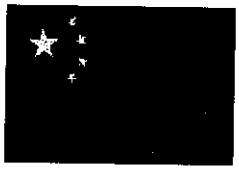


Empowered lives.
Resilient nations.

United Nations Development Programme
People's Republic of China
Project Document

Project Title:	UPOPs Reduction through BAT/BEP and PPP-based Industry Chain Management in Secondary Copper Production Sector in China
UNDAF Outcome(s):	UNDAF Outcome 2: More people enjoy a cleaner, healthier and safer environment as a result of improved environmental protection and sustainable green growth
Expected Outcome(s):	CPD Outcome 2: More people enjoy a cleaner, healthier and safer environment as a result of improved environmental protection and sustainable green growth
Expected Output(s):	Output 2: China's actions on climate change mitigation, biodiversity and chemicals across sectors are scaled up, funded and implemented
Executing Entity:	Ministry of Environmental Protection of China (MEP)
Implementing Agencies:	Foreign Economic Cooperation Office, Ministry of Environmental Protection (FECO/MEP) and United Nations Development Programme (UNDP)

Brief Description

The five-year project will help China to fulfill the requirement of the Stockholm Convention. Consistent with this objective, the project aims to reduce releases of UPOPs from secondary copper production in China, to reduce negative impacts on human health and the environment. The project will achieve this project objective through the introduction and demonstration of BAT/BEP technologies and sound process control, to increase China's capability in meeting its obligations under the Stockholm Convention. The project as outlined is structured with four components: Component 1 will support the development and improvement of regulatory framework, strengthen institutional and management capacities, and enhance coordination with other multilateral environmental conventions; Component 2 covers the development of the required infrastructure and the demonstration of BAT/BEP technologies and PPP-based industry chain management with the UNDP-GEF support focused on introduction of international technology; Component 3 will develop a national replication plan of BAT/BEP for the secondary copper smelting industry on the demonstration results and experience gained, with PPP joint governance and management structure established; Component 4 supports the monitoring and evaluation of the project and dissemination of experience and lessons learned, something that is seen as useful for other developing countries dealing with the issue globally. In addition, project management capacity will be strengthened to achieve implementation effectiveness and efficiency.

Programme Period:	60 months
Key Result Area (Strategic Plan)	
Atlas Award/Project ID:	00086820/00094023
PIMS No.	5383
Start date:	1 July 2016
End Date:	30 June 2021
PAC Meeting Date:	4 March 2016
Management Arrangement:	National Execution (NIM)

Total Budget	$65,050,000
Allocated resources:	
• GEF	$12,600,000
• Government	$ 510,000
• Private Sector	$12,000,000
• Other (Institutes)	$ 3,000,000
In kind contributions:	
▪ Government	$ 3,750,000
▪ Private Sector	$25,000,000
▪ UNDP	$ 100,000
▪ Others (Institutes)	$ 8,090,000

Agreed by: Ministry of Finance _____ Date: _____

Agreed by: FECO,
Ministry of Environmental Protection: _____ Date: 2016.6.6

Agreed by: UNDP _____ Date: _____

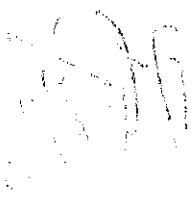


Table of Contents

ACRONYMS AND ABBREVIATIONS

AQSIQ	General Administration of Quality Supervision, Inspection and Quarantine
APR	Annual Project Report
ARR	Annual Review Report
AWP	Annual Work Plan
BAT	Best Available Techniques
BEP	Best Environmental Practice
CDR	Combined Delivery Report
CMRA	China Nonferrous Metals Association Recycling Metal Branch
CO	Country Office
EMSW	Environment Management of Solid Waste in China
EPB	Environmental Protection Bureau
FECO	Foreign Economic Cooperation Office
GEF	Global Environment Facility
GOC	Government of China
HQs	Headquarters
IA	Implementing Agencies
IR	Inception Report
IW	Inception Workshop
LPMO	Local Project Management Office
M&E	Monitoring & Evaluation
MEP	Ministry of Environmental Protection, PRC
MFA	Ministry of Foreign Affairs, PRC
MIIT	Ministry of Industry and Information Technology, PRC
MOFCOM	Ministry of Commerce, PRC
MOHURD	Ministry of Housing and Urban-Rural Development, PRC
MPS	Ministry of Public Security, PRC
NDRC	National Development and Reform Commission, PRC
NGO	Non-governmental Organizations
NIP	National Implementation Plan
NPT	National Project Team
PC	Project Coordinator
PCB	*Polychlorinated biphenyl*
PCDD/Fs	*Polychorinated dibenzodioxins/dibenzofurans*
PIM	Programme Implementation Manual
PIR	Project Implementation Review
PMO	Project Management Office
POPs	Persistent Organic Pollutants
PPG	Project Preparation Grant
PRC	People's Republic of China
RCU	Regional Coordinating Unit
SAC	Standardization Administration, PRC
SAIC	State Administration for Industry and Commerce of the People's Republic of China
SAICM	Strategic Approach to International Chemicals Management
SEPA	State Environmental Protection Administration (former body of MEP)
SESP	UNDP Social and Environmental Screening Procedure
TCG	Technical Coordination Group
TPR	Tripartite Review
TTR	Terminal Tripartite Review
UNDP	United Nations Development Programme
UNDP-GEF	United Nations Development Programme, Global Environment Facility Unit
UNEP	United Nations Environment Programme
UPOPs	Unintentional Persistent Organic Pollutants
USD	United States dollars

I. SITUATION ANALYSIS

Problem to be Addressed

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 by-products of many industrial processes, such as metallurgical processes, the incineration of chlorine-containing substances etc.

2. Secondary copper smelting involves copper production from sources that may include copper scrap, sludge, computer and electronic scrap, and drosses from refineries. Processes involved in copper production are feed pre-treatment, smelting, alloying and casting. Factors that may give rise to chemicals listed in Annex C of the Stockholm Convention include the presence of catalytic metals (of which copper is a highly effective example); organic materials in feed such as oils, plastics and coatings; incomplete combustion of fuel; and temperatures between 200 °C and 500 °C.

3. In addition to UPOPs listed in Annex C of the Stockholm Convention, direct drying or combustion of these raw materials will produce a variety of pollutants, including carbon oxides (CO_x), nitrogen oxides (NO_x), particulate matter (PM) 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 pre-treatment approaches, predominantly practiced in small and medium size enterprises, is drastically increasing the release of UPOPs in China. Such releases are not only impacting the workers in this sector, but also surrounding communities, impacting the environment and human health at local as well as global level.

5. According to the data from The Yearbook of Nonferrous Metals Industry of China (2014), the production of secondary copper increased rapidly from 2004 to 2013 in China, and reached 2.16 million tons in 2013, which accounted for 58 percent of global production. Although international prices of copper continued to decline in recent years, the production of secondary copper is still rising in China.

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. The daily inhalation doses for workers exceeded the tolerable daily intake recommended by the World Health Organization.

7. Relevant studies have indicated that UPOPs emissions from secondary copper smelters are higher than those from primary copper smelters, iron foundries and secondary aluminium smelters.

8. As part of the preparation of China's National Implementation Plan on POPs (NIP) (2007 version), a UPOPs inventory ("National Dioxin Inventory of China") based on the UNEP toolkit was undertaken. The estimated total PCDD/Fs emission from secondary copper production sector was estimated at 1,133.8 g TEQ/a, including atmospheric emissions of 403 g TEQ/a and fly ash emissions of 730.8 g TEQ/a, respectively.

9. 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.

10. Furthermore, secondary copper smelting is also an important source of PM2.5. It was reported that up to 80% of PCDD/Fs were distributed in PM2.5, which are able to infiltrate deep into the respiratory tract, reaching the lungs.

The Baseline Scenario and Associated Baseline Projects

11. Secondary nonferrous metal industry is one of six priority sectors to be targeted for control of UPOPs releases. 70.45% of national PCDD/Fs releases from secondary nonferrous metal industry originates from the secondary copper production sector (1133.8 g TEQ/a in NIP).

12. Factors that may give rise to chemicals listed in Annex C of the Stockholm Convention include the presence of catalytic metals (of which copper is a highly effective example); organic materials in feed such as oils, plastics and coatings; incomplete combustion of fuel; and temperatures between 200 °C and 500 °C.

13. The raw materials used often contain organic matters such as oil, grease, plastic, coating and insulation materials. In addition to UPOPs listed in Annex C of the Stockholm Convention, direct drying or combustion will produce a variety of pollutants, including CO_x, NO_x, PM and metal compounds, as well as organic carbon compounds.

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

15. 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).

16. In the smelting process, 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.

17. 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 pre-treatment technologies.

18. 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 fulfil environmental protection measures.

19. Labourers' 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 (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.

20. 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.

21. 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 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.

22. 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 environmental protection, to develop a circular economy and promote industrial park management.

23. 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.

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

National Institutional and Legal Framework

Institutional structure

25. In China, in addition to governmental agencies, there are various key stakeholders who are involved in secondary copper production sector management and development. The key stakeholders include civil society organizations, institutions, agencies, researchers, private sector, industrial groups, local and indigenous communities. The respective roles of key stakeholders and their areas of expertise are described below.

26. At the national level, three governmental agencies play the key roles in legislation, management, monitoring and communication of secondary copper production sector, namely, Ministry of Environmental Protection (MEP), National Development and Reform Committee (NDRC), and Ministry of Industry and Information Technology (MIIT). MEP focuses on pollution prevention and control for all kinds of industrial sectors, covering secondary copper production sector. It is mainly responsible for the development, organization, implementation and supervision of plan, policies, standards and technical guidelines in the environmental protection area. NDRC focuses on overall national and regional industry development strategy and plan. It is mainly responsible for the general industrial policy, industrial structure adjustment and cleaner production promotion. MIIT focuses on industrial production management. It is mainly responsible for development, organization, implementation and supervision of plan, policies, standards and technical guidelines in the industrial development area.

27. In the industry, the responsible parties are copper-contained waste providers, secondary copper producers, and association. The current dominated association is China Nonferrous Metals Industry Association and China Nonferrous Metals Industry Association Recycling Metal Branch (CMRA).

28. Then, there are the research institutions which comprise of Chinese Research Academy of Environmental Sciences, Chinese Academy of Science, Tsinghua University, Beijing Science and Technology University, Beijing General Research Institute of Mining & Metallurgy, other domestic research institutes, and overseas researchers.

Main laws and legislations related to secondary copper sector

29. Over the past decade, the Government of China has issued a variety of environmental laws, regulations, standards, technical guidelines and norms related to POPs control in the non-ferrous

industry, including secondary copper sector. The main environmental protection laws, regulations and rules related to POPs administration are shown in Table 1.

Table 1 Main Law and Regulations on POPs Management in Secondary Copper Production Sector in China

Law/Regulation Name	Issuing Institution	Implementation Date	Applicable Scope
Environmental Protection Law of the People's Republic of China	NPC Standing Committee of PRC	2015	Basic environmental protection law
Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution	NPC Standing Committee of PRC	2016	Prevent atmospheric pollution, protect and improve living environmental and ecological environment
Law of the People's Republic of China on Prevention and Control of Water Pollution	NPC Standing Committee of PRC	2008	Pollution prevention of surface water, e.g. river, lake, canal, channel and reservoir, etc. as well as groundwater
Law of the People's Republic of China on Prevention of Environmental Pollution Caused by Solid Waste	NPC Standing Committee of PRC	2005	Prevention of environmental pollution caused by solid waste and hazardous waste
Law of the People's Republic of China on Conserving Energy	NPC Standing Committee of PRC	2008	Promote energy conservation by all sectors of the society, increase the efficiency in the use of energy and its economic results, protect the environment, ensure national economic and social development, and meet the people's needs in everyday life.
Marine Environment Protection Law of the People's Republic of China	NPC Standing Committee of PRC	2000	Protect marine environment as well as resources and prevent pollution and damage
Environmental Impact Assessment Law of the People's Republic of China	NPC Standing Committee of PRC	2003	Environmental impact assessment of planning and construction projects
Regulations on the Administration of Construction Project Environmental Protection	State Council of PRC	1998	Environmental administration of chemical industry and other construction projects
Law of the People's Republic of China on the Promotion of Clean Production	NPC Standing Committee of PRC	2012	Promote cleaner production, increase the efficiency of the utilization rate of resources, reduce and avoid the generation of pollutants, protect and improve environments, ensure the health of human beings and promote the sustainable development of the economy and society

Law/Regulation Name	Issuing Institution	Implementation Date	Applicable Scope
Regulation on Renewable Resources Recycling Management	MOC, NDRC, MPS, MOHURD, SAIC, SEPA	2007	Provisions on management and supervision of renewable resources, including scrap metal. Encourage environmentally friendly processing of renewable resources recycling and relevant technological innovation
Circular Economy Promotion Law of the PRC	NPC Standing Committee of PRC	2009	Principle requirements on the development of nonferrous industry
Guidance on Strengthen Dioxin Pollution Prevention and Control.(2010[123])	MEP, MFA, NDRC, MOST, MIIT, MOF, MOHURD, MOC, AQSIQ	2010	Secondary copper is listed as one of the key control industry. By 2015, set up a comparatively dioxins pollution control system and long-term supervision mechanism

30. China has set up a series of national and local standards on environmental quality, industrial pollutant discharge limits, drinking water and aquatic products to control discharge of POPs as well as other environmental pollutants. POPs control limits in various effective standards of China are as shown in Table 2.

Table 2 POPs Control Limits in Various Effective Standards of China

Standard Name and Number	POPs Control Limits
Industrial Emission Standards	
Discharge standard of water pollutants for pulp and paper industry (GB 3544-2008)	Discharge limit value of water pollutants: dioxin≤30 TEQ ng/m^3 (applicable to new facility effective August 1, 2008 and existing facility as of July 1, 2011)
Discharge standard of pollutants for municipal wastewater treatment plant (GB 18918-2002)	Pollutants discharge limit value of sludge for farmland: dioxin≤100 ng TEQ/kg dry sludge; PCB≤0.2 mg/kg dry sludge
Emission standard of pollutants for petroleum chemistry industry (GB 31571-2015)	Discharge limit value of waste water: HCBD≤0.006 mg/L; dioxin≤0.3 ng TEQ/L. Emission limit value of exhaust gas: dioxin≤0.1 Ng TEQ/m^3
Emission Standards of Pollutants for Secondary Copper, Aluminum, Lead and Zink Industry. (GB 31574-2015)	Emission limit value of air pollutants: dioxin≤0.5 TEQ ng/m^3, (applicable to new facility effective July 1, 2015 and existing facility as of Jan 1, 2017)
Emission Standard of Air Pollutants for Crematory (GB 13801-2015)	Emission limit value of air pollutants for cremation: for existing facility, the dioxin emission limit value is 1.0 TEQ ng/m^3 from July 1, 2015 to June 30, 2017; the dioxin emission limit value is 0.5 TEQ ng/m^3 form July 1, 2017; for new facility, the dioxin emission limit value is 0.5 TEQ ng/m^3 from July 1, 2015. Emission limit value of air pollutants for relic and oblation incineration: 1.0 TEQ ng/m^3 from July 1, 2015

Standard Name and Number	POPs Control Limits
Emission Standard of Air Pollutants for Steel Smelt Industry (GB 28664-2012)	Emission limit value of air pollutants: Dioxins≤0.5 TEQ ng/m^3 for electric furnace
Emission Standard of Air Pollutants for Sintering and Pelletizing of Iron and Steel Industry (GB 28662-2012)	Emission limit value of air pollutants: Dioxins≤0.5 TEQ ng/m^3 for sintering and pelletizing roasting equipment
Standard for pollution control on the municipal solid waste incineration (GB 18485-2014)	Emission limit value of air pollutants: Dioxins≤0.1 TEQ ng/m^3
Standard for pollution control on co-processing of solid wastes in Cement kiln (GB 30485—2013)	Emission limit value of air pollutants: Dioxins≤0.1 TEQ ng/m^3
Technical Standard for Medical Waste Incinerator (on trial) (GB 19218-2003)	Emission limit value of air pollutants: Dioxins≤0.5 TEQ ng/m^3
Pollution control standard for hazardous wastes incineration (GB 18484-2001)	Emission limit value of air pollutants: Dioxins≤0.5 TEQ ng/m^3
Control standard on ploy chlorinated biphenyls for wastes (GB 13015-91)	Emission limit value of air pollutants: PCBs≤50 mg/kg
Environmental Quality Assessment Standards	
Environmental quality standards for surface water (GB 3838-2002)	Lindane≤0.002 mg/L; DDT≤0.001mg/L; HxCBz≤ 0.05mg/L; PCBs≤2×10^{-5} mg/L; HCBD≤0.0006 mg/L
Water quality standard for fisheries (GB 11607-89)	Lindane≤0.002 mg/L; DDT≤0.001mg/L
Environmental quality evaluation standard for farmland of greenhouse vegetables production (HJ 333-2006)	Lindane≤0.1mg/kg; DDT≤0.1 mg/kg
Farmland environmental quality evaluation standards for edible agricultural products (HJ 332-2006)	Lindane≤0.1mg/kg; DDT≤0.1 mg/kg
Occupational exposure limits for hazardous agents in the workplace (GBZ 2.1-2007)	Lindane≤0.05 mg/m^3; DDT≤0.2mg/m^3; HCBD≤0.2 mg/m^3; PCDF≤0.5 mg/m^3
Drinking Water Standards	
Standards for drinking water quality (GB 5749-2006)	Heptachlor≤0.0004 mg/L; HCH≤ 0.005mg/L; HCB≤ 0.001mg/L; Lindane≤ 0.002mg/L; DDT ≤0.001mg/L; HCBD≤ 0.0006mg/L

Standard Name and Number	POPs Control Limits
Aquatic Products Standard	
Maximum levels of contaminants in foods (GB2762-2012)	Limit value for aquatic animals and products from them: PCBs ≤ 0.5 (PCB refers to the total of PCB28, PCB52, PCB101, PCB118, PCB138, PCB153 and PCB180)

31. China has set up a series of national technical documents and standards on industrial quality and technical requirements, to control production condition, production capacity and requirements of typical facilities. Such documents catalysed the reduction of carbon discharge and environmental pollutants emission, clean production, and industrial sustainability in a way. The main national standards covering secondary copper production are outlined in Table 3.

Table 3 Main National Standards on Secondary Cooper Production Sector

Standard Name and Number	Issuing Institution	Applicable Scope
Emission Standards of Pollutants for Secondary Copper, Aluminum, Lead and Zink Industry. (GB 31574-2015)	MEP, AQSIQ	The standards specify the pollutants emission limit values for secondary copper industry
Industry Standard for Copper Smelters	MIIT	Applicable to copper smelting enterprises using copper concentrate and copper-containing secondary resource as raw materials
Scraps of copper and copper alloy (GB/T 13587-2006)	AQSIQ, SAC	The standards specifies classification, requirements, test methods, inspection rule and packaging, logo, transportation and storage of scraps of copper and copper alloy and is applicable to secondary metal smelting enterprises, including secondary copper smelting enterprises
Environmental protection control standard for imported solid wastes as raw materials-Nonferrous metal scraps (GB 16487.7-2005)	MEP, AQSIQ	Applicable to import management of nonferrous metal scraps in imported solid wastes as raw materials
Environmental protection control standard for imported solid wastes as raw materials-Waste electric motors (GB 16487.8-2005)	MEP, AQSIQ	Applicable to waste electric motors in imported solid wastes as raw materials
Environmental protection control standard for imported solid wastes as raw materials-Waste wires and cables (GB 16487.9-2005)	MEP, AQSIQ	Applicable to import management of waste wires and cables in imported solid wastes as raw materials
Environmental protection control standard for	MEP, AQSIQ	Applicable to metal and electrical appliance scraps in imported solid

Standard Name and Number	Issuing Institution	Applicable Scope
imported solid wastes as raw materials-Metal and electrical appliance scraps (GB 16487.10-2005)		wastes as raw materials
Cathode Copper (GB/T467-2010)	AQSIQ, SAC	Applicable to cathode copper produced by electrolytic refining and electrolytic deposition method

Root Causes and Barriers Analysis

Root causes of UPOPs generation

32. It is commonly considered that the formation mechanism of PCBs, HxCBz, PeCBz and PCNs is similar to that of PCDD/Fs. The formation of PCDD/Fs is probably due to the presence of carbon, oxygen, chlorine precursors (from feeds and fuels) and highly potent copper catalyst from plastics and trace oils in the feed material in a system that can provide ideal formation conditions at temperatures between 200 °C-500 °C, high levels of particulate and long residence times. As copper is the most efficient metal to catalyse PCDD/Fs and PCNs formation, copper smelting is a particular concern.

