fs, other UPOPs, such as PCBs, HxCBz, PeCBz and PCNs, are also released from secondary copper production processes. The concentrations of them are generally higher than those of PCDD/Fs, up to several orders of magnitude.

11. Furthermore, secondary copper smelting is also an important source of PM<sub>2.5</sub>. It was reported that up to 80% of PCDD/Fs were distributed in PM<sub>2.5</sub>, which are able to infiltrate deep into the respiratory tract, reaching the lungs.

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<sup>8</sup> Jicheng Hu et al., *Environ. Sci. Technol.* 2013, 47, 7773–7779

<sup>9</sup> Chen C M. The emission inventory of PCDD/PCDF in Taiwan. *Chemosphere*, 2004, 54(10): 1413–1420. Ba T, Zheng M H, Zhang B, Liu W B, Xiao K, Zhang L F. Estimation and characterization of PCDD/Fs and dioxin-like PCBs from secondary copper and aluminum metallurgies in China. *Chemosphere*, 2009, 75(9): 1173–1178

Tian B, Huang J, Wang B, Deng S, Yu G. Emission characterization of unintentionally produced persistent organic pollutants from iron ore sintering process in China. *Chemosphere*, 2012, 89(4): 409–415.

Li H, Lu Y, Luo W, Gosens J, Li L. Polychlorinated dibenzo-pdioxins and dibenzofurans emissions in a primary copper smelter in China. *Chemistry and Ecology*, 2012

<sup>10</sup> Chemicals UNEP. Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases. 2005. Available online at <http://chm.pops.int/Overview/tabid/372/Default.aspx>

<sup>11</sup> China Environmental Protection Administration. The People's Republic of China National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants 2007. Available online at [http://www.china-pops.net/download\\_view.asp?id=90](http://www.china-pops.net/download_view.asp?id=90)

### Root Causes

12. It is commonly considered that the formation mechanism of PCBs, HxCBz, PeCBz and PCNs is similar to that of PCDD/Fs. Conditions that have been shown to promote the formation of PCDD/Fs include:

- (i) The presence of elemental chlorine in raw materials such as polyvinyl chloride,
- (ii) Raw materials including non-ferrous metal that can catalyze UPOPs formation, and
- (iii) The temperatures attained at which UPOPs are formed during smelting process steps.

Because these conditions are met in secondary copper facilities, they are generally considered to be important sources of UPOPs.

13. In the studies conducted, high concentrations of PCDD/Fs were measured because the raw materials were not pre-treated before smelting. In the smelting process, reverberatory furnaces are widely used in China. These have a simple structure, are easy to operate, have a high fuel consumption and produce significant emissions. UPOPs, such as PCDD/Fs, are not considered a factor of concern in this industry.

14. A large number of small manufacturing enterprises still lack capabilities in fulfilling environmental protection requirements. Previous studies reported mainly on the detection and estimation of emission factors of PCDD/Fs emitted from secondary copper smelters. However, exact amounts of PCDD/Fs releases were not analyzed, nor were measures introduced to lower these emissions.

### Barriers

15. The following elaborates on the barriers to the adoption of cleaner production processes in the secondary copper production sector:

- Insufficient legal/regulatory framework and lack of capacity in policy enforcement at national, industrial and local level;
- Limited attention paid in the past to proactively support and coach the existing secondary copper production sector to improve pollution control and environmental management. This has been due to the fact that most of the focus has been on the sector's growth, to operate as a resource renewable industry in China;
- Limited access to and awareness of international Best Available Techniques/Best Environmental Practices (BAT/BEP) related to secondary copper processing technologies and limited ability/capacity to pilot and demonstrate it;
- Limited access to international experience in implementing and sustaining a PPP-based management system both financially and operationally (some secondary smelters are state owned, some by private sector enterprises, and some others with joint ownership by the state and private sector enterprises); and
- Insufficient capacity to undertake supervision and monitoring of the pollution caused by the secondary copper processing industry, and dealing with both socio-economic and environmental legacies.

## **2) The Baseline Scenario and Associated Baseline Projects**

16. Regeneration of the metallurgical industry is one of six priority sectors to be targeted for control of UPOPs releases. 70.45% of national PCDD/Fs releases from the metallurgical industry, originate from the secondary copper production sector (1,133.8 g TEQ/a in 2010).