33. Because these conditions are met in secondary copper facilities, they are generally considered to be important sources of UPOPs. In the meantime, copper is the most important catalyst to PCNs formulation. That makes secondary copper production sector coming to be the most suspicious industry of PCNs generation.

Root causes of UPOPs release

34. In the studies conducted, high concentrations of PCDD/Fs were measured because the raw materials were not pre-treated before smelting. As previously mentioned, converter smelting and anode furnaces are widely used in China. These have a simple structure, are easy to operate, have high fuel consumption and produce significant emissions. UPOPs, such as PCDD/Fs, PCBs, HxCBz, PeCBz and PCNs are not considered one of the top concern factors in this industry currently. In addition to UPOPs listed above, a variety of pollutants will be generated in the smelting process, including CO_x, NO_x, SO_x, PM and metal compounds, as well as organic carbon compounds.

35. A large number of small/medium size manufacturing enterprises still lack UPOPs treatment capabilities through Off-gases disposal facilities. This is one the most important reasons for UPOPs release to the environment.

36. Almost 60% UPOPs will be formed as fly ash in the process of secondary copper production process. The lack of environmental sound management measures of fly ash is the other cause for UPOPs emission.

Barriers

37. The following elaborates on the barriers to the adoption of environmental sound management in the secondary copper production sector:

(1) Incomplete legal/regulatory framework and lack of capacity in policy enforcement at national, industrial and local level;
(2) Limited attention paid in the past to proactively support and coaches 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;
(3) Limited access to international Best Available Techniques/Best Environmental Practices (BAT/BEP) related to secondary copper processing technologies and limited ability/capacity to pilot and demonstrate it;
(4) Limited access to international experience in implementing and sustaining a PPP-based management system both financially and operationally (some secondary smelters are state

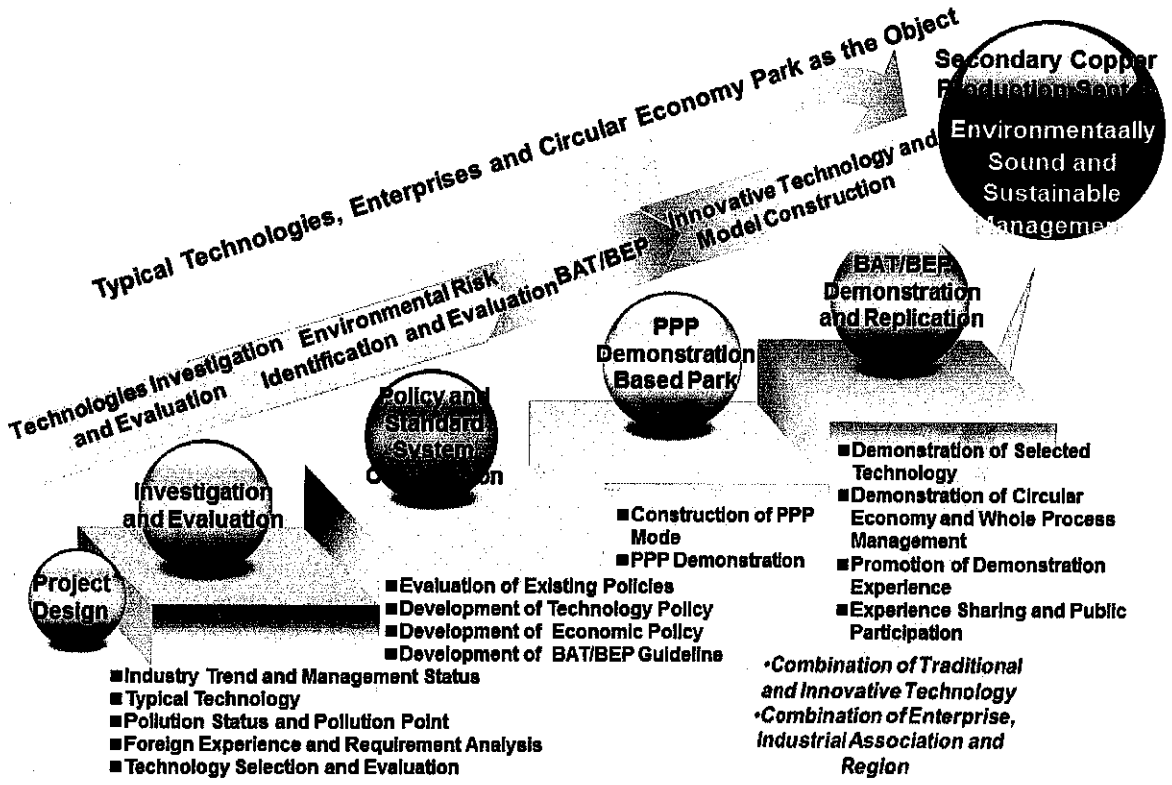
owned, some by private sector enterprises, and some others with joint ownership by the state and private sector enterprises); and

(5) Insufficient capacity to undertake monitoring of the pollution caused by the secondary copper smelting, and dealing with both socio-economic and environmental legacies.

II. STRATEGY

Strategy to Address UPOPs Emission in the Secondary Copper Production Sector

38. The overall project strategy is to blend GEF funding into the overall national secondary copper production management system development process to address the issues and barriers noted above, specifically ensuring that international best practice experience and technology options are considered. The project will achieve reduction of UPOPs release through four comprehensive and targeted components.



39. At the macro level, it will take in international experience to develop and improve the national management and supervision system for the secondary copper production sector. National technical standards will be adopted and implemented, particularly on UPOPs emission. Public awareness activities will be conducted to promote implementation of full process UPOPs reduction system.

40. Through demonstration activities at two selected locations and actions to be taken at selected enterprises, pre-treatment, smelting, alloying, casting, electrolysis, gas treatment and fly ash disposal will be conducted in an environmentally sound manner utilizing demonstrated BAT/BEP that will result in achieving reduction of UPOPs release.

Project Rational and Policy Conformity

41. The project is fully consistent with the GEF-6 Chemicals and Waste Focal Area Objective CW-2: Reduce the prevalence of harmful chemicals and waste and support the implementation of clean alternative technologies/substances, Program 3: Reduction and elimination of POPs. The project will contribute towards Outcome 3.1: Quantifiable and verifiable tonnes of POPs eliminated or reduced, to phase out POPs and other chemicals of global concern. The project will also contribute to the overall objective of the SAICM of achieving the sound management of chemicals throughout their life-cycle

in ways that lead to the minimization of significant adverse effects on human health and the environment.

Relevant GEF-6 Strategy Outcome/Indicator	Project's Contribution
Outcome 1.1: Countries have appropriate decision-making tools and economic approaches to promote the removal of barriers preventing the sound management of harmful chemicals and waste Indicator 1.1.1: Number of demonstrated tools for Mercury, new POPs and emerging chemicals and waste issues Indicator 1.1.2: Prioritized list of actions for reducing/eliminating chemicals and waste	With the evaluation, improvement and development of sector-related governance and regulatory framework, technical standards and management documents for pollution prevention and control , as well as the strengthening of capacities at national and local level for effective management and monitoring of the secondary copper sector, coupled with enhanced cooperation, communication and coordination with relevant international environmental conventions secretariat, China will be able to effectively carry out actions for sound management of harmful chemicals and wastes. The development of a national replication plan of BAT/BEP for secondary copper smelting and dismantling through the demonstration activities and international experience and knowledge gained, a concrete action plan will be in place for China to achieve 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, to contribute to global environmental benefits.
Outcome 3.1: Quantifiable and verifiable tonnes of POPs eliminated or reduced Indicator 3.1: Amount and type of POPs eliminated or reduced	Through demonstration of BAT/BEP at two secondary copper production demonstration plants, it is expected that the demonstration activities will contribute to direct reduction of 11.88 g TEQ of UPOPs release. 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 emission of 403 g TEQ/a and fly ash emissions of 730.8 g TEQ/a respectively. With the development of a national replication plan of BAT/BEP for secondary copper smelting and dismantling and its subsequent implementation, reduction of 396 g TEQ dioxin in secondary copper production sector nationwide is expected.

Project Consistency with National Priorities/Plans

42. The National Implementation Plan (NIP) for the Stockholm Convention on Persistent Organic Pollutants, completed and approved by the State Council in 2007, is the principle national plan directly pertinent to this project. The action plan placed a high priority on reduction of unintentionally produced POPs (UPOPs) release. The NIP lists the secondary nonferrous metal industry as one of six priority industries to be targeted for control of PCDD/Fs releases. The PCDD/Fs emission by the

secondary copper production industry is 70.45% of the total PCDD/Fs emission of the secondary nonferrous metal industry.

43. The task of the 12th Five Year Plan (FYP) for POPs prevention and control on key industries is to reduce PCDD/Fs emission in four key industries including the secondary nonferrous metal production industry by strengthen supervision and management, phase out outdated capacity, implementation of technological upgrading etc. The project will be designed and implemented as an integral part of the country's efforts to reduce PCDD/Fs release from secondary nonferrous industry in the next period.

44. In 2010, a national level strategy "Guidance on strengthen dioxin prevention and control " also offers the framework on reduction of PCDD/Fs emission. The Guidance set up a comparatively dioxins pollution control system and long-term supervision mechanism by 2015. Secondary nonferrous metal production industry is listed as one of four key industries and related requirements on strengthen pollution prevention and control is raised in the Guidance. In 2015, a guidance document "Technical Policy on Strengthen Dioxin Prevention and Control in key industries" provides technological route and methods on reduction of dioxin emission in secondary copper production sector, including full process control and encourages research and development of new technology. The project activities will effectively support the implementation of the national strategy.

45. In addition, the associated China's Secondary Non-Ferrous Industry Development and Promotion Plan issued in 2011 proposed to speed up phase out of outdated capacity and strengthen technology transformation. The project will conduct demonstration activities through introducing BAT/BEP which is consistent with the guiding ideology of development and promotion plan.

The Proposed Alternative Scenario, Expected Outcome and Project Components

46. Emission Standards of Pollutants for Secondary Copper, Aluminium, Lead and Zink Industry (GB 31574-2015) were issued on April 16, 2015. The standards stipulated the limit values of pollutants releases for secondary copper sector and would be effective on July 1, 2015 for new facility and as of January 1, 2017 for existing facility.

47. If the flue gas of all enterprises meets the 0.5 ng TEQ/m^3 and the fly ash is treated in an environmentally sound manner, estimated PCDD/Fs emissions for the secondary copper industry would reduce to 5.8 g TEQ/a (as compared to 1,133.8 g TEQ/a), 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.

48. The project will achieve reduction of UPOPs release through five comprehensive and targeted components. At national policy level, it will introduce international experience to improve the national policy system for secondary copper production industry on pollution prevention and control; technical standards and technology management documents will be developed and capacity building will be strengthened for effective implementation and management in the secondary copper production sector, including pollution prevention and control technology assessment and available technology guideline, cleaner production assessment indicator system, risk assessment etc.

49. Through demonstration activities at selected locations and enterprises, pre-treatment, process control, flue gas treatment and final disposal of fly ash in an environmentally sound manner utilizing demonstrated BAT/BEP, will help enterprises to meet national standards and result in achieving reduction of UPOPs release. Combining the demonstration experiences, public awareness raising events and national replication plan will be conducted to achieve UPOPs reduction nationwide in the secondary copper production industry.

Project Objective and Indicated Outputs

50. The proposed five-year project will help China to fulfil the requirement of the Stockholm Convention. Consistent with this objective and taking into account of achievements of the PPG activities, the project will strengthen institutional (industry, enterprises, decision-makers) capacities; establish and improve policy and enforcement measures; demonstrate BAT/BEP and PPP-based industry chain management to address and achieve reduction of POPs emissions in the secondary copper production process. A national replication programme will be developed to disseminate

demonstration results. The following describes detailed activities envisioned under each component to achieve the expected Outcomes and Outputs:

Component 1 – Institutional Strengthening and Capacity Building

Outcome 1.1: Improved legal framework through policy research for the 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 environmental policy, technical standards and technology management documents, industry entry condition, etc.

Output 1.1.1 Sector-related governance and regulatory framework evaluated and developed.

Activity 1.1.1 Carry out implementation performance assessment of current policies in secondary copper production sector, conduct pollution prevention and control policy research based on assessment results.

Activity 1.1.2 Develop technical standards and management documents in terms of pollution prevention and control technology assessment, cleaner production assessment indicator system, environmental risk and damage assessment etc.

Activity 1.1.3 Conduct international exchange on international knowledge and experience. Establish international communication to facilitate strengthening of policy enforcement capacities.

Outcome 1.2: Capacities of enterprises, industries and Local Project Management Office strengthened to facilitate effective management and monitoring of the secondary copper sector

Output 1.2.1 Supervision and management measures and methods are established for each relevant stakeholders.

Activity 1.2.1 Develop supervision documents on facility operation in secondary copper smelting industry. Establish technical training system and carry out training activities, in particular, for technical workers who do not know UPOPs adverse impact on the environment and human health. Promote secondary copper production sector autonomy capacities. Develop a data information management system to track and facilitate the establishment of a UPOPs index, the operational parameters, material flow etc.

Output 1.2.2 Supervision and monitoring capacity at local level is improved.

Activity 1.2.2 Establish Local Project Management Office (LPMO), carry out project management training, undertake day-to-day project management, and conduct international and cross-provincial communications and exchanges. Develop measures to strengthen raw materials management in demonstration province. Improve UPOPs monitoring capacity.

Output 1.2.3 Inter-agency and industry coordination for enhanced sustainable development within the sector is strengthened.

Activity 1.2.3. Establish a multi-stakeholder platform allowing for regular exchanges and coordination of activities between the different stakeholders.

Outcome 1.3: Enhanced cooperation with other international environmental conventions

Output 1.3.1 Communication and coordination with relevant international environmental convention secretariats on POPs management and pollution control is strengthened.

Activity 1.3.1. Undertake synergistic interaction with other conventions.

Output 1.3.2 Coordination with Basel Convention and SAICM is promoted and strengthened.

Activity 1.3.2 Undertake research and evaluation on convergence between different conventions to determine the contents, procedures and mechanisms to realize such convergences.

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 conducted

Output 2.1.1 A more up-to-date and accurate estimation and assessment of UPOPs emissions is conducted.

Activity 2.1.1 Conduct full process environmental risk analysis and assessment of secondary copper production, including dismantling and smelting process. Conduct a thorough sampling and analysis of exposure and risk groups, and an assessment of UPOPs pollution.

Output 2.1.2 Best available technologies for demonstration enterprises are selected and detailed implementation plans for demonstration activities are developed.

Activity 2.1.2 Identify technological solutions and potential providers of technical support for each POPs emitting process in secondary copper smelting, conduct economic and technical feasibility analysis for technological solutions identified. Define an implementation and evaluation plan for the smelting industry taking into account operational priorities.

Output 2.1.3 BAT/BEP is demonstrated to achieve an effective reduction in UPOPs emissions in two demonstration plants.

Activity 2.1.3 Conduct technical demonstration activities in two demonstration enterprises. Develop operation manuals on smelting process and fly ash disposal. Establish information reporting and sharing mechanism for the demonstration plants. Establish training programme, e.g. develop training materials and carry out training to the manager and practitioners of demonstration plants.

Outcome 2.2: Circular economy, PPP and centralized park based approach demonstrated for the secondary copper sector

Output 2.2.1 Implementation scheme for the circular economy and PPP industrial chain park-based secondary smelter industry arrangements for application of sustainable industrial development are developed.

Activity 2.2.1 Carry out research and analysis on approach and mechanisms to generate maximum benefits for an effective PPP industrial chain park-based secondary smelter industry management.

Output 2.2.2 Industrial park-based demonstration (Circular economy, PPP and smart environment management) is conducted to support China in achieving its national policy.

Activity 2.2.2 Conduct PPP and environmental management demonstration in the industrial park that will contribute to both environmental protection and economic development, establish smart environmental management system. Perform professional training of smart environmental management.

Output 2.2.3 Establishment of exchange platform based on circular economy and PPP industrial chain-based.

Activity 2.2.3 Promote cooperation and partnership among government agencies, research institutes, associations and enterprises to generate effective integrated solution to achieve environmental protection, sustainable development and economic development.

Outcome 2.3: Evaluation and demonstration project acceptance

Output 2.3.1 Process inspection is conducted and demonstration activities are evaluated.

Activity 2.3.1 Assist in the design and establishment of a set of evaluation indicators and manual to evaluate demonstration results. Monitor and measure UPOPs reduction as compared to the baseline.

Output 2.3.2 Acceptance of the results of the demonstration project is ensured.

Activity 2.3.2 Conduct acceptance procedures of demonstration project results based on evaluation indicator and manual.

Component 3: National Replication Programme (NRP)

Outcome 3.1: Replication and promotion of demonstration results and experience

Output 3.1.1 A national replication plan of BAT/BEP for secondary copper smelting and dismantling is developed and related activities are conducted.

Activity 3.1.1 Based on the experience gained through the pilot activities of the project, lessons learnt and key successful factors are documented. A national replication plan is developed and the roll-out of the BAT/BEP is planned and introduced through a national promotion meeting. Design incentive plan for the smelting and dismantling enterprises, conduct training on its implementation, and undertake evaluation of enterprises participating in the incentive.

Output 3.1.2 A PPP joint governance and management structure is established.

Activity 3.1.2 Together with the industry association, define clear rules, roles and responsibilities for secondary copper smelting stakeholders. Create a platform that allows private and public partners to meet regularly for the coordination of the national replication programme.

Outcome 3.2: Promotional events for public awareness raising

Output 3.2.1 A training course for full production process management in the secondary copper industry supporting BAT/BEP is established.

Activity 3.2.1 Develop knowledge products such as published and online training modules, audio, video, publications and promotion materials based on the lessons learned throughout the project duration. Conduct training sessions, promotion and public awareness activities.

Output 3.2.2 Extensive stakeholder awareness raising is conducted.

Activity 3.2.2 Organize a series of national and international workshops to disseminate demonstration results and experience, to promote the NRP implementation.

Component 4: Monitoring and evaluation

Outcome 4.1: Project monitoring and evaluation

Output 4.1.1 M&E activities undertaken with annual review, mid-term review, social and economic assessment, and terminal evaluation conducted and project performance evaluated.

Activity 4.1.1 Conduct Inception Workshop, undertake continuous monitoring as well as periodic progress reviews; apply adaptive management to the project in response to needs and findings of the monitoring activities and the Mid-Term Evaluation. Develop and implement impact assessment procedures. Conduct social and economic assessment. Conduct terminal evaluation and project performance evaluation.

Outcome 4.2: Knowledge sharing and information dissemination

Output 4.2.1 Knowledge products on best/worst practices, experience and lessons learned documented and shared nationally and internationally.

Activity 4.2.1 Prepare and disseminate experience, lessons learned and best practices at national level as the system develops and internationally through multilateral forums such as conducting international workshops, utilizing POPs and Basel Regional Centers, UNDP Regional Resource Centers and/or directly with other developing countries.

Baseline Project

51. The following elaborates on the baseline project definition by project Component:

Component 1: Institutional strengthening and capacity building: China's current legal and regulatory framework, management requirements in the field of secondary copper are covered throughout the various relevant laws, regulations and standards, but the existing problems and

needs in the current system include the following:(1) Late application of standardized management skills by the secondary copper enterprises, there is lack of specific laws and regulations directed to management of the secondary copper industry; specific provisions that apply to the management of the secondary copper industry-are covered under the comprehensive environmental management laws and regulations and the relevant provisions on non-ferrous metal smelting; (2) Non-ferrous metal smelting industry, including the secondary copper industry, has not yet considered specific provisions and requirements to address POPs, it is necessary to improve this situation in subsequent system construction. (3) While secondary copper industry standards has been established including scrap copper recycling, however, relevant pollution control standards regarding copper sludge recycling, which is most seriously polluted, also need to be taken into consideration. (4) In terms of institutional capacity-building, capacity has not been established for monitoring and enforcement of the secondary copper industry, subsequent development in this area is on strong demand and of top priority.