17. In the period 2004–2009, no activities were implemented to reduce China's PCDD/Fs releases from the secondary non-ferrous metals industry.

18. According to the “2009–2015 Secondary Non-Ferrous Metals Special Plan,” China’s secondary copper

production will reach 3.8 million tons in 2015<sup>12</sup>. The secondary copper industry will experience industrial centralization, and large-scale enterprises with an annual output above 100,000 tons will increase. In addition, a number of key regions with high industrial concentration will be fostered, the proportion of their total production capacity will account for over 80%. Based on prognosis, the average annual growth rate of the secondary copper production in the period 2009–2015 will reach 19.8%.

19. In general, the secondary copper smelter sector faces a number of serious challenges, related to the industry's structure and layout, the level of technologies used, absence of pollution control, etc. resulting in low recycling efficiencies, low-end products, scattered distribution networks, and low productivity (the latter for small-scale enterprises in particular).

20. As previously mentioned, converter smelting, anode smelting furnaces are widely used throughout China. These have a very simple structure, are easy to operate, but have high fuel consumption and produce significant emissions.

21. The raw materials used often contain organic matters such as oil, grease, plastic, coating and insulation materials. Direct drying or combustion will produce a variety of pollutants (PCDD/Fs, CO<sub>x</sub>, NO<sub>x</sub>, dust and metal compounds, as well as organic carbon compounds), which will be released into the environment, posing serious threats to the ecological system and human health. High UPOPs emissions mainly result from inadequate practices employed during the recovery procedures, such as hand scrapping, poor combustion conditions and too low temperatures (250°C–500°C).

22. In China's secondary copper production sector, about 3% of the large scale enterprises use advanced equipment which helps to control releases of conventional pollutants. However such technologies do not control/reduce emissions of PCDD/Fs. Some of the mid-scale enterprises make use of basic production and primary pretreatment technologies<sup>13</sup>.

23. Environmental protection facilities such as air pollution control devices (APCDs), water recycling, and waste heat recovery technologies, have been established/introduced in scaled smelters. However, the majority of small manufacturing enterprises still lack the capacity to fulfill environmental protection measures.

24. Labours' health is generally not protected since no precautionary measures have been adopted in the sector. As a result of exposure, occupational diseases related to skin, stomach, respiratory tract and other organs have been found. Many of the workers in the secondary copper smelting are women and children (working on the dismantling), they are thus the group most at risk from exposure to emissions from this sector, as well as close-by communities where workers most often reside.

25. China's 11th Five Year Plan (2006-2010) identified economical use of resources as China's basic national policy to promote a circular economy, preserve the environment, establish a resource saving and environmentally friendly society, and achieve a harmonious balance of economic growth, population, resources, and the environment.

26. The circular economy, a mode of economic development based on ecological circulation of natural materials, requires compliance with ecological laws and sound utilization of natural resources to achieve economic development. It is, essentially, an ecological economy that follows the principles of “reducing resource use, reusing, and recycling”, with the objectives of reducing the resources that enter the production process, effecting multiple use of the same resources in different ways, and reusing waste from one facility as a resource for other facilities. In this mode, with materials going through a feedback process of “resource–product–renewed resource”, the ultimate objective of optimum production, optimized consumption and minimum waste can be achieved in production. “Reducing resource use” means achieving the objectives set for production and consumption by using minimal raw materials and energy and by cutting pollution at the very outset of economic activity. “Reusing” refers to the reuse of a product at other facilities after its initial consumption rather than

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<sup>12</sup> China Non-Ferrous Metal Association. China Secondary Non-Ferrous Metals Special Plan 2009–2015. 2011. Available online at [http://www.cnmc.com.cn/detail.jsp?article\\_millseconds=1318934732316&column\\_no=010304](http://www.cnmc.com.cn/detail.jsp?article_millseconds=1318934732316&column_no=010304)

<sup>13</sup> Nie Z, Liu G, Liu W, Zhang B, Zheng M. Characterization and quantification of unintentional POP emissions from primary and secondary copper metallurgical processes in China. *Atmospheric Environment*, 2012, 57(9): 109–115

letting it become toxic waste. Recycling, the third principle of the circular economy, means the use of a product many times in its primary state rather than one-off use<sup>14</sup>.