Component 2: Demonstration of BAT/BEP and PPP-based industry chain management in the secondary copper production sector: The annual production level of secondary copper production in 2007 was 2 million tons (China Non-Ferrous Metals Industry Association, 2008). Of the 2,000 secondary copper metallurgy plants, the annual production level of eight plants were above 500,000 tons per year, contributing about 69% to the total secondary copper yield in China.

The smaller secondary aluminum and copper plants will be shut down step by step by more strict emission standards in the near future (China Non-Ferrous Metals Industry Association, 2008). Therefore the large and medium-size enterprises will represent the typical situation of secondary nonferrous industry in China. 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 or reduce emissions of PCDD/Fs. Some of the medium-size enterprises make use of basic production and primary pre-treatment technologies. 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, majority of the small manufacturing enterprises still lack the capacity to fulfill environmental protection measures. Copper-containing material used in secondary copper production varies greatly, and includes mixed scrap, for instance electronic waste (e-waste) parts such as cables, coils, copper-plastic parts, which often contain plastic parts and chlorine compounds. These are the cause for the high POP emissions in secondary copper production. The two most relevant processes with respect to POPs emission control are the scrap pre-treatment and smelting processes, in particular the smelting reduction step. Other later processes such as refining, alloying or casting are similar to those occurring in primary copper production, and are based on copper intermediary products such as black copper that are mostly devoid of organic and chlorine impurities. They are therefore less of a concern regarding POPs. Two types of measures can be adopted to avoid emissions: 1) Primary measures that prevent the formation of POPs, and 2) Secondary measures that prevent formed POPs to be emitted to the environment.

Public and Private Partnership is critical to ensure the technical and economic feasibility of BAT/BAP to reduce POPs. Government agencies, associations, research institutes and enterprises will work together on technology selection, piloting, evaluation and formulation of the replication plan. Regular communication and cooperation mechanism will be established for the joint work. In addition to POPs reductions, other co-benefits will be identified for more incentives for the wider application of the technologies for POPs reduction. The success of circular economy will also count on the effective cooperation by both public and private partnership where government should create enabling policy environment and enterprises can generate economic values. Value chain analysis and redesign is needed for the reconstruction of the cooperation of different enterprises to ensure the circular economy will contribute to sustainable development, environmental protection and economic development.

Component 3: National Replication Programme (NRP): The baseline project would essentially undertake limited policy and national level technical guidance efforts in addressing the informal sector, its integration into the formal system, and the legacy issues associated with past practices.

However this would have a limited priority given the primary focus in the baseline project on developing the large scale formal processing capability and would not include the more locally oriented demonstration and assessment activities contemplated in the proposed project.

Component 4: Monitoring and evaluation: This component would involve a fairly minimal effort in the baseline project except as required under local practice and procedures. The international M&E practices associated with GEF projects would not be included and the potentially important initiatives associated with international dissemination of results, lessons learned and best practices would be absent in the baseline project.

Expected Results

52. The overall results of the project is the reduction and elimination of PCDD/Fs, HCB and PCNs releases through the introduction of BAT/BEP in the secondary copper production sector in China. Consistent with this objective, the five-year project aims to reduce releases of UPOPs from secondary copper production in China, to reduce negative impacts on human health and the environment. The project will achieve this project objective through the introduction and demonstration of BAT/BEP technologies and sound process control, to increase China's capability in meeting its obligations under the Stockholm Convention. The project as outlined is structured with four components: Component 1 will support the development and improvement of regulatory framework, strengthen institutional and management capacities, and enhance coordination with other multilateral environmental conventions; Component 2 covers the development of the required infrastructure and the demonstration of BAT/BEP technologies and PPP-based industry chain management with the UNDP-GEF support focused on introduction of international technology and capability; Component 3 will develop a national replication plan of BAT/BEP for the secondary copper smelting industry on the demonstration results and experience gained, with PPP joint governance and management structure put in place; Component 4 supports the monitoring and evaluation of the project and dissemination of experience and lessons learned, something that is seen as useful for other developing countries dealing with the issue globally. In addition, project management capacity will be strengthened to achieve implementation effectiveness and efficiency.

Incremental/Additional Cost Reasoning and Global Environmental Benefits

53. 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.

54. 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.

55. 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.

56. Furthermore, it is expected that very limited efforts will be undertake 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.

57. 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.

58. The Pre-selection of the pilot plants were 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. 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. It is anticipated that demonstration activities undertaken at the two pilot plants will allow for a reduction of UPOPs releases as 11.88 g TEQ totally.

59. 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.

Global Environmental Benefits and Adaptation Benefits

60. 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.

61. 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.

62. 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_2 release from secondary copper was 1.96 million tons/a based on the total secondary copper output of 2.16 million tons/a and the energy consumption (average 340 kg coal equivalent per ton, and the elasticity coefficient of carbon dioxide emissions per-unit standard coal is selected as 2.67 CO_2/ton coal equivalent).

Socioeconomic Benefits

63. The overall socioeconomic benefit of the project is derived from the elimination of POPs releases that having significant negative impacts on biological resources, inclusive of human health. The associated risk reduction at both a local and national level will positively impact the productivity of populations and reduce the financial burden imposed by potentially degraded public health, as well as contributing to general wellness, economic development and quality of life. This is particularly true for vulnerable parts of the population and for maternal health that would be improved by reduced POPs exposure.

64. More specific socioeconomic benefits from the project are associated with its proactive approach to integrating the informal sector into a properly managed and funded secondary copper production management system.

Innovative, Sustainability and Potential for Scaling Up

65. The innovative aspects of the project design follow three pillars:

(i) 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;

(ii) 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;

(iii) 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.

66. 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:

(i) Involving all key stakeholders, including local participation from the beginning of project formulation and throughout its implementation;

(ii) Demonstrating the effectiveness of BAT/BEP approach to secondary copper production and control of the UPOPs emission;

(iii) Supporting provincial and national capacity building; and

(iv) Putting in place and demonstrating the mechanisms for effective enforcement of BAT/BEP technology, PPP-based management system, and public awareness raising.

67. 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.

Risks and Mitigation Measures

68. 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.

Risks	Mitigation Measures
Failure to successfully test identified BAT/BEP options for the sector	To mitigate the 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.
Failure to promote sector-wide adoption of tested BAT/BEP options and PPP-based industry chain management	To mitigate the 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

Risks	Mitigation Measures
	copper production enterprises to comply with the national policies.

Sustainability and Replicability

69. China implemented the Stockholm Convention on POPs for over 8 years; sustainability implies not only the commitment of China and its national implementing agency to continue to make provision for Convention implementation, but also on the development of an updated NIP which will be submitted to the Conference of Parties (COP) as soon as it has been fully developed. The non-ferrous metals sector, including secondary copper sector, is one of the key industrial sectors for POPs control. It will provide initiatives to mainstream the objectives of the POPs Convention into the nation's broader development policies and strategies, and on the engagement of a wide range of stakeholders and public authorities throughout the project cycle.

70. Objectives and the actions of the project for key industrial sectors identified in the NIP will be set out to emphasize both the environmental and economic benefits of sectoral participation. Raising production effectiveness and reducing manufacturing inputs, for example, generate lower production costs and provide a positive incentive for enterprises to participate. Concomitant reductions in POPs emissions and releases bring the environmental benefits sought by the wider community.

71. The national implementing agency, FECO, has over 15 years' experience in the development, implementation and managerial oversight of projects and programmes funded by various MEAs and their funding mechanisms, including the GEF. It has wide experience of collaboration with various Intergovernmental Organizations, bilateral donors and enterprises in China.

72. Social sustainability will be ensured by strengthening public participation and ensuring access to project outcomes by the general public (e.g. website). In particular, local communities and women groups will be consulted on project activities to ensure that risks and problems associated with PCDD/Fs, PCN will be properly addressed and mitigation strategies can be formulated.

Mainstreaming Gender in Reduction and Elimination of POPs

73. 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. 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 born of those female workers were lower. It is therefore necessary to undertake further investigation and assessment on this issue during project implementation to assess the impacts of UPOPs emission on workers, in order to adopt measures to reduce the negative health impacts of secondary copper smelting process emission on women.

74. 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.

75. 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 and implementation 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.

76. 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.

Achievements of Project Preparation Grant (PPG)

77. A Project Preparation Grant (PPG) in the amount of US$300,000 was approved by GEF in order to refine the project objectives, outcomes, and outputs as well as the work plan and budget on the project components of the PIF submitted. The PPG is primarily to support local and international consultants to undertake assessment and technical assistance necessary to define the detailed project scope needed to rapidly implement the Full-sized Project (FSP). It also included activities to improve baseline scenario mapping, cost effectiveness and the global benefits of the project.

78. The PPG undertook the following activities and yielded the following outputs:

i) *National Baseline Survey*: Based on the situation in China, a comprehensive survey was conducted on the status of the secondary copper industry, the production technology and the pollution prevention and control technology (including raw materials pre-treatment, incineration control, exhaust treatment, fly ash disposal and recovery). Survey data shows the proportion of small scale enterprises is large and these small scale enterprises are poorly equipped with smelting equipment and pollution prevention and control measures that cause environmental pollution. Through the survey, the production technology and pollution prevention and control technology in secondary copper smelting were defined, gaps on policy and technology between domestic and overseas operations were identified.

ii) *National level coordination mechanism strengthened.* Led by MEP, a National Coordination Committee for Stockholm Convention was formed to coordinate at the national level to undertake the important tasks of POPs management and implementation to ensure China complies with the obligations of the Stockholm Convention. Besides, relevant government departments, industry association, research institutions and secondary copper enterprises will strengthen their cooperation on secondary copper industry management and technical improvement so as to reduce UPOPs release.

iii) *Survey, evaluation and selection of demonstration sites, enterprises and technologies* After careful and extensive background research, demonstration sites collection activity and site surveys, and based on principles established for the selection of demonstration activities, Jiangxi Province with a large number of secondary copper production enterprises and enterprises with production ability over 50,000 tons, was selected to participate as demonstration site. Enterprises visits were conducted after Jiangxi Province was selected as the demonstration site and some of the enterprises in the province were researched, visited and evaluated. According to enterprise situation, and applying the selection principles, two enterprises will be selected to participate as the demonstration enterprises during project implementation.

iv) The Expert team visited the demonstration locations to conduct research, and through continuous communications, consultations and coordination, continued to interact with the industry. In the selection of demonstration technologies, the expert team conducted workshops to discuss technical difficulties, exchange ideas to identify appropriate technology route.

v) Establishment of an expert group consists of national and international experts under the PPG phase have already produced quality reports. The expert team visited Jiangxi Province to

conduct enterprises investigation and exchange ideas to identify potential candidate demonstration enterprises through several workshops.

vi) Mobilized enterprises to actively participate in project design and formulation; secured their commitments to actively participate in project implementation and on co-financing.

vii) The dioxin emission detection of secondary production enterprises was conducted, the detection data showed that the dioxin emission value was higher than dioxin emission limit value (0.5 TEQ ng/m^3) stipulated in emission standards of pollutants for secondary copper, aluminum, lead and zinc industry (GB 31574-2015) which will be implemented for existing enterprises on July 1, 2017.

viii) According to the current domestic situation, potential available technologies for raw materials pre-treatment, incineration process control, exhaust treatment, fly ash disposal and recovery were researched. The potential appropriate technologies for demonstration enterprises need further evaluation and identification during project implementation stage based on enterprises situation.

79. A number of remaining activities and studies were recently completed, including detailed implementation plan and budget for demonstration activities at the selected demonstration site and identification of potential candidate demonstration enterprises; establishing screening criteria used to select demonstration enterprises; and inventory of potential technology on pollution prevention and control have been incorporated in the project document. Other follow-up activities are still in progress and are expected to be completed in the very near future, at which time, disbursements of the remaining committed PPG funds will take place.

III. RESULTS AND RESOURCES FRAMEWORK

Intended Outcome as stated in the Country Programme Results and Resource Framework: CPD Outcome 9: Key United Nations conventions promoted through improved capacity to fulfill their obligations
Outcome indicators as stated in the Country Programme Results and Resources Framework, including baseline and targets. **Outcome indicators and Targets:** Implementation of the Stockholm Convention supported through strengthened capacities and policies, especially in the area of reduction of POPs emissions
Applicable Key Result Area (from 2014-2017 Strategic Plan): Area of Work 1 Sustainable Development Pathways IRRF Indicator 1.3.1
Partnership Strategy UNDP will be the GEF Implementing Agency, responsible for monitoring and evaluating project objectives, activities, output and emerging issues. UNDP will manage the GEF fund based on the UNDP established procedures on GEF-funded projects.
Project title and ID (ATLAS Award ID): UPOPs Reduction through BAT/BEP and PPP-based Industry Chain Management in Secondary Copper Production Sector in China (00086820)
Applicable GEF Expected Outcomes: GEF-6 Chemicals and Waste Focal Area Expected Outcomes: 1) Outcome 1.1: Countries have appropriate decision-making tools and economic approaches to promote the removal of barriers preventing the sound management of harmful chemicals and waste; 2) Outcome 1.2: Innovative technologies are successfully demonstrated, deployed and transferred; 3) Outcome 3.1: Quantifiable and verifiable tonnes of POPs eliminated or reduced.
Applicable GEF Outcome Indicators: GEF-6 Chemicals and Waste Focal Area Outcome Indicators: 1) Indicator 1.1.2: Prioritized list of actions for reducing/eliminating chemicals and waste; 2) Indicator 1.2: Number of technologies demonstrated, deployed and transferred; 3) Indicator 3.1: Amount and type of POPs eliminated or reduced.

	Indicator	Baseline	End of Project Target	Source of Verification	Risks and Assumptions
Project Objective The project aims to address and achieve reduction of POPs emissions in the secondary copper production sector in China. A national replication programme will be developed to disseminate demonstration results, through promotional activities to roll-out BAT/BEP for national replication	Quantity of UPOPs reduction at the demonstration locations	The total PCDD/Fs emission from secondary copper production sector was estimated at 1,133.8 g TEQ/a, including atmospheric emissions of 403 g TEQ/a and fly ash emissions of 730.8 g TEQ/a respectively	11.88 g TEQ dioxin in two demonstration enterprises reduced through BAT/BEP demonstration in project period	Monitoring report of PCDD/PCDFs	Risks: Insufficient funds generated to adequately attract process facilities and associated infrastructure investment Technology limited in eliminating POPs release Assumptions: Prior commitments secured during project formulation and design BAT/BEP technologies suitable and applicable to context of Chinese secondary copper industry
	Number of facilities replicating or establishing environmentally sound secondary copper production Estimated reduction quantity through implementation of the national replication programme	Same as above	BAT/BEP integrated into development plan of secondary copper production sector Reduction of 396 g TEQ dioxin in secondary copper production sector nationwide expected through implementation of the national replication programme	Verification reports	

	Indicator	Baseline	End of Project Target	Source of Verification	Risks and Assumptions
	Number of new technologies demonstrated	None	At least 2 BAT/BEP key technologies demonstrated to meet pollution control standards Relevant technical guidelines finalized	BAT/BEP demonstration reports Finalized guidelines	
	Number of officials, decision-makers, and workers trained on sound secondary copper processing	None	At least 300 officials and 2,000 technical workers trained on BAT/BEP and sound secondary copper processing	Workshop and training reports	
Component 1: Institutional Strengthening and Capacity Building					
Outcome 1.1 Improved legal framework through policy research for the secondary copper production sector	**Expected Outputs:** 1.1.1 Sector-related governance and regulatory framework evaluated and developed				
	Effectiveness of policy implementation	Lack of specific laws and regulations directed to environmentally sound management of the secondary copper industry	Effectiveness of existing policy implementation evaluated and suggestions for improvement finalized	Evaluation report, policy drafts, circulars/directives	Risks: Resistance in compliance and inadequate enforcement effort Assumptions: Standards guiding proper secondary copper production to reduce POPs release
	Number of technical standards finalized	No specific technical standard document available for collection, logistics, pre-treatment, material recovery and hazardous waste disposal	At least 4 technical standard documents finalized	Technical standards documents	
	International knowledge and experience gained	None	International exchanges conducted	Mission reports	
Outcome 1.2 Capacity of enterprises, industries, Local Project Management Office strengthened to facilitate effective	**Expected Outputs:** 1.2.1 Supervision and management measures and methods are established for each relevant stakeholder 1.2.2 Supervision and monitoring capacity at local level is improved. 1.2.3 Inter-agency and industry coordination for enhanced sustainable development within the sector is strengthened				
	Supervision and management manual developed	None	Manual drafted, reviewed and finalized	Manual	Risks: Continued illegal enterprises

	Indicator	Baseline	End of Project Target	Source of Verification	Risks and Assumptions
management and monitoring of the secondary copper sector	Capacity for supervision and management strengthened	Limited	Local Project Management Office (LPMO) set up 2 times of training and technical exchanges conducted, covering over a total of 50 management officers	Training and technical exchange reports	activities due economic considerations Inefficient supervision and management efforts Assumptions: Established infrastructure and strengthened capacity for effective enforcement efforts
	Industry autonomy capacity building improved	None implemented	Annual training programme and technical exchanges conducted, covering over 30 enterprises and over 2,000 technicians and management personnel	Training and technical exchange reports	
	Data information management system established	None	Data information management system established and operational	Data information management system, reports	
	Coordination and sustainable development enhanced	None	Multi-stakeholder platform and international communication mechanism established to facilitate inter-agency, industry and international coordination	Meeting and mission reports	
Outcome 1.3 Enhanced cooperation with other international environmental conventions	**Expected Outputs:** 1.3.1 Communication and coordination with relevant international environmental convention secretariats on POPs management and pollution control is strengthened 1.3.2 Coordination with Basel Convention and SAICM is promoted and strengthened				
	Synergistic interaction with other conventions	None implemented	Regular communication and updates on progress took place with SAICM and other conventions	Reports and communication exchanges	Risks: Difficult in coordination and collaboration
	International exchange meetings	None implemented	Meetings conducted	Meeting reports	Assumptions: Multi- and inter-ministerial

	Indicator	Baseline	End of Project Target	Source of Verification	Risks and Assumptions
					interactions will facilitate consensus in legislative and technology improvement
Component 2: Demonstration of BAT/BEP and PPP-based Industry Chain Management					
Outcome 2.1 BAT/BEP demonstration conducted	**Expected Outputs:** 2.1.1 A more up-to-date and accurate estimation and assessment of UPOPs emissions is conducted 2.1.2 Best available technologies for demonstration enterprises are selected and detailed implementation plans for demonstration activities are developed 2.1.3 BAT/BEP is demonstrated to achieve an effective reduction in UPOPs emissions in two demonstration plants				
	Up-to-day and accurate estimation and assessment of UPOPs emission	Incomplete data	National copper sludge investigation report finalized Smelting industry implementation and evaluation planning finalized	Inventory and investigation reports	Risks: Technologies not directly targeting POPs sensitive release Assumptions: BAT/BEP are suitable for application to Chinese processing enterprises to reduce POPs release
	Technological solution and potential providers of technical support identified	None	BAT/BEP for demonstration as well as providers of technical support identified and selected	Evaluation report, project progress and completion reports	
	Technical documents compilation	None	Smelting process operation manual and dismantling process operation manuals compiled	Manuals	
	BAT/BEP demonstration	None	BAT/BEP demonstration at two plants implemented and results assessed Dioxin releases reduced to meet emission standards at two demonstration plants through demonstration activities	Progress and completion reports	
Outcome 2.2 Circular economy, PPP and	**Expected Outputs:** 2.2.1 Implementation scheme for the circular economy and PPP industrial chain park-based secondary smelter industry arrangements for application of				

	Indicator	Baseline	End of Project Target	Source of Verification	Risks and Assumptions
centralized park based approach demonstrated for the secondary copper sector	sustainable industrial development are developed 2.2.2 Industrial park-based demonstration (Circular economy, PPP and smart environment management) is conducted to support China in achieving its national policy 2.2.3 Establishment of exchange platform based on circular economy and PPP industrial chain-based				
	Management guidelines for circular economy and PPP industrial chain park-based	None	Research and analysis on approach and mechanisms to generate maximum benefits for effective management conducted and documented	Research report findings and recommendations	Risks: PPP solution not suitable for all kinds of enterprises or industrial park Assumptions: PPP model is highly promoted in China, especially given that the demonstration solution is quite suitable for the industrial chain park
	Demonstration of circular economy and PPP industrial park-based management	None	PPP and environmental management demonstrated to contribute to both environmental protection and economic development	Progress and completion reports	
	Results of demonstration activities	None	Demonstration results evaluated, documented and disseminated.	Demonstration progress and completion report; meeting and workshop reports	
Outcome 2.3 Evaluation and demonstration project acceptance	Expected Outputs: 2.3.1 Process inspection is conducted and demonstration activities are evaluated 2.3.2 Acceptance of the results of the demonstration project is ensured				
	Demonstration results monitored and reduction measured	None	Self-evaluation indicators and manual designed and established	Set of indicators and manual	Risks: Monitoring results may not reflect the real situation of the demonstration activities in a fair and objective way Assumptions: Monitoring and evaluation plan to be reviewed by expert group to ensure every point of demonstration activities can be evaluated in appropriate way
	Acceptance of the results of the demonstration project	None	Demonstration results evaluated and accepted	Acceptance report	
Component 3: National Replication Programme					
Outcome 3.1	**Expected Outputs:**				

	Indicator	Baseline	End of Project Target	Source of Verification	Risks and Assumptions
Replication and promotion of demonstration results and experience	3.1.1 A national replication plan of BAT/BEP for secondary copper smelting and dismantling is developed and related activities are conducted 3.1.2 A PPP joint governance and management structure is established				
	Project experience summary	None	Experience gained and lessons learned documented, evaluated and disseminated	Publications and evaluation report	Risks: The promotion plan not directly targeting POPs sensitive release Assumptions: Through promotion, replication can reach expected target successfully
	National replication plan	None	National replication plan incorporating experience gained and lessons learned developed	National replication plan	
	Promotion plan design and implementation	None	Promotion plan for dismantling and smelting enterprises designed and implemented. BAT/BEP integrated into development plan of secondary copper project	Activities and verification report	
Outcome 3.2 Promotional events for public awareness raising	**Expected Outputs:** 3.2.1 A training course for full production process management in the secondary copper industry supporting BAT/BEP is established 3.2.2 Extensive stakeholder awareness raising is conducted				
	Knowledge products and promotion materials	None	Knowledge products based on lessons learned developed to disseminate demonstration results	Training materials	Risks: Lack of interest of enterprises and general public on sound management and prevention and control of chemicals and wastes Low participation rate on training and public awareness activities Assumptions: Careful design of knowledge products, promotional and training activities; professional organization and promotion of events
	Training and promotional activities	None	Training sessions, promotion and public awareness activities awareness conducted, covering over 2,000 technicians and 1,000,000 general public	Training and workshop reports	
Component 4: Monitoring and Evaluation					
Outcome 4.1 Project	**Expected Outputs:**				

	Indicator	Baseline	End of Project Target	Source of Verification	Risks and Assumptions
monitoring and evaluation	4.1.1 M&E activities undertaken with annual review, mid-term review, social and economic assessment, and terminal evaluation conducted and project performance evaluated				
	Timing and quality of annual (APRs, PIRs etc.) and M&E reports Quality appraisal in Mid-Term Review and Terminal Evaluation	Indicative M&E plan, budget and timeframe	M&E activities implemented as scheduled and on budget, project implementation monitored to achieve project objectives Adaptive management undertaken	Various M&E and substantial reports Mid-Term Review, Final Project Report and Terminal Evaluation reports	Risks: Failure to exercise timely and effective M&E activities due to capacity issue Assumptions: Efficient M&E to facilitate achievement of project outcomes and objectives
Outcome 4.2 Knowledge sharing and information dissemination	**Expected Outputs:** 4.2.1 Knowledge products on best practices, experience and lessons learned documented and shared nationally and internationally				
	Lessons learnt and experience documented and disseminated; post-project action plan formulated	None	Lessons and experience documented and disseminated	Knowledge products; post-project action plan	Risks: Failure to exercise timely and effective M&E activities due to capacity issue Assumptions: Efficient M&E to facilitate achievement of outcomes and project objectives
Component 5: Project Management					
Outcome 5.1 Strengthened Project management capacities and efficiency	**Expected Outputs:** 5.1.1 Strengthened institutional capacities for effective project management to achieve results				
	Timely project implementation and disbursement	Basic project implementation structure	Capacity of National Project Team strengthened. In additional to existing staff, a Project Coordinator and a secretary are recruited National Project Team established, staffed, equipped and trained	Project APRs, PIRs, CDRs	Risks: Inadequate capacity and insufficient coordination will impact project implementation Assumptions: Efficient project management will lead to timely achievement of outcomes and project

	Indicator	Baseline	End of Project Target	Source of Verification	Risks and Assumptions
	Staff of Project Team trained about the Project Implementation Manual and relevant requirements of GEF and UNDP on project management	None	Staff trained and project management capacity strengthened	Training reports	objectives
	Routine project management activities undertaken to ensure the smooth and timely implementation of the project. The activities include but not limited to: drafting TORs, select and contract with consultants, organize M&E activities, organize the review of substantial report	None	Efficient and effective project management leading to achievement of project objectives	Progress and annual reports, mission reports and achieved outcomes	

IV. ANNUAL WORK PLAN

Detailed Breakdown of GEF and Co-Financing Budget and Work Plan

Part 1: Total Project Workplan and Budget under GEF Financing

Award ID: 00086820				**Project ID: 00094023**				**Business Unit:**	**CHN10**		
Project Title	**UPOPs Reduction through BAT/BEP and PPP-based Industry Chain Management in Secondary Copper Production Sector in China**										
Executing Agency	**Ministry of Environmental Protection (MEP)**										
	Planned Budget										

GEF Outcome / Atlas Activity*	Implementing Agent/Resp. Party	Source of Funds	Atlas Code	Atlas Budget Description	Amount (USD) 2016	Amount (USD) 2017	Amount (USD) 2018	Amount (USD) 2019	Amount (USD) 2020	Amount (USD) 2021	Total (USD)	Budget Notes
Component 1: Institutional Strengthening and Capacity Building	MEP	62000 GEF	71300	Local Consultants	0	10,000	10,000	10,000	0		**30,000**	1
			71600	Travel	10,000	20,000	20,000	20,000	20,000	10,000	**100,000**	2
			72100	Contractual Services – companies	160,000	160,000	300,000	300,000	300,000	140,000	**1,360,000**	3
			75700	Training, workshop, and conference	1,000	2,000	2,000	2,000	2,000	1,000	**10,000**	4
	Sub-total				**171,000**	**192,000**	**332,000**	**332,000**	**322,000**	**151,000**	**1,500,000**	
Component 2: Demonstration of BAT/BEP and PPP-based Industry Chain Management	MEP	62000 GEF	71200	International Consultants	0	20,000	20,000	20,000	20,000		**80,000**	5
			72100	Contractual Services – companies	590,000	1,100,000	2,100,000	2,100,000	2,000,000	500,000	**8,390,000**	6
			74500	Miscellaneous	1,000	2,000	2,000	2,000	2,000	1,000	**10,000**	7
			75700	Training, workshop, and conference	2,000	4,000	4,000	4,000	4,000	2,000	**20,000**	8
	Sub-total				**593,000**	**1,126,000**	**2,126,000**	**2,126,000**	**2,026,000**	**503,000**	**8,500,000**	
Component 3: National Replication Programme	MEP	62000 GEF	71300	Local Consultants				80,000	80,000	40,000	**200,000**	9
			72100	Contractual Services – companies			420,000	420,000	410,000		**1,250,000**	10
			75700	Training, workshop, and conference	5,000	10,000	10,000	10,000	10,000	5,000	**50,000**	11
	Sub-total				**5,000**	**10,000**	**430,000**	**510,000**	**500,000**	**45,000**	**1,500,000**	
Component 4: Monitoring and Evaluation	MEP	62000 GEF	71200	International Consultants			30,000			30,000	**60,000**	12
			71300	Local Consultants	5,000	22,000	22,000	22,000	22,000	7,000	**100,000**	13
			71600	Travel	4,000	8,000	8,000	8,000	8,000	4,000	**40,000**	14
			72100	Contractual Services – companies			85,000	85,000	85,000		**255,000**	15

GEF Outcome / Atlas Activity*	Implementing Agent/Resp. Party	Source of Funds	Atlas Code	Atlas Budget Description	Amount (USD) 2016	Amount (USD) 2017	Amount (USD) 2018	Amount (USD) 2019	Amount (USD) 2020	Amount (USD) 2021	Total (USD)	Budget Notes
			75700	Training, workshop, and conference	4,500	9,000	9,000	9,000	9,000	4,500	**45,000**	16
	Sub-total				**13,500**	**39,000**	**154,000**	**124,000**	**124,000**	**45,500**	**500,000**	
Component 5: Project Management	MEP	62000 GEF	71600	Travel	750	1,500	1,500	1,500	1,500	750	**7,500**	17
			72400	Communication & Audio Visual Equip	0	1,000	1,000	1,000	1,000	0	**4,000**	18
			74100	Professional Services	72,000	110,000	110,000	110,000	110,000	58,000	**570,000**	19
			74500	Miscellaneous	0	500	500	500	500	0	**2,000**	20
			75700	Training, workshop, and conference	1,000	1,500	1,500	1,500	1,500	688	**7,688**	21
	UNDP	62000 GEF	74598	Direct project costs	0	0	4,406	0	4,406	0	**8,812**	22
	Sub-total				**73,750**	**114,500**	**118,906**	**114,500**	**118,906**	**59,438**	**600,000**	

Budget Notes

Budget Notes:	
	Component 1 – Institutional Strengthening and Capacity Building
1	National consultant cost for to develop supervision and management manuals and to assist in the strengthening of national level capacities. ($300/day for 100 working days)
2	Pro-rata travel costs at established travel, DSA and terminal allowance rates for international knowledge exchange for MEP and FECO personnel, provincial/municipality EPBs, and technical personnel at demonstration enterprises (supporting Outcomes 1.1, and 1.2)
3	Subcontracts 1 – 19 for indicative activities and outputs as detailed in table below on pages 36 - 39
4	Training sessions, workshops and meetings to support policy review and revision; capacities strengthening; and multi-stakeholder platform
	Component 2 – Demonstration of BAT/BEP Technologies and PPP-based Industry Chain Management
5	International consultant cost for experts in BAT/BEP technologies and demonstration ($700/day for 114 working days)
6	Subcontracts 1 – 18 for indicative activities and outputs as detailed in table below on pages 36 - 39
7	Costs to cover miscellaneous unbudgeted small items relating to different activities
8	Training sessions, workshops and meetings to support demonstration activities and knowledge sharing
	Component 3 – National Replication Programme
9	National consultant cost for documenting experience and lessons learn and development of National Replication Programme, work plan; development and evaluation of incentive scheme; and development of promotional materials and training ($300/day for 666 working days)
10	Subcontracts 1 – 8 for indicative activities and outputs as detailed in table below on pages 36 - 39
11	Training sessions, workshops and meetings to support National Replication Programme, on promotional and public awareness activities

	Component 4 - Monitoring and evaluation
12	International consultant and travel costs (ticket, DSA and Terminal Allowance) for conducting Mid-Term Review and Terminal Evaluation ($700/day for 60 working days; Travel costs of $18,000)
13	National consultant cost for evaluation of project achievement of objectives and outcomes, Mid-Term Review and Terminal Evaluation, evaluation and knowledge sharing of project achievements, and audits ($300/day for 330 working days)
14	Pro-rata travel costs for national consultants and project staff at established travel, DSA and terminal allowance rates for regular M&E activities, Mid-Term Review and Terminal Evaluation
15	Subcontracts 1 – 4 for indicative activities and outputs as detailed in table below on pages 36 - 39
16	Training sessions, workshops and meetings to support M&E, promotion and public awareness activities
	Component 5 – Project management
17	Pro-rata travel costs for project monitoring and supervision
18	Communication costs
19	Professional services consist of management services of project staff/coordination of Project Management Office ($541,500), office equipment ($10,000) and office supplies/materials ($18500) for the 60-month duration of the project
20	Costs to cover miscellaneous unbudgeted small items relating to different activities
21	Training sessions, workshops and meetings to support efficient project management and supervision
22	UNDP Direct Support costs to National Implementation modality for recruitment of international consultants and travel arrangements for overseas training activities

Part 2: Total Project Workplan and Budget Reflecting GEF Resources and Co-Financing Based on Activities

Project Activities	Description of Activities	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total	GEF	Cofinancing
Component 1: Institutional Strengthening and Capacity Building									
Outcome 1.1, Output 1.1.1	**Activity 1.1.1** Carry out implementation performance assessment of current policies in secondary copper production sector, conduct pollution prevention and control policy research based on assessment results						765,000	170,000	595,000
	Activity 1.1.2 Develop technical standards and management documents in terms of pollution prevention and control technology assessment, cleaner production assessment indicator system, environmental risk and damage assessment etc.						1,530,000	340,000	1,190,000
	Activity 1.1.3 Conduct international exchange on international knowledge and experience. Establish international communication to facilitate strengthening of policy enforcement capacities						270,000	90,000	180,000
Outcome 1.2. Output 1.2.1	**Activity 1.2.1** Develop supervision documents on facility operation in secondary copper smelting industry. Establish technical training system and carry out training activities. Promote secondary copper production sector autonomy capacities. Develop a data information management system to track and facilitate the establishment of a UPOPs index, the operational parameters, material flow etc.						675,000	150,000	525,000
Outcome 1.2. Output 1.2.2	**Activity 1.2.2** Establish Local Project Management Office (LPMO), carry out project management training, undertake day-to-day project management, and conduct international and cross-provincial communications and exchanges. Develop measures to strengthen raw materials management in demonstration province. Improve UPOPs monitoring capacity						3,740,000	650,000	3,090,000
Outcome 1.2. Output 1.2.3	**Activity 1.2.3** Establish a multi-stakeholder platform allowing for regular exchanges and coordination of activities between the different stakeholders						420,000	80,000	340,000
Outcome 1.3, Output 1.3.1	**Activity 1.3.1** Undertake synergistic interaction with other conventions						30,000	-	30,000
Outcome 1.3, Output 1.3.2	**Activity 1.3.2** Undertake research and evaluation on convergence between different conventions to determine the contents, procedures and mechanisms to realize such convergences						70,000	20,000	50,000
Sub-total Component 1							**7,500,000**	**1,500,000**	**6,000,000**
Component 2: Demonstration of BAT/BEP Technologies and PPP-based Industry Chain Management in the secondary copper production sector									
Outcome 2.1, Output 2.1.1	**Activity 2.1.1** Conduct full process environmental risk analysis and assessment of secondary copper production, including dismantling and smelting process. Conduct a thorough sampling and analysis of exposure and risk groups, and an assessment of UPOPs pollution						1,000,000	400,000	600,000
Outcome 2.1, Output 2.1.2	**Activity 2.1.2** Identify technological solutions and potential providers of technical support for each POPs emitting process in secondary copper smelting, conduct economic and						1,300,000	260,000	1,040,000

Project Activities	Description of Activities	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total	GEF	Cofinancing
	technical feasibility analysis for technological solutions identified. Define an implementation and evaluation plan for the smelting industry taking into account operational priorities								
Outcome 2.1, Output 2.1.3	**Activity 2.1.3** Conduct technical demonstration activities in two demonstration enterprises. Develop operation manuals on smelting process and fly ash disposal. Establish information reporting and sharing mechanism for the demonstration plants. Establish training programme, e.g. develop training materials and carry out training to the manager and practitioners of demonstration plants						40,000,000	6,000,000	34,000,000
Outcome 2.2, Output 2.2.1	**Activity 2.2.1** Carry out research and analysis on approach and mechanisms to generate maximum benefits for an effective PPP industrial chain park-based secondary smelter industry management						200,000	80,000	120,000
Outcome 2.2, Output 2.2.2	**Activity 2.2.2** Conduct PPP and environmental management demonstration in the industrial park that will contribute to both environmental protection and economic development, establish smart environmental management system. Perform professional training of smart environmental management						2,925,000	1,170,000	1,755,000
Outcome 2.2, Output 2.2.3	**Activity 2.2.3** Promote cooperation and partnership among government agencies, research institutes, associations and enterprises to generate effective integrated solution to achieve environmental protection, sustainable development and economic development						25,000	10,000	15,000
Outcome 2.3, Output 2.3.1	**Activity 2.3.1** Assist in the design and establishment of a set of evaluation indicators and manual to evaluate demonstration results. Monitor and measure UPOPs reduction as compared to the baseline						900,000	450,000	450,000
Outcome 2.3, Output 2.3.2	**Activity 2.3.2** Conduct acceptance procedures of demonstration project results based on evaluation indicator and manual						400,000	130,000	270,000
Sub-total Component 2							**46,750,000**	**8,500,000**	**38,250,000**
Component 3: National Replication Programme									
Outcome 3.1, Output 3.1.1	**Activity 3.1.1** Based on the experience gained through the pilot activities of the project, lessons learnt and key successful factors are documented. A national replication plan is developed and the roll-out of the BAT/BEP is planned and introduced through a national promotion meeting. Design incentive plan for the smelting and dismantling enterprises, conduct training on its implementation, and undertake evaluation of enterprises participating in the incentive						4,500,000	900,000	3,600,000
Outcome 3.1, Output 3.1.2	**Activity 3.1.2** Together with the industry association, define clear rules, roles and responsibilities for secondary copper smelting stakeholders. Create a platform that allows private and public partners to meet regularly for the coordination of the national replication programme						300,000	60,000	240,000
Outcome 3.2, Output 3.2.1	**Activity 3.2.1** Develop knowledge products such as published and online training modules, audio, video, publications and promotion materials based on the lessons learned throughout the project duration. Conduct training sessions, promotion and public awareness activities						1,500,000	300,000	1,200,000

Project Activities	Description of Activities	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Total	GEF	Cofinancing
Outcome 3.2, Output 3.2.1	**Activity 3.2.2** Organize a series of national and international workshops to disseminate demonstration results and experience, to promote the NRP implementation						1,200,000	240,000	960,000
Sub-total Component 3							**7,500,000**	**1,500,000**	**6,000,000**
Component 4: Monitoring and evaluation									
Outcome 4.1, Output 4.1.1	**Activity 4.1.1**. Conduct Inception Workshop, undertake continuous monitoring as well as periodic progress reviews; apply adaptive management to the project in response to needs and findings of the monitoring activities and the Mid-Term Evaluation. Develop and implement impact assessment procedures. Conduct social and economic assessment. Conduct terminal evaluation and project performance evaluation						1,020,000	340,000	680,000
	Activity 4.2.1 Prepare and disseminate experience, lessons learned and best practices at national level as the system develops and internationally through multilateral forums such as conducting international workshops, utilizing POPs and Basel Regional Centers, UNDP Regional Resource Centers and/or directly with other developing countries						480,000	160,000	320,000
Sub-total Component 4							**1,500,000**	**500,000**	**1,000,000**
Component 5: Project management									
Outcome 5.1	Undertake day-to-day project management activities to ensure smooth and timely implementation of project activities including but not limited to: drafting TORs, select and contract with consultants, organize M&E activities, organize the review of substantial report						1,800,000	600,000	1,200,000
Sub-total Component 5							**1,800,000**	**600,000**	**1,200,000**
PROJECT TOTAL							**65,050,000**	**12,600,000**	**52,450,000**

63. To ensure smooth and efficient implementation of the project under the arrangement of national execution modality agreed between UNDP and FECO/MEP, major component of the project activities will be implemented with the support of qualified technical national and international experts and institutes, to be engaged through contractual agreements (subcontracts) by FECO/MEP with the qualified individual experts or institutions as appropriate and applicable, in accordance with established financial rules and regulations, through competitive bidding process. Such contractual agreements will be a more effective and simplified mechanism that will enable efficient supervision and monitoring by FECO/MEP and UNDP to assure the timely delivery of anticipated results. Furthermore, the subcontract arrangements will also afford better financial management as payments will only be effected on agreed deliverables and upon satisfactory completion of the tasks stipulated in the subcontract. Table 4 below highlights the major subcontracts to be awarded under each of the project component. The list is indicative and will be finalized based on the actual situation during project implementation.