27. To enhance industrial centralization, the non-ferrous metals industry in China will build a circular economy industrial chain to advance the organic integration of secondary copper production and mining, tailings, building materials, and smelting, to develop a circular economy and promote industrial park management.

28. Areas of consideration should include:

- From a technology perspective: to push for full implementation of pollution control and management technologies, waste utilization technologies and best available techniques and best environmental practices (BAT/BEP);
- From the perspective of resource utilization: to seek efficient use of resources, mutual use and recycling utilization;
- From the perspective of industrial development: at the enterprise level, attention to be paid to cleaner production and minimized pollution emissions;
- From the regional level: enterprises to promote a full cycle of resource and energy re-utilization;
- From the perspective of industrial park construction: in the planning and construction stage, attention to be paid to appropriate land use, and rational industrial structure;
- From the management prospective: to establish clearly defined admission requirements and corporate investment threshold, to promote timely monitoring and management of the ecological environment of the park.

This will effectively promote the role and functions of the secondary copper industry in the circular economy industrial chain, through technology and management demonstration.

### **3) The Proposed Alternative Scenario, Expected Outcome and Project Components**

29. With the development of a regional economy and the upgrading of enterprises in the secondary copper sector, it would be recommended to establish a limit value of PCDD/Fs releases and such releases should be controlled.

30. If the flue gas of all enterprises meets the 0.5 ng TEQ/m<sup>3</sup> and the fly ash is treated in an environmentally sound manner, estimated PCDD/Fs emissions for the secondary copper industry would only amount to 5.8 g TEQ/y (as compared to 1,133.8 g TEQ/y), based on a yearly copper output of 1.16 million tons. In such a scenario, the total PCDD/Fs emission-reduction target of 99.5% can be achieved, the secondary copper sector no longer being the main source of PCDD/Fs releases from the metallurgical industry.

31. Effective regulation of secondary smelters in terms of PCDD/Fs generated in industrial production processes will require strategies that take into account technical options, as well as economic and social factors. Such approaches require discussions and collaboration solutions amongst leaders from the industrial sector; academia, energy and industry ministries, as well as central policy agencies to ensure opportunities for innovation, future energy supply, and green industrial growth are maximized. It will also be necessary to engage the provinces and local governments as their support will be needed for effective implementation and enforcement.

32. There will also be a need for command-and-control type of PCDD/Fs emission regulations that progressively implement more stringent standards. The latter should take into consideration international practices as well as factors related to environmental and human health protection in China.

33. The project aims to reduce releases of UPOPs from secondary copper smelting in China, to reduce negative impacts on human health and the environment. The project aims to do that through the introduction and demonstration of BAT/BEP technologies and sound process control, to increase China's capability in meeting its

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<sup>14</sup> Feng Zhijun, Yan Nailing, (2007) "Putting a circular economy into practice in China" Sustain Sci 2.95-101



obligation under the Stockholm Convention.

34. The project will support China in meeting outcome 4: low carbon and other environmentally sustainable strategies and technologies are adapted widely to meet China's commitments and compliance with Multilateral Environmental Agreements (Stockholm Convention).

35. The project's approach is expected to make use of Public-Private Partnerships (PPP). As some secondary smelters are state owned, some by private sector enterprises, and some others with joint ownership by the state and private enterprises, this forms a solid foundation to foster PPP. Therefore, the private sector will be closely involved in the project and will be supported by the public sector in the piloting of new technologies to reduce UPOPs releases. The private sector will also support the government in participating in assessment of the new policy impacts and standards. Hands-on experience from the private sector will be taken up in the national replication plan to facilitate effective technology transfer and experience exchange, ensuring sustainability of project achievements.

36. The following describes activities envisioned under each project component consistent with the Outcomes and Outputs provided above:

### **Component 1 – Institutional strengthening and capacity building**

Outcome 1.1 Improved legal framework for secondary copper production sector

- Support the development and improvement of a sector-related governance and regulatory framework to increase control and reduce UPOPs emission, e.g. through the development of an environmental policy, technical standards and technology management documents, industry entry condition, etc.;
- Develop a data information management system to track and facilitate the establishment of a UPOPs index to be listed as part of industrial standards.