Table 4 Indicative list of major subcontracts to be awarded. The actual subcontracts will be finalized based on actual situation during project implementation

Description of subcontract	Total budget (USD)	GEF (USD)	Co-financing (USD)	Indicative Activities/Outputs of the subcontracts
Component 1: Institutional Strengthening and Capacity Building				
Subcontract 1: Implementation performance assessment of current policies in secondary copper production sector	225,000	50,000	175,000	Assess domestic and international policies and implementation effects of the secondary copper production industry. Reports on existing polices and the results and impacts of policy implementation
Subcontract 2: Research on pollution prevention and control technical policy on secondary copper smelting industry	180,000	40,000	140,000	Research on pollution prevention and control technical policies on secondary copper production industry. Reports on technical policies addressing pollution prevention and control in the industry
Subcontract 3: Research on pollution prevention and control economic policy on secondary copper smelting industry	225,000	50,000	175,000	Research on economic policies covering pollution prevention and control in the secondary copper industry. Reports on policies on pollution prevention and control in the industry
Subcontract 4: Technical standards on pollution prevention and control and technology assessment and evaluation in secondary copper smelting industry	270,000	60,000	210,000	Development of technical standards for pollution prevention and control for secondary copper smelting industry. Standards will guide reduction of pollutants emission in the smelting industry
Subcontract 5: Technical standards on cleaner production assessment indicator system on secondary copper smelting industry	315,000	70,000	245,000	Development of technical standards on cleaner production for pollution prevention and control inn secondary copper smelting industry. Standards to guide cleaner production to reduce pollutants emission
Subcontract 6: Environmental risk assessment and technical standards on pollution prevention and control on secondary copper smelting industry	270,000	60,000	210,000	Conduct environmental risk assessment and develop technical standards on pollution prevention and control in the secondary copper smelting industry` Reports to guide technology selection
Subcontract 7: Environmental damage assessment and technical standards on pollution prevention and control secondary copper smelting industry	225,000	50,000	175,000	Assessment of damage of secondary smelting industry on the environment and human health. Reports to guide pollution prevention and control actions in the secondary copper smelting industry
Subcontract 8:Development of technical pollution control specifications of low-grade copper scrap	225,000	50,000	175,000	Develop pollution prevention and control specifications on low-grade copper scrap. Specifications will guide pretreatment of low-grade copper scrap
Subcontract 9: Development of technical pollution control specifications on copper scrap dismantling	225000	50,000	175,000	Specification on pollution prevention and control in copper scrap dismantling to reduce generation of dioxin during copper smelting process
Subcontract 10: Development of supervision document on facility operation in secondary copper smelting industry	225,000	50,000	175,000	Supervision and management documents developed to guide operation, supervision and management of production facilities in secondary copper smelting industry to strengthen policy enforcement capacities
Subcontract 11: Establishment of technical training system in secondary copper smelting industry	225,000	50,000	175,000	Establish technical training system to address pollution prevention and control in the secondary copper smelting industry on environmentally sound process, in particular targeting workers and technical personnel who are not aware of UPOP's impact on the environment and human health
Subcontract 12: Promotion of secondary copper	135,000	30,000	105,000	Capacity building activities to promote the secondary copper production sector

production sector autonomy capacities				autonomy capacities
Subcontract 13: Establishment of Local Project Management Office and day-to-day management	400,000	80,000	320,000	Establish Local Project Management Office in the demonstration location to undertake and facilitate efficient day-to-day project management
Subcontract 14: Capacity strengthening on supervision and management on dioxin	2,940,000	490,000	2,450,000	Strengthen capacity in effective supervision and management of activities addressing the reduction of dioxin
Subcontract 15: Training of personnel on sound chemical management	250,000	50,000	200,000	Develop training materials and conduct training sessions for LPMO staff on supervision and management of dioxin
Subcontract 16: Inter-agency and industry coordination	400,000	80,000	320,000	Establish multi-stakeholder platform to facilitate regular international and cross-provincial communication and experience exchanges
Subcontract 17: Development measures to strengthen raw material management	150,000	30,000	120,000	Develop measures to strengthen raw materials management in demonstration province
Subcontract 18: Synergistic interaction	30,000	-	30,000	Undertake synergistic interaction with other conventions to enhance cooperation
Subcontract 19: Research and evaluation on convergence between different conventions	70,000	20,000	50,000	Undertake research and evaluation on convergence between different conventions to facilitate convergences with other international environmental conventions
Sub-total	**6,985,000**	**1,360,000**	**5,625,000**	
Component 2: Demonstration of BAT/BEP Technologies and PPP-based Industry Chain Management				
Subcontract 1: Environmental risk assessment of the demonstration enterprises	200,000	80,000	120,000	Conduct full process environmental risk analysis and assessment of secondary copper production to generate up-to-date and accurate estimation of UPOPs emissions in demonstration enterprises
Subcontract 2: Environmental risk assessment of smelting enterprises	175,000	70,000	105,000	Conduct full process environmental risk analysis of assessment of the smelting process to yield an assessment of UPOPs pollution in dismantling enterprises
Subcontract 3: BAT technology selection and feasibility study	175,000	70,000	105,000	Identify technological solutions and potential providers of technical support for POPs emitting process in secondary copper smelting. Conduct technical feasibility analysis to facilitate BAT/BEP demonstration
Subcontract 4: Development and refinement of implementation plan and evaluation plan of the demonstration enterprise	200,000	80,000	120,000	Develop and define an implementation and evaluation plan for the smelting industry taking into account of operational priorities to facilitate demonstration activities
Subcontract 5 -6: Demonstration at smelting enterprises	35,000,000	5,000,000	30,000,000	Conduct technical demonstration activities in two demonstration enterprises to achieve UPOPs emissions reduction
Subcontract 7: Capacity strengthening of park based chain management	5,000,000	1,000,000	4,000,000	Capacity building to strengthen approach and mechanisms to generate maximum benefits for an effective PPP industrial chain park-based secondary smelting industry management
Subcontract 8: National copper sludge investigation	400,000	80,000	320,000	Investigation to generate accurate information and data to facilitate UPOPs emissions reduction
Subcontract 9: Operation procedures for pollution prevention in secondary copper smelting process	400,000	80,000	320,000	Operation manuals on environmentally sound management to achieve effective national policy on UPOPs emissions reduction

Subcontract 10: Operational procedures for fly ash and slag disposal and recovery	250,000	50,000	200,000	Operation manuals on smelting process and fly ash disposal to achieve national policy on UPOPs emissions reduction
Subcontract 11: Facilitation of information disclosure of secondary copper production enterprises	250,000	50,000	200,000	Establish information reporting and sharing mechanism for the demonstration enterprises for effective monitoring and management
Subcontract 12: Development and refinement of smart park based environmental management system and evaluation plan	200,000	80,000	120,000	Establish smart environmental management system and evaluation plan to guide park conduct effective management of demonstration activities
Subcontract 13: Information/data collection on secondary copper production and establishment of management information system	375,000	150,000	225,000	Establishment of effective centralized park chain data collection and management system for application of sustainable industrial development
Subcontract 14: Development and operation of smart environmental management modules	1,100,000	440,000	660,000	Smart environmental management to contribute to both environmental protection and economic development
Subcontract 15: Training on effective application of secondary copper production industry platform	200,000	80,000	120,000	Perform professional training of smart environmental management system
Subcontract 16: Conduct PPP and smart industrial park based environmental management demonstration	1,250,000	500,000	750,000	Conduct PPP and environmental management demonstration in the industrial park that will contribute to both environmental protection and economic development
Subcontract 17: Design and establishment of evaluation indicators and manual	900,000	450,000	450,000	Design and establishment of a set of evaluation indicators and manual to evaluate demonstration results. Conduct process inspection to monitor and measure UPOPs emission
Subcontract 18: Acceptance procedures of demonstration project results	400,000	130,000	270,000	Conduct demonstration project results acceptance based on evaluation indicators and manual
Sub-total	**46,475,000**	**8,390,000**	**38,,085,000**	
Component 3: National Replication Programme				
Subcontract 1: Development of an implementation plan for national replication including promotion	250,000	50,000	200,000	Development of an Implementation and promotion plan for national replication including a promotion scheme
Subcontract 2 -3: Development of Incentive schemes for secondary copper dismantling and smelting enterprises	3,750,000	750,000	3,000,000	Design and development of an incentive scheme targeting enterprises to participate in the National Replication Programme
Subcontract 4: Design and production of online training modules	1,000,000	200,000	800,000	Design of online training modules to raise public awareness, promote and generate interest in participation of the National Replication Programme
Subcontract 5: Conduct training sessions	250,000	50,000	200,000	Conduct training sessions to raise awareness and promote the National Replication Programme
Subcontract 6: Conduct promotion activities	350,000	70,000	280,000	Public awareness and promotion activities to promote and generate interest on the National Republication Programme
Subcontract 7: Development of promotional video	400,000	80,000	320,000	Develop video on lessons learned of the demonstration results used to promote public awareness
Subcontract 8: Conduct province level promotional	250,000	50,000	200,000	Conduct promotional activities at provincial level on National Republication

activities				Programme
Sub-total	**6,250,000**	**1,250,000**	**5,000,000**	
Component 4: Monitoring and evaluation				
Contract 1: Social and economic assessment	270,000	90,000	180,000	Carry out project social and economic assessment to generate social and economic assessment reports
Subcontract 2: Annual project audit	25,000	25,000	-	Conduct annual financial and management audit on project activities and results. Annual financial and management audit report to facilitate adaptive management
Subcontract 3: Project performance evaluation	270,000	90,000	180,000	Conduct project performance evaluation to yield evaluation report on achievements and lessons learned of the project
Subcontract 4: Production and sharing of knowledge products	150,000	50,000	100,000	Demonstration results, experience and lessons learned documented and knowledge products produced for dissemination and promotion
Sub-total	**715,000**	**255,000**	**460,000**	

V. MANAGEMENT ARRANGEMENTS

Project management arrangement

64. The project will be implemented under National Execution (NIM) modality in line with the Standard Basic Assistance Agreement between UNDP and the Government of China and the Country Programme Action Plan (CPAP). The Ministry of Environmental Protection is the government institution responsible for the daily execution and coordination of the project and will serve as the government Executing Agency (EA). MEP has designated FECO as the entity in the implementation of activities relating to fulfilling China's obligations under multilateral environmental conventions. UNDP is the GEF Implementing Agency (IA) for the project.

65. For the implementation of this project, it will involve a wide range of stakeholders. The roles and responsibilities of the various stakeholders directly involved in project implementation are described below:

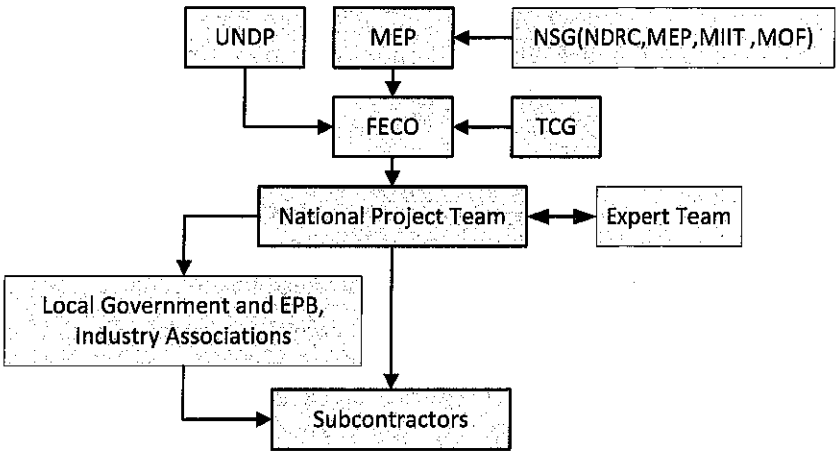


Figure 1: Project Institutional Arrangement

a. **Ministry of Environmental Protection (MEP).** As the administrative authority on environmental protection, is designated by the State Council as the core agency for coordination of all POPs related activates in China and the focal point for the implementation of the POPs Convention in China. MEP is national implementing agency for this project. Its responsibilities will include (1) responsible for the project in general and ensure its successful implementation and quality; (2) to provide political direction and guidance to FECO; (3) coordination with stakeholders, including GEF, donors, IAs, and relevant domestic ministries and agencies, including the member commissions and ministries of the NCG; (4) development/issuance/implementation of national policy and standards to regulate environmental performance of the secondary copper production management system; (5) Identification of BAT/BEP technology requirements; (6) qualification and permitting of secondary copper production management processing facilities; (7) supervision of the enforcement of environmental policies and performance requirements applied to secondary copper production management; (8) supervision the disclosure of environmental information; and (9) supervision of the day-to-day management of the project.

b. **National Development and Reform Commission (NDRC).** NDRC is responsible for developing macroeconomic plans and pilot projects related to the socially-, economically- and environmentally-responsible treatment of secondary metals production. It issues and enforces overall national industrial policies, and undertakes policy level scope definition of secondary copper production industry management.

c. **Ministry of Industry and Information Technology (MIIT).** MIIT provides technical and policy guide to MOF, MOC, NDRC and MEP on development and implementation of the secondary copper production industry management system including identification of technology requirements.

d. **Ministry of Finance (MOF).** As the country's GEF Operational Focal Point, MOF has the overall responsibility for national GEF programme. It reviews, endorses and supervises preparation and implementation of GEF funded projects, receives and supervises use of the GEF grant.

e. **National Steering Group (NSG).** An inter-ministerial steering group consists of NDRC, MEP, MIIT, and MOF to provide overall guidance and coordination for the implementation of relevant activities and legislative measures, to ensure the committed inputs and contributions are available as needed. The NSG will meet twice per year or as needed.

f. **Foreign Economic Cooperation Office, Ministry of Environmental Protection (FECO/MEP).** FECO is an inter-departmental coordination unit of MEP and acts as the secretariat of the NSG. It is responsible for day-to-day compliance with the Stockholm Convention in China. FECO's responsibilities include: (1) provision of technical support for international negotiations and policy studies on the Stockholm Convention, (2) provision of support to the development and implementation of corresponding policy and regulations, as well as coordination of key governmental stakeholders, (3) mobilize co-financing for the project from bilateral and domestic governmental and private sources, (4) collecting data and information, compiling reports, organizing trainings, and publishing information. In this project, FECO will represent MEP to provide political guidance to the implementation of this project, coordinate with various stakeholders with TCG and other appropriate approaches, and to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost.

g. **National Project Team (NPT).** The project team, composing of a Project Coordinator (PC), a Project Assistant, and additional support staff from MEP and possibly staff from other ministries with respective responsibilities on secondary copper production management and legislative activities, is administratively managed by FECO/MEP. FECO is a professional office with more than 15 years experiences for the implementation of international environmental cooperation programs and for the follow-up implementation of international environmental conventions. In general, the team is responsible for the day-to-day management, coordination and implementation of the proposed project under the guidance of FECO and with the support of the consultants recruited. Its responsibilities include (1) to manage project procurement and financial resource in accordance with UNDP's procedures, prepare and amend as necessary the Annual Work Plan and relevant progress and financial report; (2) to organize and convene project coordination and review meeting, including the Annual Review Meeting and prepare Project Review Report; (3) to prepare TORs under this project; (4) to select and contract with individual consultants and sub-contractors, supervise the implementation of contractors to ensure the smooth implementation of the contracts; (5) to provide guidance to the local EPB and industry association; and (6) to organize the inspections and verifications related to the project achievement.

h. **Technical Coordination Group (TCG).** During NIP development, FECO/MEP established a coordination mechanism for stakeholder involvement, called TCG. Relevant domestic stakeholders, international IAs and EAs, as well as potential bilateral donors, private sectors, NGOs etc. would be informed about the progress and further needs for Convention implementation, invited to advise on its design and encouraged to be involved and co-fund some of the activities. They would be briefed on the implementation progress and impacts at the TCG meetings. FECO will continue to convene TCG meetings at interval of around once per year. The coordination on the implementation of this project will be one of the important components of the TCG meetings.

i. **Local Project Management Office (LPMO).** LPMO is established for routine management under this project. The staff of LPMO will come from the member bureaus. It is responsible for (1) organization of project demonstration activities implementation; (2) development of annual work

plans and budgets and the submission to FECO; (3) coordination with stakeholders to ensure successful project implementation; (4) collection of information needed and preparation of the required reports; and (5) supervision of the day-to-day management of the project.

j. **Expert Team.** Consultants will be engaged to provide technical support for the implementation of the project. (1) international expert(s) will be recruited as needed to introduce international experience on secondary copper production management, and to provide overall technical direction and guidance for the application of BAT/BEP technology demonstration; and (2) national technical experts with experience and knowledge in secondary copper production management and BAT/BEP technology demonstration will be recruited to work with the international experts and assist FECO and LPMO for the demonstration activities.

k. **China Nonferrous Metals Industry Association.** The Association is responsible for (1) coordinate and support compliance actions within the secondary copper production sector; (2) facilitate information exchanges among the members; and (3) facilitate formulation of sector development strategies.

l. **China Nonferrous Metals Association Recycling Metal Branch (CMRA).** The Branch will be involved in industrial strategy development on secondary metals sector and assist in providing support to enterprise on management competency.

m. **Private Sector.** The Private Sector will provide financing, business planning and detailed design on the development and operation of secondary copper production facilities, participate in BAT/BEP identification and the demonstration activities, provide investment in their facilities and comply with national and local environmental policies and standards to achieve UPOPs reduction.

n. **General Public, NGOs (International/National/Community levels).** General public will be informed through public awareness activities on UPOPs issues related to the secondary copper production, and will exercise consumer's rights to influence on environmental performance by the secondary copper production sector. NGO organizations will assist in communication activities at the national and local levels support awareness raising on sound management of wastes in secondary copper production, and be invited to participate in the assessment of the effect of the implementation of the project.

Oversight of project activities will be the responsibility of the NSG. Day-to-day operational oversight will be ensured by UNDP, through the UNDP Country Office, and strategic oversight by the UNDP/GEF Regional Technical Advisor (RTA) responsible for the project. This oversight will include ensuring that the project practices due diligence with regard to UNDP's Social and Environmental Screening Procedure (SESP).

FECO/MEP will take overall responsibility for the project execution, and the timely and verifiable attainment of project objectives and outcomes. FECO will provide support to, and inputs for, the implementation of all project activities, and recruitment of project staff and contracting of consultants and service providers with the advice from and involvement of the UNDP. The day-to-day administration of the project will be carried out by a National Project Team (NPT). The project staff will be recruited following UNDP and FECO/MEP recruitment procedures. The Project Coordinator will, with the support of the Project Assistant, manage the implementation of all project activities, including: (i) preparation/updates of project work and budget plans, record keeping, accounting and quarterly and annual progress reporting; (ii) drafting of terms of reference, technical specifications and other documents as necessary; (iii) identification, proposal of project consultants to be approved by the NSG, coordination and supervision of consultants and suppliers; (iv) organization of duty travel, seminars, public outreach activities and other project events; and (v) maintaining working contacts with project partners at the central and local levels.

The NPT for the national-level project will be responsible for coordinating with each provincial projects and providing guiding. The PC will also liaise and work closely with all partner institutions to ensure

good coordination with other complementary national programmes and initiatives. Under the supervision of the National Project Team, project management for the implementation of activities at the selected demonstration site in Jiangxi Provinces will be coordinated through the established Local Project Management Office.

The Project Coordinator is accountable to the NPT and the NSG for the quality, timeliness and effectiveness of the activities carried out, as well as for the use of funds. The PC will produce Biennial Work Plan and Budget Plans to be approved by the NSG. These plans will provide the basis for allocating resources to planned activities. The PC will further produce quarterly operational reports for consolidation into the Annual Progress Reports (APR) for submission to the PSC. These reports will summarize the progress made by the project versus the expected results, explain any significant variances, detail the necessary adjustments and be the main reporting mechanism for monitoring project activities. The PC will also be technically supported by contracted national and international service providers. Recruitment of specialist services for the project will be done by the NPT in consultation with the UNDP. The organigram for project management under Management Arrangements illustrates the working relationship between all main project implementing parties or bodies.

Coordination with other related initiatives

66. 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.

67. 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.

68. 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.

UNDP Cost Recovery Policy

69. As per Determination and Decision of UNDP's Executive Board on the Cost Recovery Policy over Regular and Other Resource-funded projects, the GEF contribution is subject to UNDP's cost recovery as follows:

(i) Direct Costs incurred in the provision of Direct Project Services (DPS) by UNDP. These costs shall be unequivocally related to specific activities and transactional services clearly identified, charged annually as per the UNDP Universal Price List. For more details, please see Annex 4.

VI. MONITORING AND EVALUATION PLAN AND BUDGET

Monitoring and Reporting

70. Project monitoring and evaluation (M&E) will be conducted in accordance with established UNDP and GEF procedures and will be provided by the project team and the UNDP Country Office (UNDP-CO) with support from UNDP-GEF Regional Coordinating Unit (RCU) in Bangkok. The Results and Resources Framework under Annex A provides performance and impact indicators for project implementation along with their corresponding means of verification. These indicators, together with the POPs Tracking Tool will be used as instruments to monitor progress in POPs reduction management

effectiveness and form the basis for the M&E system under this project. The M&E plan includes: inception report, project implementation reviews, quarterly and annual review reports, and mid-term and terminal evaluations. The following sections outline the principal components of the Monitoring and Evaluation Plan and indicative cost estimates related to M&E activities. The project's Monitoring and Evaluation Plan will be presented and finalized in the Project's Inception Report following a collective fine-tuning of indicators, means of verification, and the full definition of project staff M&E responsibilities.

71. The Ministry of Environment (MEP) as the national implementing agency will designate the National Project Team (NPT) to be responsible for the organization of the M&E activities as stated in Table 5.

Table 5 - Indicative Monitoring and Evaluation Work Plan, Budget and Time Frame

Type of M&E Activity	**Responsible Parties**	**Budget (GEF)**	**Budget Co-financing**	**Budget (US$)** *(Excluding project team staff time)*	**Time frame**
Initiate the project by Inception Workshop (IW)	National Project Team (NPT)	10,000	10,000	20,000	Within first three months of project start up
Prepare Inception Report	NPT	0	0	Included in IW	Submit draft two weeks before IW, finalize two weeks after IW
Verify impact indicators, project progress and performance by field visits, questionnaires, interviews and monitoring as appropriate	NPT, Project Manager to oversee and designate responsibilities	150,000	385,000	535,000	Annually, prior to APR/PIR as defined in AWPs
Prepare Quarterly Progress Reports	NPT	0	0	None	Quarterly
Prepare Annual Project Reports (APR) and Project Implementation Reviews (PIR)	NPT in collaboration with UNDP-CO and UNDP-GEF	0	0	None	Annually, before ARM
Convene Annual Review Meetings (ARM)	Project Coordinator in collaboration with UNDP-CO	25,000	25,000	50,000	Annually
Prepare minutes for Annual Review Meetings	UNDP-CO	0	0	Included in ARM	Two weeks after meeting
Carry out annual project financial audits	Independent Audit Entity	25,000	0	25,000	Annually
Carry out Mid-Term Review and Terminal Evaluation	PT, UNDP-CO, External Consultants	90,000	180,000	270,000	Mid and End of the project
Prepare Terminal Report, with social and economic impact assessment	PT, UNDP-CO, local consultants	100,000	200,000	300,000	Two months after project completion
Lessons learned and knowledge generation	PT, UNDP-CO, UNDP-GEF	60,000	120,000	180,000	Annually

Type of M&E Activity	Responsible Parties	Budget (GEF)	Budget Co-financing	Budget (US$) *(Excluding project team staff time)*	Time frame
Visits to field sites (UNDP staff travel costs to be charged to IA fees)	UNDP-CO, UNDP-GEF (as appropriate), Government Representatives	40,000	80,000	120,000	Annually as required
TOTAL indicative Cost *Excluding expenses of NPT and UNDP*		500,000	1,000,000	1,500,000	

Project Inception Phase

72. A Project Inception Workshop (IW) will be conducted with the full project team, relevant government counterparts, co-financing partners, the UNDP-CO and representative from the UNDP-GEF Regional Coordinating Unit, as well as UNDP-GEF (HQs) as appropriate to inform the key stakeholders the goal, objectives and management arrangement of the project, mobilize them to actively participate in the implementation of this project. A fundamental objective of the Inception Workshop will be to assist the project team to understand and take ownership of the projects goal and objective, as well as to finalize preparation of the project's first annual Work Plan (AWP) on the basis of the Results and Resources Framework, along with M&E plan, with concise and measurable performance indicators and in a manner consistent with the expected outcomes of the project. Additionally, the purpose and objective of the Inception Workshop will be to: (i) introduce project staff to the UNDP-GEF team which will support the project during its implementation, namely the CO and responsible Regional Coordinating Unit staff; (ii) detail the roles, support services and complementary responsibilities of UNDP-CO and RCU staff vis à vis the project team; (iii) provide a detailed overview of UNDP-GEF reporting and monitoring and evaluation (M&E) requirements, with particular emphasis on the Annual Project Implementation Reviews (PIRs) and related documentation, the Annual Review Report (ARR), Annual Review Meetings, audited financial statements, as well as mid-term and final evaluations. Equally, the IW will provide an opportunity to inform the project team on UNDP project related budgetary planning, budget reviews, and mandatory budget rephasings. The IW will also provide an opportunity for all parties to understand their roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff and decision-making structures will be discussed again as needed, in order to clarify for all, each party's responsibilities during the project's implementation phase. NPT will prepare the Inception Report to summarize the outputs and achievement of the workshop.

Monitoring responsibilities and events

73. A detailed schedule of project reviews meetings will be developed by the project management, in consultation with project implementation partners and stakeholder representatives and incorporated in the Project Inception Report. Such a schedule will include: (i) tentative time frames for Tripartite Reviews, Steering Committee Meetings, (or relevant advisory and/or coordination mechanisms) and (ii) project related Monitoring and Evaluation activities.

74. Day-to-day monitoring of implementation progress will be the responsibility of the Project Coordinator based on the project's Annual Work Plan and its indicators. The National Project Team will inform the UNDP-CO of any delays or difficulties faced during implementation so that the appropriate support or corrective measures can be adopted in a timely and remedial fashion.

75. The Project Coordinator and the Chief Technical Advisor will fine-tune the progress and performance/impact indicators of the project in consultation with the full project team at the Inception Workshop with support from UNDP-CO and assisted by the UNDP-GEF Regional Coordinating Unit.

Specific targets for the first year implementation progress indicators together with their means of verification will be developed at this Workshop. These will be used to assess whether implementation is proceeding at the intended pace and in the right direction and will form part of the Annual Work Plan. The local project management offices will also take part in the Inception Workshop in which a common vision of overall project goals will be established. Targets and indicators for subsequent years would be defined annually as part of the internal evaluation and planning processes undertaken by the project team.

76. Measurement of impact indicators related to global benefits will be done according to the schedules defined in the Inception Workshop. The measurement of these will be undertaken through subcontracts or retainers with relevant institutions, or through specific studies that are to form part of the projects activities. Indicators of project goal, progress and performance will be continuously monitored and evaluated throughout the whole project life.

77. Periodic monitoring of implementation progress will be undertaken by the UNDP-CO through quarterly meetings with the project proponent, or more frequently as deemed necessary. This will allow parties to take stock and to troubleshoot any problems pertaining to the project in a timely fashion to ensure smooth implementation of project activities.

78. UNDP-CO and UNDP-GEF RCU as appropriate, will conduct yearly visits or more often based on an agreed upon schedule to be detailed in the project's Inception Report / Annual Work Plan to assess first hand project progress. Any other member of the Steering Committee can also accompany, as decided by the Steering Committee. A Field Visit Report will be prepared by the UNDP-CO and circulated no less than one month after the visit to the project team, all Steering Committee members, and UNDP-GEF.

79. Annual Monitoring will occur through the Tripartite Review (TPR). This is the highest policy-level meeting of the parties directly involved in the implementation of a project. The project will be subject to Tripartite Review (TPR) at least once every year. The first such meeting will be held within the first twelve months of the start of full implementation. The project proponent will prepare an Annual Project Report (APR) and submit it to UNDP-CO and the UNDP-GEF RCU at least two weeks prior to the TPR for review and comments.

80. The APR will be used as one of the basic documents for discussions in the TPR meeting. The project proponent will present the APR to the TPR, highlighting policy issues and recommendations for the decision of the TPR participants. The project proponent also informs the participants of any agreement reached by stakeholders during the APR preparation on how to resolve operational issues. Separate reviews of each project component may also be conducted if necessary.

81. The Terminal Tripartite Review (TTR) will be held in the last month of project operations. The project proponent is responsible for preparing the Terminal Report and submitting it to UNDP-CO and UNDP-GEF's Regional Coordinating Unit. It shall be prepared in draft at least two months in advance of the TTR in order to allow review, and will serve as the basis for discussions in the TTR. The Terminal Tripartite Review considers the implementation of the project as a whole, paying particular attention to whether the project has achieved its stated objectives and contributed to the broader environmental objective. It decides whether any actions are still necessary, particularly in relation to sustainability of project results, and acts as a vehicle through which lessons learnt can be captured to feed into other projects under implementation of formulation.

82. The TPR has the authority to suspend disbursement if project performance benchmarks are not met. Benchmarks will be developed at the Inception Workshop, based on delivery rates, and qualitative assessments of achievements of outputs.

Verify performance indicators

83. During the implementation of the project, NPT, in collaboration with UNDP-CO and with assistance by the LPMO, will organize the activities for verifying performance indicators. Detailed M&E schedule will be developed simultaneously with and as part of the Annual Work Plan.

84. UNDP-CO and UNDP-GEF RCU as appropriate, will conduct yearly visits or more often based on an agreed upon schedule to be detailed in the project's Inception Report / Annual Work Plan.

Project Reporting

85. The Project Manager in conjunction with the UNDP-GEF extended team will be responsible for the preparation and submission of the following reports that form part of the monitoring process. The first six reports are mandatory and strictly related to monitoring, while the last two have a broader function and the frequency and nature is project specific to be defined throughout implementation.

86. A Project Inception Report (IR) will be prepared immediately following the Inception Workshop. It will include a detailed work plan divided in quarterly time-frames detailing the activities and progress indicators that will guide implementation during the first year of the project. This work plan will include the dates of specific field visits, support missions from the UNDP-CO or the Regional Coordinating Unit (RCU) or consultants, as well as time-frames for meetings of the project's decision making structures. The Report will also include the detailed project budget for the first full year of implementation, prepared on the basis of the Annual Work Plan, and including any monitoring and evaluation requirements to effectively measure project performance during the targeted 12 month time-frame. The Inception Report will include a more detailed narrative on the institutional roles, responsibilities, coordinating actions and feedback mechanisms of project related partners. In addition, a section will be included on progress to date on project establishment and start-up activities and an update of any changed external conditions that may affect project implementation. When finalized, the report will be circulated to project counterparts who will be given a period of one calendar month in which to respond with comments or queries. Prior to this circulation of the IR, the UNDP Country Office and UNDP-GEF's Regional Coordinating Unit will review the document.

87. An Annual Project Report (APR) shall be prepared by the Project Manager and shared with the Project Steering Committee. As a self-assessment by the project management, it does not require a cumbersome preparatory process. As minimum requirement, the Annual Project Report shall consist of the Atlas standard format for the Project Progress Report (PPR) covering the whole year with updated information for each element of the PPR as well as a summary of results achieved against pre-defined annual targets at the project level. As such, it can be readily used to spur dialogue with the Project Steering Committee and partners. An APR will be prepared on an annual basis prior to the Project Steering Committee meeting to reflect progress achieved in meeting the project's Annual Work Plan and assess performance of the project in contributing to intended outcomes through outputs and partnership work. The APR should consist of the following sections: (i) project risks and issues; (ii) project progress against pre-defined indicators and targets and (iii) outcome performance.

88. The Project Implementation Review (PIR) is an annual monitoring process mandated by the GEF. It has become an essential management and monitoring tool for project managers and offers the main vehicle for extracting lessons from ongoing projects. Once the project has been under implementation for a year, a Project Implementation Report must be completed by the CO together with the project team. The PIR should be preliminary prepared in July and discussed with the CO and the UNDP/GEF Regional Coordination Unit during August with the final submission to the UNDP/GEF Headquarters in the first week of September.

89. Quarterly progress reports: Short reports outlining main updates in project progress will be provided quarterly to the local UNDP-Country Office and the UNDP-GEF RCU by the project team.

90. UNDP ATLAS Monitoring Reports: A Combined Delivery Report (CDR) summarizing all project expenditures, is mandatory and should be issued quarterly following the finalization of the quarterly. The

Project Manager should send it to the Project Steering Committee for review and the Implementing Partner should certify it. The following logs should be prepared: (i) The Issues Log is used to capture and track the status of all project issues throughout the implementation of the project. It will be the responsibility of the Project Manager to track, capture and assign issues, and to ensure that all project issues are appropriately addressed; (ii) the Risk Log is maintained throughout the project to capture potential risks to the project and associated measures to manage risks. It will be the responsibility of the Project Manager to maintain and update the Risk Log, using Atlas; and (iii) the Lessons Learned Log is maintained throughout the project to capture insights and lessons based on good and bad experiences and behaviours. It is the responsibility of the Project Manager to maintain and update the Lessons Learned Log.

91. Project Terminal Report: During the last three months of the project the project team will prepare the Project Terminal Report. This comprehensive report will summarize all activities, achievements and outputs of the Project, lessons learnt, objectives met, or not achieved, structures and systems implemented, etc. and will be the definitive statement of the Project's activities during its lifetime. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the Project's activities.

92. Periodic Thematic Reports: As and when called for by UNDP, UNDP-GEF or the Implementing Partner, the project team will prepare Specific Thematic Reports, focusing on specific issues or areas of activity. The request for a Thematic Report will be provided to the project team in written form by UNDP and will clearly state the issue or activities that need to be reported on. These reports can be used as a form of lessons learnt exercise, specific oversight in key areas, or as troubleshooting exercises to evaluate and overcome obstacles and difficulties encountered. UNDP is requested to minimize its requests for Thematic Reports, and when such are necessary will allow reasonable timeframes for their preparation by the project team.

93. Technical Reports are detailed documents covering specific areas of analysis or scientific specializations within the overall project. As part of the Inception Report, the project team will prepare a draft Reports List, detailing the technical reports that are expected to be prepared on key areas of activity during the course of the Project, and tentative due dates. Where necessary this Reports List will be revised and updated, and included in subsequent APRs. Technical Reports may also be prepared by external consultants and should be comprehensive, specialized analyses of clearly defined areas of research within the framework of the project and its sites. These technical reports will represent, as appropriate, the project's substantive contribution to specific areas, and will be used in efforts to disseminate relevant information and best practices at local, national and international levels.

94. Project Publications such as knowledge products and compilations of lessons learned will form a key method of crystallizing and disseminating the results and achievements of the Project. These publications may be scientific or informational texts on the activities and achievements of the Project, in the form of journal articles, multimedia publications, etc. These publications can be based on Technical Reports, depending upon the relevance, scientific worth, etc. of these Reports, or may be summaries or compilations of a series of Technical Reports and other research. The project team will determine if any of the Technical Reports merit formal publication, and will also (in consultation with UNDP, the government and other relevant stakeholder groups) plan and produce these Publications in a consistent and recognizable format. Project resources will need to be defined and allocated for these activities as appropriate and in a manner commensurate with the project's budget.

Independent Evaluations, Audits and Financial Reporting

95. The project will be subjected to at least two independent external evaluations as follows: An independent Mid-Term Review will be undertaken at exactly the mid-point of the project lifetime. The Mid-Term Review will determine progress being made towards the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project

implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Furthermore, it will review and update the ESSP report. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term review will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term review will be prepared by the UNDP-CO based on guidance from the UNDP-GEF Regional Coordinating Unit.

96. An independent Final Evaluation will take place three months prior to the terminal Project Steering Committee meeting, and will focus on the same issues as the mid-term evaluation. The final evaluation will also look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental goals. The Final Evaluation should also provide recommendations for follow-up activities. The Terms of Reference for this evaluation will be prepared by the UNDP-CO based on guidance from the UNDP-GEF Regional Coordinating Unit.

Learning and Knowledge Sharing

97. Results from the project will be disseminated within and beyond the project intervention zone through a number of existing information dissemination networks and forums. New channels will be created to strengthen the knowledge sharing among the public. Knowledge sharing will support the development of national policies, guidelines, regulations, financial mechanisms.

98. The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects. Identification and analysis of lessons learned is an on- going process, and the need to communicate such lessons as one of the project's central contributions is a requirement to be delivered at least once in every 12 months. UNDP-GEF shall provide a format and assist the project team in categorizing, documenting and reporting on lessons learned.

Audit Clause

99. The Government will provide the Resident Representative with certified periodic financial statements, and with an annual audit of the financial statements relating to the status of UNDP (including GEF) funds according to the established procedures set out in the Programming and Finance manuals. The Audit will be conducted according to UNDP financial regulations, rules and audit policies by the legally recognized auditor of the Government, or by a commercial auditor engaged by the Government.

VII. LEGAL CONTEXT

100. This Project Document shall be the instrument referred to as such in Article I of the Standard Basic Assistance Agreement (SBAA) between the Government of the People's Republic of China and the United Nations Development Programme, signed by the parties on 29 June 1979. The host country implementing agency shall, for the purpose of the Standard Basic Assistance Agreement, refer to the government co-operating agency described in that Agreement.

101. The UNDP Resident Representative in China is authorized to effect in writing the following types of revision to this Project Document, provided that he/she has verified the agreement thereto by the UNDPGEF and is assured that the other signatories to the Project Document have no objection to the proposed changes:

a) Revision of, or addition to, any of the annexes to the Project Document;
b) Revisions which do not involve significant changes in the immediate objectives, outputs or activities of the project, but are caused by the rearrangement of the inputs already agreed to or by cost increases due to inflation;
c) Mandatory annual revisions which re-phase the delivery of agreed project inputs or increased

expert or other costs due to inflation or take into account agency expenditure flexibility; and

d) Inclusion of additional annexes and attachments only as set out here in this Project Document.

VIII. ANNEXES

Annex 1 Evaluation and Selection of Demonstration Locations and Demonstration Enterprises
Annex 2 Evaluation and Selection of Processing Technology
Annex 3 UNDP Social and Environmental Screening Procedure
Annex 4 Letter of Agreement for UNDP Direct Project Services
Annex 5 GEF POPs tracking tool

Annex 1 Evaluation and Selection of Demonstration Locations and Demonstration Enterprises

To ensure appropriate and smooth implementation of the project activities, in particular, the demonstration activities, and to successfully achieve the project objectives and outcomes, during project formulation and the Project Preparation Grant (PPG) stage, the Executing Agency, Foreign Economic Cooperation Office of the Ministry of Environmental Protection (FECO/MEP), has undertaken extensive research, investigations and consultations with key stakeholders, interacted with provinces, municipalities and cities with significant volume of secondary copper production, and charged the provincial and local level Environmental Protection Bureaus/Departments to carefully investigate, identify, review and analyze localities and enterprises as suitable and capable candidates to participate in the demonstration activities. Potential demonstration localities were first identified and evaluated for selection, simultaneously, the provinces/municipalities identified potential candidate demonstration locations, interacted and cooperated with FECO/MEP to begin the selection of potential candidate enterprises and potential BAT/BEP technologies for demonstration.

A. Selection of Demonstration Location

1. Criteria for Selection of Demonstration Province

As part of the Project Preparation Grant (PPG) activities, research was carried to select demonstration locations by analyzing the principle and criteria of selection for the proposed locations and candidate enterprises to carry out BAT/BEP technologies demonstration. The Project selected the typical province to carry out demonstration activities.

Taking into consideration of project objectives, project cycle, scope of implementation and other considerations, the main factors to select the demonstration province include the following aspects:

a. Contain enterprises with treatment capacity over 50,000 tones and typical production technology and capacity to reduce pollution release and conduct environmentally sound disposal of fly ash;

b. Contain secondary copper industrial parks that possess willingness to involve circular economy and a PPP model to achieve a harmonious balance of environment protection and economic growth;

c. Capacity to undertake high quality monitoring and supervision activities; and

d. Committed to provide co-financing and possess international cooperation management experience.

2. Database

The project concentrates on the data from the secondary copper production processes which generates the highest concentration of POPs. The 2013 data on secondary copper enterprises is therefore used as reference to select the demonstration locations.