Outcome 1.2 Capacity of enterprises, industries and Environmental Protection Bureaus (EPBs) strengthened to facilitate effective management

- Establish supervision and management measures and methods for EPBs, industry association and enterprises, including the collaborative management between different sectors;
- Improve supervision and monitoring capacity at national and local level;
- Strengthen inter-agency and industry coordination for enhanced sustainable development within the sector.

Outcome 1.3 Enhanced coordination with other international environmental conventions

- Strengthen communication and coordination with relevant international environmental convention secretariats in POPs management and pollution control;
- Promote and strengthen coordination with Basel Convention and SAICM.

### **Component 2 – Demonstration of BAT/BEP technologies and PPP-based industry chain management in the secondary copper production sector**

Outcome 2.1 BAT/BEP demonstration

- Development of technology selection and operational technique guidelines for BAT/BEP;
- Demonstrate BAT/BEP in two pilot plants (including pre-treatment and classification, incineration control, exhaust treatment, fly ash disposal and recovery) and evaluate technology, cost effectiveness, organize public outreach events and share lessons learned.

The expected outputs include:

- a) A more up-to-date and accurate estimation and assessment of UPOPs emissions, including an analysis of exposure and risk groups, and an assessment of UPOPs pollution at both pilot sites through sampling;

- b) An assessment conducted to identify the most feasible approach/measures/technologies for improved smelter processing; costs evaluated for optimized methodologies implementation;
- c) BAT/BEP fully implemented at each pilot site; lessons learned disseminated; training and capacity building conducted at both pilot secondary copper smelting facilities.

The identification and selection of the two pilot plants will be carried out during the PPG stage, utilizing established evaluation and selection criteria and taking into account findings of the characterization study on the secondary copper production sector.

Considering the average annual production output of a typical large secondary copper production is around 50,000 tons, it is expected that a plant size with output over 50,000 tons would be an appropriate demonstration plant.

Therefore the two large enterprises to be selected to undertake demonstration activities will have a combined total annual output of around 100,000 tons, corresponding to a baseline of 68 g TEQ/y of dioxins releases, consists of 5 g TEQ of atmospheric emissions and 63 g TEQ of fly ash emissions.

It is anticipated that demonstration activities at the two selected pilot plants will allow for a reduction of UPOPs releases from 68 g TEQ down to 0.5 g TEQ (emissions), a PCDD/Fs emission reduction efficiency of up to 99.26%. 11.88 g TEQ of dioxin will be reduced at the two pilot plants through the demonstration activities, the total dioxin reduction will reach up to 396 g TEQ in the secondary copper production sector as a result of the implementation of the National Replication Program.

The slag and fly ash disposal through the demonstration activities will be 21.93 g TEQ of dioxin, and will reach 731 g TEQ of dioxin after implementation of the National Replication Program.

#### Outcome 2.2 Demonstration of circular economy and PPP industrial chain park-based

- Develop management guidelines for the circular economy and PPP park-based secondary smelter industry arrangements for application of sustainable industrial development;
- Conduct project demonstration for circular economy and PPP industrial chain to support China in achieving its national policy to promote a circular economy, preserve the environment, establish a resource-saving and environmentally friendly society, and achieve a harmonious balance of economic growth, population, resources, and the environment, in the secondary copper production industry.

#### Outcome 2.3 Evaluation and pilot project acceptance

- Conduct process inspection and evaluate demonstration activities;
- Undertake inspection and evaluation and ensure acceptance of the results of the demonstration project.

### **Component 3 – National Replication Programme (NRP)**

#### Outcome 3.1 Replication and promotion of demonstration experience

- Develop a national replication plan of BAT/BEP for secondary copper smelting based on the experience gained through the pilot activities of the project;
- PPP joint governance and management structure put in place, with clear rules, roles and responsibilities for secondary copper smelting.

#### Outcome 3.2 Promotional events for public awareness raising

- Establish training and an accreditation course for lifecycle management in the secondary copper industry that support BAT/BEP;
- Conduct extensive stakeholder awareness raising, including a series of national and international workshops.