Figure 1 below shows the yield of secondary copper of different provinces in 2013. It shows that Jiangxi Province ranked first in output and it accounts for 31% of the total outputs in China.

In order to strengthen the management of the copper smelting industry, and improve the utilization rate of resources and environmental protection level, MIIT issued the "Specifications for Copper Smelting Industry" in 2014 and it put forward specific requirements on the scale of production, energy consumption, process technology and equipment. So far, two batches of enterprises list have been released by MIIT that meet the requirements of "Specifications for Copper Smelting Industry". Table 2 below showed the list of secondary copper enterprises that the MIIT released so far and it shows that a large number of enterprises are located in Jiangxi Province.

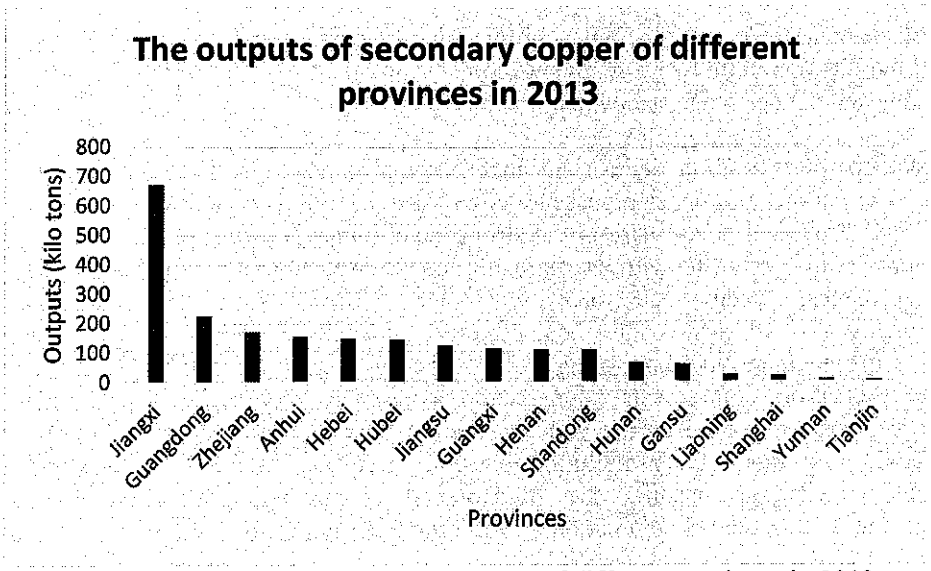


Figure 1 The outputs of secondary copper of different provinces in 2013

Table 1 List of secondary copper enterprises released by MIIT that meet the requirements of "Specifications for Copper Smelting Industry"

No.	Location	Enterprise
1	Jiangsu	Changzhou Nanhai Copper Co., Ltd.
2	Zhejiang	Lanxi Zili Copper Co., Ltd.
3	Zhejiang	Ningbo Shimao Copper Co., Ltd.
4	Jiangxi	Jiangxi Zili Environmental Protection Technology Co., Ltd.
5	Jiangxi	Ganzhou Jiangwu New Alloy Material Co., Ltd.
6	Jiangxi	Jiangxi Jinhui Copper Co., Ltd.
7	Jiangxi	Shangrao Hefeng Copper Co., Ltd.
8	Shandong	Shandong Jin Sheng Nonferrous Metals Group Co., Ltd.
9	Hunan	Hunan Jinlong International Copper Co., Ltd.
10	Guangxi	Guangxi Nonferrous Metals Recycling Co., Ltd.
11	Hunan	Sichuan Jinjin Copper Co., Ltd.

Although many provinces meet the criteria for demonstration site, the underdeveloped economic situation is a barrier for them to be able to provide financial support for the project. Inadequate technical capability will be a barrier for them to implement the project. To ensure proper evaluation and selection, some additional criteria were established: the strength of support provided by the local government; the history and management experience in international cooperation; and the willingness to participate and the ability to properly manage the project activities.

3. Situation of the proposed selection for secondary copper demonstration locations

Based on the comprehensive criteria above, Jiangxi Province was preliminarily selected as the key demonstration location. The situations of Jiangxi Province on secondary copper production is described below.

Jiangxi Province is one of China's largest copper production bases. Currently around Jiangxi Copper Group, Jiangxi Shangrao City, Yingtan City, Ganzhou, Fuzhou City and other places have developed more than 50 processing enterprises utilizing copper sludge or copper scrap as raw materials for the

production of cement or recycled copper blister, anode copper and copper cathode, with annual production of more than 500,000 tons of copper products, and the treatment of more than one million tons of copper sludge and copper scape as raw materials.

During the past five years, with the industrial transformation in the neighboring Guangdong and Zhejiang Provinces, a large number of copper processing enterprises in Zhejiang and Guangdong Provinces were moved to Jiangxi Province where there is the strong determination to promote the development of the secondary copper industry, in line with the national industrial development policies, to effectively utilize renewable resources, promoting local economic development. Environmental protection bureau/departments at all levels also consistently enhance service and awareness, carry out comprehensive management and monitoring of the industry, encourage enterprises to implement sound environmental protection requirements, support enterprises to become bigger and stronger. The related secondary copper enterprises are in line with the current State industry access policy, have the will to carry out dioxin and other POPs pollution control, have the capability to undertake BAT/BEP demonstration, as well as meeting the fundamental requirements for technology and facility improvements, and have received nomination and recommendation of the administration of the local EPB.

4. Selection Results

Following the selection procedures and applying the selection criteria and after extensive review, the project selected Shangrao City and Yingtan City in Jiangxi Province as two demonstration locations that are more representative of the provincial and municipal/city level. The demonstration locations not only include top provincial level with large scale and comprehensive long range secondary copper development planning, but also a top city level with smaller scale planning. The demonstration location not only cover the western region as one of the region with the most number of secondary copper enterprises, but that they are located in one of the core province, Jiangxi Province, which is one of the "One Belt One Road Silk Road Economic Belt and 21st Century Maritime Silk Road" in China. Jiangxi Province will follow-up in promoting industrial structure adjustment and the transformation will face new opportunities. More advanced technologies and transformation can be offered and adopted, where new technologies and equipment can be introduced to speed up their further development.

B. Selection of Demonstration Enterprises

To ensure appropriate and smooth implementation of the project activities, in particular, the demonstration activities, to successful achieve the project results and project objectives, during project formulation and the Project Preparation Grant (PPG) stage, the Executing Agency, Foreign Economic Cooperation Office of the Ministry of Environmental Protection (FECO/MEP), has undertaken extensive research, investigations and consultations with key stakeholders, interacted with provinces, municipalities and cities with significant volume of secondary copper production, and charged the provincial and local level Environmental Protection Bureaus/Departments to carefully investigate, identify, review and analyze localities and enterprises as suitable and capable candidates to participate in demonstration activities. Potential demonstration localities were first identified and evaluated for selection. Simultaneously, the provinces/municipalities identified as potentially selected candidate demonstration locations interacted and cooperated with FECO/MEP to begin the selection of potential candidate enterprises and potential collection and processing technologies for demonstration.

1. Principles of Selecting Demonstration Enterprises in Jiangxi Province

Jiangxi Province Environmental Protection Bureau, as the municipality selected as the demonstration province, and the local government wish to participate in the waste copper recycling and disposal technology demonstration and promotion activities. To ensure smooth implementation of the demonstration activities, it is necessary to select the most representative and suitable enterprises to participate in the demonstration activities. To achieve this objective, the following principles will be used to select the demonstration enterprises during project implementation:

a. Has treatment capacity over 50,000 tone and possess stable processing capacity of copper scrap and copper sludge;

b. Has established treatment facilities for exhaust gas and waste water or the capacity and capital to construct such facilities;

c. Has capacity and willingness to dispose fly ash in an environmentally sound manner;

d. Has the capacity and capital to support the demonstration activities with required co-financing funding;

e. Willing to cooperate with the project team to undertake research and development on the control of POPs emission during the life cycle of secondary copper production.

Annex 2 Evaluation and Selection of Processing Technologies

The goal of the project is to maximize the reduction of the release of the global environmental concerned pollutants POPs during the production cycle of secondary copper to protect local and global ecological environment and human health.

In order to effectively implement the project, demonstration activities are needed to achieve this goal. FECO has undertaken survey and research to gain clear understanding of the production process in the secondary copper production industry. The following is a description of the available technology options to reduce POPs emission to achieve environmentally sound management in the secondary copper production process.

1. BAT/BEP to Control POPs Emissions in Secondary Copper Production

1.1 Key Parameters for POPs Emission Control

The presence of chlorine, organic compounds, a catalyst and temperatures that lie between 250°C-500°C is conditions favorable for de-novo synthesis of PCDD/Fs. Copper being a very efficient catalyst, de-novo synthesis may occur in several processes of secondary copper production. Other dioxin-like POPs may be formed under similar conditions.

Several parameters influence the formation and emission of POPs/PTS. The major ones are:

- Type of raw material used: formation of POPs is higher when mixed copper scrap, especially e-waste containing organic and chlorine compounds is used (Figure 1).

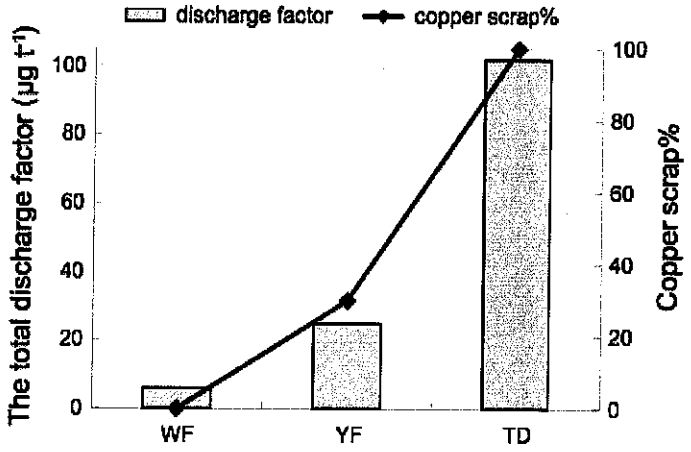


Figure 1 Relation between PCDD/F and PCB total discharge factor (stack gas emission + fly ash discharge) and raw material copper scrap content from different plants. WF plant uses 100% blister copper, YF plant uses 30% copper scrap, the rest being blister copper and anode copper remains after electrolysis, and td plant uses 100% copper scrap (Hu et al. 2013).

- The type of scrap pre-treatment performed, especially in terms of separation of the fractions and removal of organic compounds.
- The residency time in the high temperature: a longer residency time allows for the destruction of POPs.
- Cooling rate of the stack gases: a quick cool-down reduces the risk of reformation of POPs.
- The presence of air pollution control devices (cyclone, wet scrubber, fabric filter, bag filter).
- The treatment of the ashes, and whether they are recycled in the plant.

1.2 Technology Selection in Demonstration Plants

The objective is to demonstrate the reduction of PCDD/F emissions below Chinese standards with the implementation of the BEP and BAT presented in this annex. This is achieved by implementing jointly continuous monitoring of emissions and implementation of demonstration technologies.

Monitoring: The continuous monitoring of emissions before and after BEP and BAT implementation will allow demonstrating the pollution reduction efficiency. Monitoring shall be implemented using acknowledged monitoring methodologies such as EN 1948 or US-EPA 1668A. It is therefore of utmost importance to have a proper monitoring of the baseline situation in order to demonstrate the pollution reduction efficiency of the demonstration technologies.

Technology selection:

1) First of all, primary prevention technologies need to be selected based on a proper characterization of the input material. Input material containing organic compounds such as plastics, oils, etc. and scrap including halogen-containing material such as polyvinyl chloride (PVC) shall be pre-treated to ensure a clean input and prevent the formation of PCDD/F.
2) Second, effective process control measures need to be ensured. The process should be designed in such as manner as to maintain the residency time at temperatures above 800°C long enough (>2 seconds) to ensure the destruction of PCDD/F, followed by quenching of gases to < 250°C.
3) Third, secondary measures for effective air pollution control need to be implemented. Such measures comprise two families of technologies:
    a) High efficiency dust removal technology. Dusts and metal compounds should be removed as this material possesses high surface area on which PCDD/PCDF easily adsorb. Removal of these dusts would contribute to the reduction of PCDD/PCDF emissions. Processes to be considered include fabric filters (most effective method) and wet/dry scrubbers and ceramic filters.
    b) Flue gas treatment technology. Here several options exist, including afterburners, carbon absorption or SCO. The selection of the type of technology will depend on parameters such as the cost-efficiency of the technology, its availability and the investment capacity of the demonstration plants.
    c) Final disposal of fly ash. After pollutants adsorbed on particular matter have been captured by the means of APCS, it is crucial to treat them in a proper manner to avoid post-capture releases that would nullify all the pollution prevention efforts.

1.3 BATs and BEPs in Secondary Copper Production

1.3.1 Summary of BAT and BEPs in secondary copper production

Figure 2 and Table 1 below summarize the measures to follow to reduce POP emissions in the scrap pre-treatment and the smelting phases of secondary copper production.

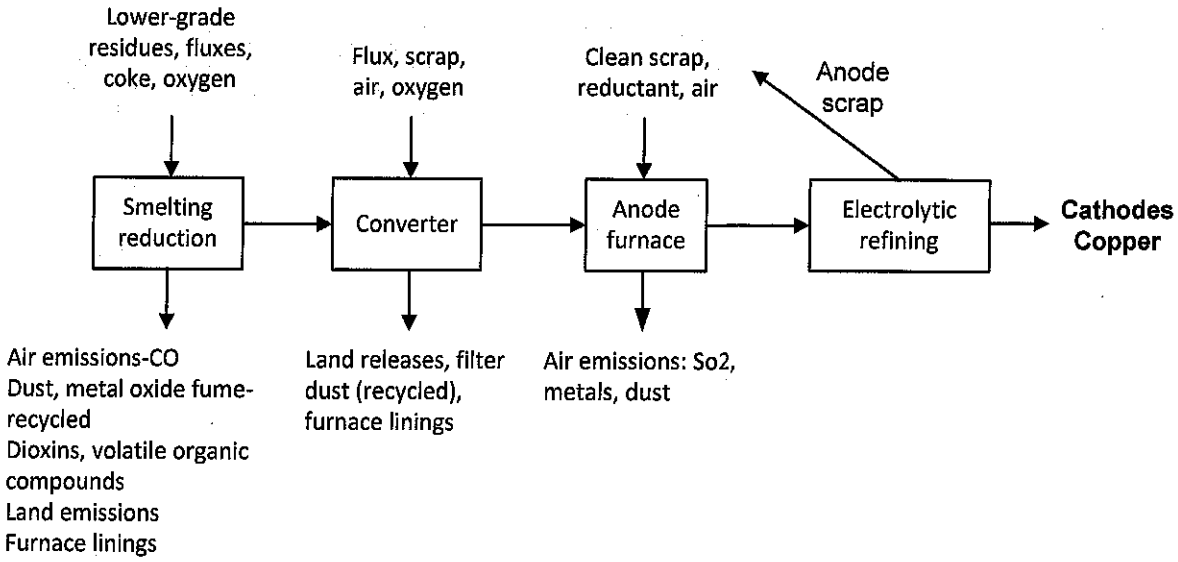


Figure 2 Summary of the main measures to reduce UPOPs emission in scrap pre-treatment and the smelting phases of secondary copper production

Table 1 Summary of measures for the control of POPs emissions in secondary copper processing (UNEP 2007)

Measure	Description	Considerations	Other comments
New Secondary Copper Smelters			
Recommended Processes	Various recommended smelting processes should be considered for new facilities.	Processes to be considered include: - The blast Furnace, mini-smelter, Top Blown Rotary Furnace, Sealed Submerged Electric Arc furnace, ISA Smelt, and the Peirce-Smith converter. - The reverberatory hearth furnace, the hearth shaft furnace and Contimelt process to treat clean copper scrap devoid of organic contamination.	These are considered to be BAT in configuration with suitable gas collection and abatement The submerged electric arc furnace is sealed and cleaner than other designs if the gas extraction system is adequately designed and sized.
Primary Measures			
Pre-sorting of Feed Material	The presence of oils, plastics and chlorine compounds in the feed material should be avoided to reduce the generation of PCDD/PCDF during incomplete combustion or by de-novo synthesis.	Processes to be considered include: - Strict control over materials sources - Oil removal from feed material - Use of milling and grinding techniques with good dust extraction and abatement. - Elimination of plastic by stripping cable insulation	Thermal de-coating and de-oiling processes for oil removal should be followed by afterburning to destroy any organic material in the off-gas

Measure	Description	Considerations	Other comments
Effective Process Control	Process control systems should be utilized to maintain process stability and operate at parameter levels that will contribute to the minimization of PCDD/PCDF generation.	PCDD/PCDF emissions may be minimized by controlling other variables such as temperature, residence time, gas components and fume collection damper controls after having established optimum operating conditions for the reduction of PCDD/PCDF.	Continuous emissions sampling of PCDD/PCDF has been demonstrated for some sectors (e.g. waste incineration), but research is still developing in this field.
Secondary Measures			
Fume and Gas Collection	Effective fume and off-gas collection should be implemented in all stages of the smelting process to capture PCDD/PCDF emissions.	Processes to be considered include: - Sealed furnaces to contain fugitive emissions while permitting heat recovery and collecting off-gases. Furnace or reactor enclosures may be necessary - Proper design of hooding and ductwork to trap fumes.	Roofline collection of fume is to be avoided due to high energy requirements.
High Efficiency Dust Removal	Dusts and metal compounds should be removed as this material possesses high surface area on which PCDD/PCDF easily adsorb. Removal of these dusts would contribute to the reduction of PCDD/PCDF emissions.	Processes to be considered include: - Fabric filters (most effective method) - Wet/dry scrubbers and ceramic filters.	- Dust removal is to be followed by afterburners and quenching. - Collected dust must be treated in high temperature furnaces to destroy PCDD/PCDF and recover metals.
Afterburners and Quenching	Afterburners should be used at temperatures >950°C to ensure full combustion of organic compounds, followed by rapid quenching of hot gases to temperatures below 250°C.	Considerations include: - PCDD/PCDF formation at 250-500°C, and destruction >850°C with O_2. - Requirement for sufficient O_2 in the upper region of the furnace for complete combustion. - Need for proper design of cooling systems to minimize reformation time.	- De novo synthesis is still possible as the gases are cooled through the reformation window.
Adsorption on Activated Carbon	Activated carbon treatment should be considered as this material possesses large surface area on which PCDD/PCDF can be adsorbed from smelter off-gases.	Processes to be considered include: - Treatment with activated carbon using fixed or moving bed reactors -injection of carbon particulate into the gas stream followed by removal as a filter dust.	Lime/carbon mixtures can also be used.

Measure	Description	Considerations	Other comments
Emerging Research			
Catalytic Oxidation	Catalytic oxidation is an emerging technology which should be considered due to its high efficiency and lower energy consumption. Catalytic oxidation transforms organic compounds into water, CO_2 and hydrochloric acid using a precious metal catalyst.	Considerations include: - Process efficiency for the vapour phase of contaminants. - Hydrochloric acid treatment using scrubbers while water and CO_2 are released to the air after cooling.	Catalytic oxidation has been shown to destroy PCDD/PCDF with shorter residence times, lower energy consumption and 99% efficiency. Off-gases should be de-dusted prior to catalytic oxidation for optimum efficiency.
Low-Temperature Plasma Decomposition - Nano Ozone Catalytic Oxidation - Ceramic Nonmaterial Adsorption	The low-temperature plasma discharges energetic electrons, hydroxyl free radicals and other reactive particles, which can readily oxidize and decomposite dioxins. The ceramic material is also loaded with a layer of catalytic compound that can catalyze the oxidation of organic compound and dioxins.	Considerations include: - Selection and control of voltage, current, rising edge and other parameters of low temperature plasma power supply - Compatibility of catalytic and adsorption properties of ceramic nano-materials with low temperature plasma	This combination technology consists of 1st low-temperature plasma decomposition, followed by further oxidation enhancement at the presence of ceramic catalytic nonmaterial and at the presence of ozone. Lower energy consumption and 95% efficiency. Ceramic nonmaterial can be reused during the process

1.3.2 Primary measures to avoid the formation of POPs

While striving to achieve best practices in the secondary copper production, the first questions to clarify are "does the copper scrap contain organic compounds such as plastic, oils, etc.? " and "does the scrap includes halogen-containing material such as polyvinyl chloride (PVC)?"