### **Component 4 - Monitoring and Evaluation**

#### Outcome 4.1 Project monitoring and evaluation

- Undertake continuous monitoring as well as periodic progress reviews. Develop and implement impact assessment procedures.

#### Outcome 4.2 Knowledge sharing and information dissemination

- Preparation and dissemination of experience and lessons learned nationally as the system develops and internationally through multilateral forums such as Basel Regional Centres and directly with other developing countries.

### **4) Incremental/Additional Cost Reasoning and Expected Contributions from the Baseline**

37. As described in the project baseline, there are many obstacles and challenges faced by the Chinese secondary copper production sector. The project, with GEF financing, will introduce international experience through BAT/BEP demonstration, PPP-based chain management, improved legal and regulatory measures, strengthened capacity for effective management, in order to improve production process, to address environmental and human health issues. GEF resource will also be directed to establish a national replication programme to ensure national efforts in the reduction of UPOPs releases.

38. Without GEF support, it is expected that China will continue its efforts to restructure its secondary copper production sector to improve the sector's economic performance, but without paying much attention to environmental performance. At this particular point in time, when a significant growth of the sector is expected to occur, it is more than ever important to ensure that the sector starts operating in accordance with environmental laws and standards.

39. In a business-as-usual (BAU) scenario, small mills will be closed and large mills promoted (which lead to a reduction in energy consumption). However, large mills will face difficulties in limiting UPOPs releases in the sector as BAT/BEP options have yet to be tested both technologically and financially in China's secondary copper production sector, without GEF support it is unlikely that BAT/BEP technologies will be introduced.

40. Furthermore, it is expected that very limited efforts will be undertaken to monitor UPOPs releases from the sector, which would lead to inadequate enforcement of newly developed UPOPs policies and standards for secondary copper production. Simply stated, it is foreseeable that UPOPs issues would be simply ignored under a BAU scenario.

41. With support from the GEF, the project will support the identification, demonstration, and promotion of BAT/BEP for secondary copper production enterprises, and will promote strong inter-agency and industry coordination at the national level for enhanced sustainable development within the sector. With this strong coordination, institutional capacity and the legal framework will be strengthened, and BAT/BEP will be demonstrated and replicated nationwide.

42. The identification and selection of the two pilot plants will be carried out only during the PPG stage, utilizing established evaluation and selection criteria and taking into account findings of the characterization study on the secondary copper production sector. However, considering the average annual production for a typical large secondary copper production enterprise is around 50,000 tons, it is expected that a plant size with annual output over 50,000 would be an appropriate demonstration plant. Therefore the two pilot plants to be selected will have a combined total annual output of around 100,000 tons, corresponding to a baseline of 68 g TEQ/y, consists of 5 g TEQ of atmospheric emissions and 63 g TEQ of fly ash emissions. It is anticipated that demonstration activities undertaken at these two pilot plants will allow for a reduction of UPOPs releases from 68 g TEQ down to 0.5 g TEQ (emissions), a PCDD/Fs emission reduction efficiency of up to 99.26%.

43. By supporting monitoring capacity development and routine UPOPs monitoring, the proposed project will assist China to properly measure UPOPs releases from its secondary copper production sector and thus, effectively enforce its industrial and environmental policies and standards. Based on such activities, the project will help China to effectively restructure its secondary copper production sector, improve the sector's economic and environmental performance, and minimize UPOPs releases from the sector.

## 5) Global Environmental Benefits and Adaptation Benefits

44. This project is expected to generate multiple benefits for the global environment as it will not only lead to a reduction in UPOPs releases from the sector, but will also reduce the sector's energy consumption; GHG (Greenhouse Gas) emissions as well as nanoparticles.

45. The direct global environmental benefits will result from a significant reduction of UPOPs releases, primarily POPs in the form of PCDD/F, HCB, PCB (and even PCNs) that would otherwise be released on an ongoing basis if no adoption of sustainable BAT/BEP would take place. At baseline level, the estimated total dioxins releases from the secondary copper sector was estimated at 1,133.8 g TEQ/a, made up of atmospheric emissions of 403 g TEQ/a and fly ash emissions of 730.8 g TEQ/a, respectively.

46. On the other hand, ecological low carbon economy development mode will be explored in this project so as to achieve low energy consumption, low pollution, and low emissions, reduces greenhouse gas emissions. In this regard, the estimated total CO<sub>2</sub> release from secondary copper was 2.2 million tons/a based on the total secondary copper output of 2.4 million tons/a and the energy consumption (average 340 kgce/t, and the elasticity coefficient of carbon dioxide emissions per-unit standard coal is selected as 2.67t CO<sub>2</sub>/tce).

## 6) Innovative, Sustainability and Potential for Scaling Up

47. The innovative aspects of the project design follow four pillars:

- (1) this initiative would represent the first GEF project in the world to launch work on reducing UPOPs releases from the secondary copper production sector, the relevant experiences and lessons learned can be replicated by other countries;
- (2) industrial cluster is a hot topic during the course in which many countries and areas seek their economic development. And then industrial domain is becoming one of the main models for achieving industrial cluster;
- (3) it is reported that the BAT/BEP for PCDD/Fs control is also effective to reduce PCNs . In this case, for UPOPs that have the same sources and similar formation mechanism as dioxins; synergistic emission reduction could be achieved through the implementing activities associated with dioxins.

48. The institutional and legal framework and technical capacity developed in the demonstration areas through this demonstration project will be used throughout the country.

Sustainability will be ensured by:

- (1) involving all key stakeholders, including local participation from the beginning of project formulation and throughout its implementation;
- (2) demonstrating the effectiveness of BAT/BEP approach to secondary copper production and control of the UPOPs emission;
- (3) supporting provincial and national capacity building; and
- (4) putting in place and demonstrating the mechanisms for effective enforcement of BAT/BEP technology, PPP-based management system, and public awareness raising.

49. The project further seeks to ensure **replicability** by including a specific component on promoting and disseminating projects results and lessons learned to the rest of China. National, provincial and local governmental organizations, institutes and enterprises involved in this project will also help ensure the dissemination of relevant information. Furthermore, the experience gained from implementation of UPOPs minimization industrial development in China can be used as reference for other countries to effectively address similar issues.

A.2. *Stakeholders*. Will project design include the participation of relevant stakeholders from civil society and indigenous people? (yes  /no  ) If yes, identify key stakeholders and briefly describe how they will be engaged in project design/preparation:

50. The roles of each key stakeholder are identified and defined as follows, however this roles will be worked out further during the PPG phase of the project:

Key Stakeholders	Roles
Ministry of Finance (MOF)	a) Overall responsibility for national GEF program; b) Review, endorse and supervise preparation and implementation of this proposal as the Country GEF Focal Point
Ministry of Environmental Protection (MEP)	a) Ongoing management of implementation of the NIP and management of the project; b) Issue national policy and standards to regulate environmental performance of China's secondary copper production sector; c) Supervise enforcement of environmental policies.
National Development and Reform Commission (NDRC)	a) Issue and enforce overall national industrial policies; b) Policy level scope definition of secondary copper production industry management.
Ministry of Industry and Information Technology (MIIT)	a) Provide technical and policy support to MOF, MOC, NDRC and MEP on development and implementation of the secondary copper production industry management system including identification of technology requirements.
Local Government and Local Environmental Protection Bureaus	a) Local planning and development approvals; b) Support public information dissemination and local social impact mitigation; c) Monitor environmental performance; d) Enforce environmental policies and requirements applicable to secondary copper management.
Non-Ferrous Metal Association of China	a) Coordinate and support compliance actions within the sector; b) Facilitate information exchanges among members; c) Facilitate formulation of sector development strategies.
Chinese Nonferrous Metal Association Recycling Metal Branch	a) Industrial strategy development of secondary metals; b) Enterprises management support.
Private Sector	a) Participate in project activities; b) Carry out investment on UPOPs reduction;

	c) Comply with national and local environmental policies and standards.
General Public	a) Improve consumers' awareness on UPOPs issues related to the secondary copper sector; b) Exercise consumers' rights to influence environmental performance of the sector.

A.3. *Gender Considerations.* Are gender considerations taken into account? (yes  /no  ). If yes, briefly describe how gender considerations will be mainstreamed into project preparation, taken into account the differences, needs, roles and priorities of men and women.

51. In the secondary copper production sector, female workers constitutes a certain proportion of the work force. In the areas of corporate management and particular production and maintenance processes, female tends to work in areas of less physical demand as compared to male workers. In a particular secondary copper production enterprise with about 300 employees, female workers may account for 20% and can be considered as occupying an important portion of the work force. At the PIF stage, there lacks sufficient relevant information and cannot provide reliable quantitative data and related diseases survey. Such survey will be conducted and data gathered during the PPG stage. However, a report on female workers at smelting enterprises in northern Sweden revealed that they are subjected to different impacts. It was also observed in the report that as the distance between the place of residence and the smelter decreases, the rate of miscarriage increases, and the weight of the new borns of those female workers were lower. It is therefore necessary to undertake further investigation and assessment on this issue, in order to reduce the negative health impacts of secondary copper smelting process emission on women.

52. The project will include activities to establish occupational protection management system, strengthen key personal security in the production process, monitoring personal health of workers to establish good management practices, establish personal health records and database. Furthermore effective training system will be established, training for workers will be strengthened, especially for female workers. Occupational protection and awareness on risk prevention will be strengthened. Measures will be instituted to reduce exposure to dioxins and heavy metal emissions during secondary copper smelting process. Practical and feasible measures will be initiated to control dust emission. Periodic occupational medical examinations will be conducted to minimize adverse impact on human health.

53. From the perspective of project design, the project will undertake gender behaviours, attitudes and impact studies, conduct occupational health surveys and assessments with typical enterprises. The results will be incorporated as key aspects in the project design to strengthen corporate operational capabilities and enhance environmental awareness of personnel. During project implementation, more than 90% of the female workers at the demonstration enterprises will be targeted for training, and actions will be undertaken to strengthen occupational and health protection and emission exposure management.

54. By reducing UPOPs releases from the secondary copper smelting processing, health risks for female workers and their children will be reduced. During implementation, the project will address priority concerns of vulnerable and high risk groups, including female workers. The project will ensure female participation in training and capacity building activities. In addition, two overarching interventions – awareness raising and multi-stakeholder's participation – will contribute to ensuring the successful implementation of gender mainstreaming.

A.4 *Risk.* Indicate risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the project design (table format acceptable):

55. Two types of risks may prevent the project objectives from being achieved: (1) failure to successfully test identified BAT/BEP options for the sector; and (2) failure to promote sector-wide adoption of tested BAT/BEP options and PPP-based industry chain management.

56. To mitigate the first risk, a national level characterization study of the sector will be conducted, technical,

economic and environmental analysis will be carried out to carefully review technical and financial feasibility of various BAT/BEP options and ensure its applicability to the Chinese secondary copper production sector, BAT/BEP guidelines will be formulated. In addition, a set of selection criteria will be developed and agreed upon among all stakeholders to ensure that participating enterprises have sufficient financial resources and technical capacity to carry out investment activities. Extensive stakeholders consultation, coordination and participation will be vigorously pursued starting from project formulation, design through successful implementation of project activities.

57. To mitigate the second risk, the project will support capacity development through close stakeholder consultation to build effective support for enforcement of national industrial and environmental policies. In addition, the project will also introduce, as necessary, new and enforceable policies, complemented by financial incentives, under the to-be-developed national replication plan in order to motivate secondary copper production enterprises to comply with the national policies.

*A.5. Coordination.* Outline the coordination with other relevant GEF-financed and other initiatives:

58. The implementation of the Stockholm Convention in China has been supported by various multilateral and bilateral organizations. With this support, China has completed its NIP, and based on the strategic guidance it contains, prepared fourteen POPs projects funded by the GEF, nine of which are under implementation. To facilitate consultation, coordination and collaboration among all stakeholders, China has set up a Technical Coordination Group (TCG) for its NIP preparation and implementation. Through the TCG, China has maintained good communication with its multilateral and bilateral development partners.

59. This project will in no way duplicate any of the nine GEF-funded POPs projects under implementation, or any other already prepared or new POPs projects China may plan to prepare, as the government has elected to focus this project on only one particular industrial source of UPOPs releases – secondary copper production. Indeed, this initiative would represent the first GEF project in the world to launch work on reducing UPOPs releases from the secondary copper production sector.

60. Experiences and lessons learned from formulation/design and implementation of other POP projects in China will be applied to benefit the design and implementation of this proposed project.

#### **DESCRIPTION OF THE CONSISTENCY OF THE PROJECT WITH:**

**B.1 IS THE PROJECT CONSISTENT WITH THE NATIONAL STRATEGIES AND PLANS OR REPORTS AND ASSESSEMENTS UNDER RELEVANT CONVENTIONS? (YES /No ). IF YES, WHICH ONES AND HOW: NAPAS, NAPS, ASGM NAPS, MIAS, NBSAPS, NCS, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURS, ETC.:**

61. The Action Plan of China's National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants (NIP) placed a high priority on reduction of unintentionally produced POPs release. A national level strategy "Guidance on Control and Prevention for PCDD/F Release" also offers the framework on environmentally sound management of PCDD/Fs emission. The NIP lists the Regeneration of metallurgical industry as one of six priority sectors to be targeted for control of UPOPs releases. The PCDD/Fs emission by the secondary copper production sector is 70.45% of the total PCDD/Fs emission of the Regeneration of metallurgical industry. During the period up to 2015, the planned actions focus on sectoral or source category initiatives involving first-stage interventions to initiate control of PCDD/Fs sources by means of technical evaluation, environmental impact assessment, revised release standards, monitoring capacity building, and BAT/BEP demonstration. During GEF-5, projects were approved in two such priority source categories: municipal waste and pulp and paper. A third sectoral initiative for environmentally sound management throughout the life cycle of electrical and electronic equipment and associated waste, with its primary focus on unintentional POPs releases was also approved for GEF-5 funding. This project, which continues the focus on unintentional POPs release in a different industrial sector, secondary copper production, with GEF support, is consistent with the NIP Action Plan. In line with guidance contained in the NIP and the 12th Five Year Plan (FYP) for POPs elimination, the project will be designed and implemented as an integral part of the country's efforts to improve the environmental performance of the sector. Specifically, the project will support implementation of the NIP by promoting BAT/BEP adoption and thus, minimize UPOPs releases from the sector. In addition, by reducing UPOPs and COD (chemical oxygen demand) discharge from the

sector, the project will support directly the implementation of the 12th FYP, as well as the associated China's Secondary Non-Ferrous Industry Development and Promotion Plan issued in 2011, which proposed to adopt energy consumption limits of less than 290 kgce/ton by the end of 2015, and further reductions through 2020. The project will also contribute to achieving the GEF-6 Corporate Results of increase in phase-out, disposal and reduction of release of POPs.


**PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)**

**A. Record of Endorsement<sup>15</sup> of GEF Operational Focal Point (S) on Behalf of the Government(s):** (Please attach the [Operational Focal Point endorsement letter\(s\)](#) with this template. For SGP, use this [SGP OFP endorsement letter](#)).

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Wensong Guo	GEF Operational Focal Point, People's Republic of China	MINISTRY OF FINANCE	08/06/2014

**B. GEF Agency(ies) Certification**

**This request has been prepared in accordance with GEF policies<sup>16</sup> and procedures and meets the GEF criteria for project identification and preparation under GEF-6.**

Agency Coordinator, Agency name	Signature	Date (MM/dd/yyyy)	Project Contact Person	Telephone	Email
Adriana Dinu, UNDP-GEF Executive Coordinator and Director, a.i.		08/07/2014	Jacques Van Engel, Officer-in-Charge, UNDP MPU/Chemicals	212-906-5782	jacques.van.engel@undp.org

<sup>15</sup> For regional and/or global projects in which participating countries are identified, OFP endorsement letters from these countries are required even though there may not be a STAR allocation associated with the project.

<sup>16</sup> GEF policies encompass all managed trust funds, namely: GEFTF, LDCF, and SCCF



**C. Additional GEF Project Agency Certification** (*Applicable Only to newly accredited GEF Project Agencies*)  
For newly accredited GEF Project Agencies, please download and fill up the required **GEF Project Agency Certification of Ceiling Information Template** to be attached as an annex to the PIF.