If the answer is no to both, there is little probability of PCDD/F formation. The BAT/BET to adopt are similar to those in primary copper production. In particular, one or a combination of air pollution control systems should be installed.

If the answer is yes to any of the above-mentioned questions, there is a high probability of PCDD/F formation.

Action should be taken on the next points:

1. Pre-treatment: is there a way to sort / clean the scrap beforehand and remove its organic and halogen compounds? It should be kept in mind that the organic material should not be allowed to react with halogens and copper at temperatures >250°C.
2. Smelting process: have all the measures been taken to avoid the formation of POPs?

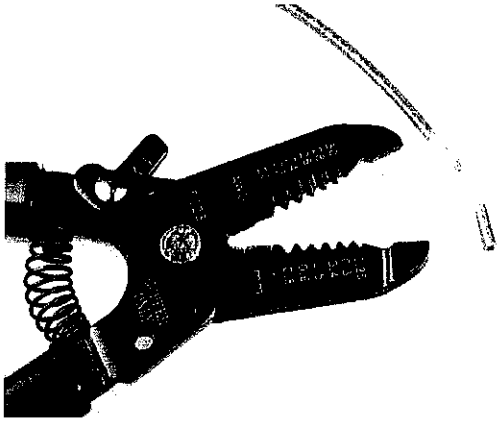
Careful pre-treatment of raw materials

In general, secondary copper production based on mixed scrap is more likely to produce POPs than when based on more homogenous, high copper-content scrap (Hu et al. 2013). Therefore, it is of utmost importance to prepare the feed material well, especially when mixed feed material is used as raw material.

Preparation is done by presorting the different fractions, cleaning the feed material, and remove organic parts.

Methods to be considered are:

- Oil and particles (mainly soil and broken organic matter) removal by wet cleaning technology for lower copper-containing scraps;
- Raw materials can be classified manually and mechanical separation equipment (for example, eddy-current separation and electric separator);
- Copper can be separated from the plastic coating semi-mechanically or fully mechanically for electric wires (Figure 3). Wire-stripping machine can be used for wires' diameter greater than 1 mm; and chopping the wires into pieces <0.5 inch facilitates the separation of the copper from its plastic coating (CDA 2013) for wires' diameter smaller than 1 mm.
- If these methods are not available, high temperature incineration can be resorted to if a good gas collection and abatement system is ensured (UNEP 2007).



Manual wire stripper (sparkfun 2015)

Semi-mechanical wire stripper (Sofies 2015)

Automatic cable granulator (http://www.cable-recyclingmachine.com/ 2015)

Figure 3 Different Cable Pre-treatment Options

Effective process control

Temperature and residency time influence the formation of POPs. Therefore, the process should be designed in such as manner as to maintain the residency time at temperatures above 800°C long enough (>2 seconds) to ensure the destruction of PCDD/F, followed by quenching of gases to < 250°C. Indeed, a quick cool down of flue gas minimizes the risks of POP reformation (UNEP 2007, Fiedler 2003).

At present, secondary copper can be produced directly and indirectly according to copper containing present of raw materials. The high-grade copper scraps can be smelting directly into copper products; based on raw materials' quality and composition, indirect method can be divided into three processes: one-step process (for high-grade copper scraps with copper-containing greater than 95%), two-step process (for mid-grade copper scraps with copper-containing between 90%-95%) and three-step process (for low-grade copper scraps with copper-containing lesser than 90%). Compared to one-step process, two-step process has higher recovery and lower energy consumption and is the main production process for secondary copper industry in China, the three-step process has long process flow, large investment and high energy consumption and is few adopted in China.

Table 2 Available technologies for the control of POPs emissions in secondary copper smelting process

Process	Available Technology	Key Technical Indictor	Applicability
Direct use smelting process	Induction furnace	Rated power: 60~250KW; Input current: 280~410A; Input voltage: 280V; Copper in slag: lower than 2%; SO_2 Concentration: 7.5%~10%	Applied to direct use of pure copper scrap
	FRHC	Smelting equipment: COS-MELT tilting furnace or COS-MELT combination furnace; Copper bar: reach EN1977 (1998) CW005A (European standard)	Applied to direct use of pure copper scrap
One-stage smelting process	Tilting furnace	Dip angle: 25 ° maximum; Copper in slag: lower than 2%; ash returning rate: 5%~10%; SO_2 Concentration: 7.5%~10%	Applied to high grade copper scrap smelting
	NGL	Average copper of feed materials: 90%; operation period: 24h; copper in slag: lower than 5%; copper recovery: higher than 95%; Gas: 110m^3/t copper; energy consumption of crude copper per ton: 290kgce/t	Applied to high grade copper scrap smelting
	Refining rocking furnace	Specific consumption of fuel: 72~82m^3/t; specific consumption of oxygen: 63~83 m^3/t	Applied to high grade copper scrap smelting
Two-stage smelting process	Improved converter smelting furnace	Oxygen-rich combustion technology; airtight smelting; negative pressure operation	Applied to low grade copper scrap smelting, such as copper sludge
	Kaldo furnace	Average copper of feed materials : 30%~80%; Rotational speed: 1~15r/h; Smelting period: less than 6h; Copper recovery: higher than 90%; Gas: 130m^3/t copper;	Applied to low grade copper scrap smelting

Process	Available Technology	Key Technical Indictor	Applicability
		Energy consumption of crude copper per ton: 290kgce/t	
	Ausmelt furnace/ISA furnace	Injection and immersion, airbrush is vertical immersed in slag	Applied to high grade copper scrap smelting
Wet metallurgy	Ammonia Leaching-electrolysis method	Current density: 200~220A/m^2, Energy consumption of crude Copper per ton: 2300~2500kWh	Applied to copper scrap treatment
	Alloy copper electrolysis technology	Current density: 180 A/m^2, Energy consumption of copper per ton: 1100kWh	Applied to alloy copper scrap smelting

1.3.3 Secondary measures to prevent the release of POPs to the environment

As it is not possible to completely prevent the formation or release of POPs, it is crucial to capture them before they enter the environment.

Fume and gas collection

Smelting units may have leakages of different types depending on the technology in place, especially in the case of old infrastructure (Table 3). It is possible to use hoods to seal the unit, e.g. over the reverberatory matte and slag launders (EPA 1980). Recent technologies such as the Ausmelt furnace avoid fugitive emissions by being fully sealed and operated under negative pressure to prevent gas leaks (Outotec 2011). As introduced earlier, furnaces with good environmental performance are the flash furnace, Ausmelt / ISAMELT furnace, electric furnace, Noranda process and the Pierce-Smith converter. The energy efficiency of the reverberatory and blast furnaces and performance in terms of air pollution control is low, and therefore these furnaces are not recommended as BAT (EC 2014).

Table 3 Potential Pathways for Fugitive Emissions in Different Smelting Technologies (EPA 1980)

Technology	Fugitive emissions
Reverberatory furnace	Emissions occur at openings in the furnace brickwork (caused by inadequate repair and maintenance or length of time in service); during charging of calcine or green concentrate; during addition of converter slag to the furnace; at the slag and matte launders during tapping operations; and by leakage at the uptake and the waste heat boiler.
Flash smelting	Fugitive emissions at launders and ladles and from leakage through the furnace walls and roof.
Pierce-Smith converter	Fugitive emissions consist of those that escape the primary hooding system and those that are emitted directly from the mouth of the converter when it is positioned in the « out-of-stack » mode, i.e., when it is receiving a cold or hot charge, or when slag or blister copper is poured from the mouth of the converter.

High efficiency air pollution control devices (APCS)

An essential measure to minimize pollution is to equip the plant with appropriate pollution control technologies.

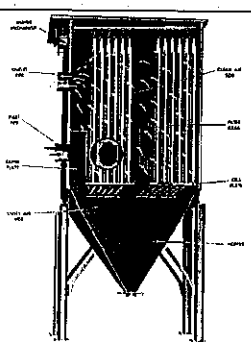
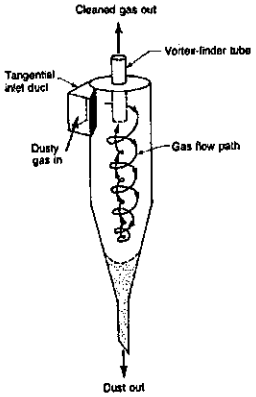
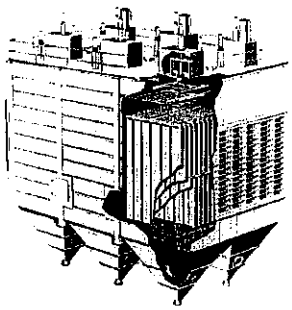
As an important fraction of the PCDD/F formed sorbs on particular matter, capturing dust and fly ash with fabric filter, bag filters or electrostatic precipitators is necessary to minimize releases. Scrubbing systems and activated carbon can be used to capture volatile compounds such as PCDD/F or mercury present in the stack gas (Liu et al 2012, CDA 2013, UNEP 2007).

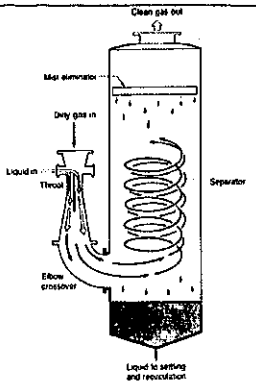
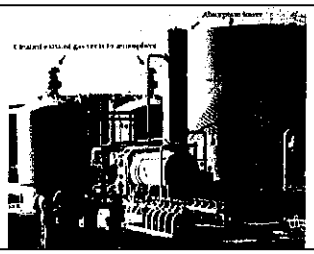
Although little information is available about APCS in secondary copper smelters specifically, dioxin-removal efficiency of APCS in general has been reported. Several options are available with their

respective strengths and weaknesses, such as dry/wet scrubber, bag or fabric filter, injection of activated carbon. The best approach is a combination of these technologies (Liu et al. 2012). In their study on PCDD/F in a municipal solid waste incineration plant, Karademir & Korucu (2013) found that removal of particle-bound PCDD/F dioxin was highest in electrostatic precipitator and wet scrubber, whereas removal of free PCDD/F was achieved best by bag filter, and to a smaller extent by wet scrubber.

Installing powerful APCS is not only relevant in terms of POP emission prevention. There are also co-benefits with regard to other political commitments, such as the Minamata Convention, which promotes the reduction of mercury emissions.

Table 4 Summary of Main APCS (AWMA 2007)

APCS	Pollutant captured	Illustration
Fabric filter / bag house Gas flows through a fabric and particles are captured on the fabric mesh. When the filter is saturated, it is cleaned by blowing air backward. The dust is collected in a hopper and removed. The collection efficiency of fabric filter can be as high as 99.9% of the entering particulates.	Particulate matter (PM)	
Cyclone Gas whirls in the cylinder-like structure of the cyclone. The resulting centrifugal force causes the particles to fly to the walls of the cylinder, and then fall into the bottom-placed hopper. Cyclones usually remove larger particles (50microns (μm) or above). Cyclones can achieve a removal efficiency of >90%. The efficiency increases with particle size and pressure drop in the cyclone.	Large particulate matter	
Electrostatic precipitator (ESP) High voltage drops between charging electrodes and collecting plates create an electrical field, which charges particles present in the gas stream. The particles are attracted by the collecting plates. An efficiency of >99% can be achieved by ESPs.	Particulate matter (PM)	

APCS	Pollutant captured	Illustration
Scrubbing systems In wet scrubbing systems, the gas passes through a liquid solution (often water), which absorbs water-soluble pollutants. This occurs through spraying the solution or strong mixing of water and gas stream. A wet sludge by-product usually results from this process. Wet scrubbers can achieve a removal efficiency of 99%.	Gases, vapors, sulfur oxides, corrosive acidic or basic gas streams, solid particles, liquid droplets	
Activated carbon Pollutants sorb chemically or physically on the solid surface and can be thus removed from the gas phase. Due to its large surface area, activated carbon is very efficient in adsorbing high quantities of pollutants. After saturation, the carbon can be treated and reused.	Vapor-phase volatile organic compounds (VOCs), hazardous air pollutants (HAPs)	

It should be noted that APCS with large dust coatings such as fabric filters should be avoided at temperatures >250°C to avoid reactions leading to the formation of POPs on the dust surface (EC 2014).

Afterburners

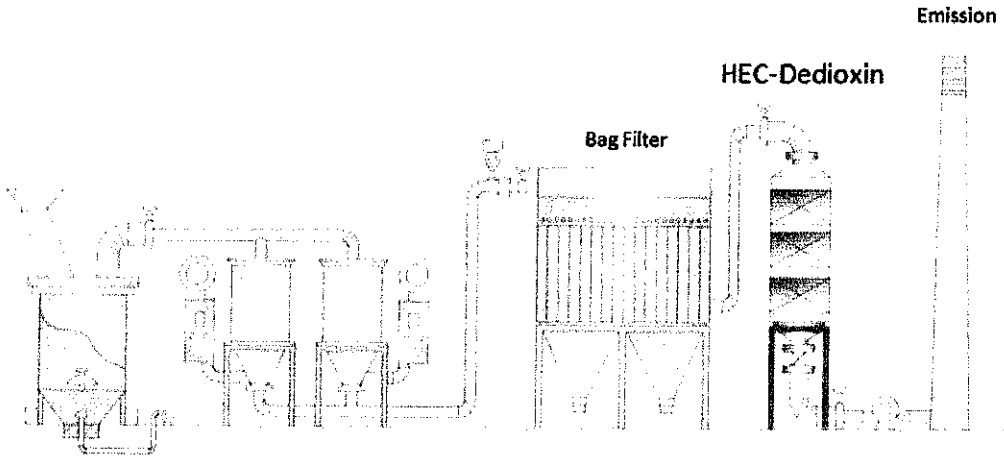
Afterburners ensure the complete combustion of POPs. At temperatures of >1000°C, the efficiency of afterburners to destroy organic compounds is 90%. However, a drawback of the afterburner is its high energy requirement (CDA 2013). The afterburner should be followed by rapid quenching of the gas to low temperatures (< 250°C) (UNEP 2007).

Emerging research

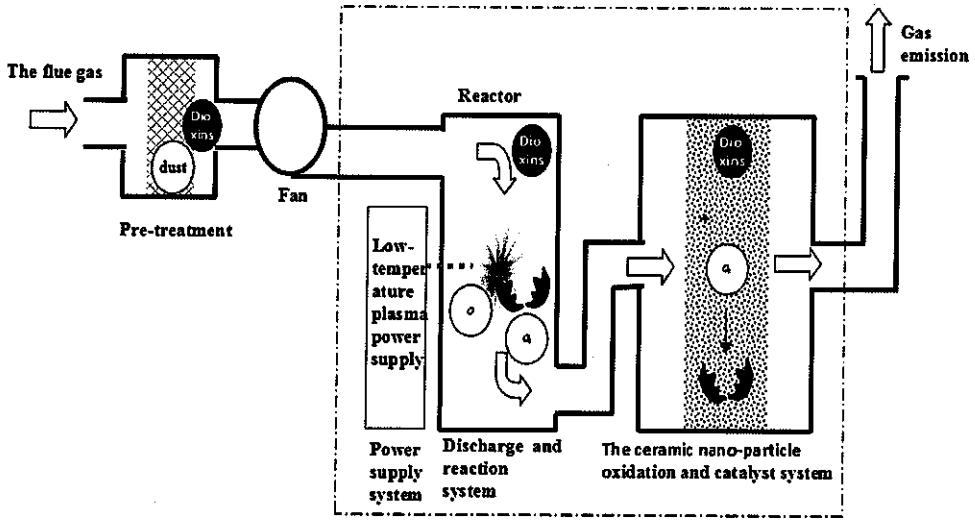
Selective Catalytic Oxidation (SCO)

Selective Catalytic Oxidation (SCO) was first reported (Hagenmaier, 1989) as an advanced technology in Dioxin removal. The principle of this technology is to catalytically degrade dioxin into small molecular organic matters or inorganic matters, which cause less toxicity and risk for following management. In recent years, SCO has been widely adopted to remove dioxin in waste gases, especially in developed countries and regions, like Europe, US and Japan.

SCO is mostly suggested to purify the gas after bag filtration and further removal the dioxin and NOx concentration.



Low-temperature plasma decomposition - nano Ozone catalytic oxidation - ceramic nanomaterial adsorption



A Low-temperature plasma decomposition - nano Ozone catalytic oxidation - ceramic nanomaterial adsorption combination technology is used to treat the flue gas during secondary cooper smelting, which contains, dioxins, acid gases, dust and other pollutants. The low-temperature plasma discharges energetic electrons, hydroxyl free radicals and other reactive particles, which can readily oxidize dioxins. The ceramic material is also loaded with a layer of catalytic compound that can catalyze the oxidation of organic compound and dioxins. This combination technology consists of 1st low-temperature plasma decomposition, followed by further oxidation enhancement at the presence of ceramic catalystic nanomaterial and at the presence of ozone. In terms of physical stability, the material is a high temperature sintered ceramic and it can withstand much higher temperatures than activated carbon. The ceramic nanoparticle has another superior property of ruse. The absorbed pollutants on the ceramic nanomaterial can be easily washed out with a regeneration compound and the nanomaterial can be reused as absorbing materials again. The mass loss of the regenerated ceramic nanomaterial is less than 0.5% and the adsorption capacity of the regenerated ceramic nanomaterial is still at 95% of the original value. Furthermore, ceramic nanomaterial adsorption can be used as adsorption materials to treat dioxins, especially to the lower concentration.

Proper ash management

After pollutants adsorbed on particular matter have been captured by the means of APCS, it is crucial to treat them in a proper manner to avoid post-capture releases that would nullify all the pollution prevention efforts.

Some of the particulate matter captured by APCS contains valuable metals and can be sold for further processing. However, due to the presence of toxic substances, this material should be considered and handled as hazardous material (CDA 2013), and the down-stream treatment or application should have the necessary infrastructure to address the issue posed by the pollutants.

In general, recycling the ashes in a high temperature furnace is recommended to ensure the destruction of POPs in high temperatures and the recovery of metal (Hu et al 2013, UNEP 2007).

In case of ash disposal in ash ponds or landfills, the ash should be considered as a hazardous material. It is crucial to prevent ash dispersion as well as leaching to the ground and water system.

Annex 3 UNDP Social and Environmental Screening Procedure Report

Project Information

Project Information	
1. Project Title	UPOPs Reduction through BAT/BEP and PPP-based Industry Chain Management in Secondary Copper Production Sector in China
2. Project Number	00094023
3. Location (Global/Region/Country)	China

Part A. Integrating Overarching Principles to Strengthen Social and Environmental Sustainability

QUESTION 1: How Does the Project Integrate the Overarching Principles in order to Strengthen Social and Environmental Sustainability?

Briefly describe in the space below how the Project mainstreams the human-rights based approach

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 pre-treatment approaches, predominantly practiced in small and medium size enterprises, is drastically increasing the release of UPOPs in China. Such releases are not only impacting the workers in this sector, but also surrounding communities, impacting the environment and human health at local as well as global level.

To address the negative impact of UPOPs emission on the environment and human health, the project aims to achieve reduction of POPs emission in the secondary copper production sector in China through institutional strengthening, establishment and improvement of policy and enforcement measures, and demonstration of Best Available Techniques (BAT) and Best Environmental Practices (BEP) as well as demonstration of circular economy, Public-Private Partnership (PPP) and centralized park-based industry chain management approach. The experience gained and lessons learned from the demonstration activities will be evaluated, documented and disseminated. A National Replication Programme will be designed and work plan will be established, a series of national and international workshop will be organized to disseminate demonstration results and experience, so as to promote national replication, to encourage all enterprises in the secondary copper production industry to undertake environmentally sound management of chemicals and wastes.

The Universal Declaration of Human Rights proclaimed by the General Assembly contains a number of articles that are closely linked to the scope of the proposed project and will thus ensure that the human rights based approach is mainstreamed in the project.

Article 3: "Everyone has the right to life, liberty and security of person" The project will directly contribute to protecting the environment and human health through the demonstrating and introduction of BAT/BEP that will enhance human health in the workplace, lead to reduction of UPOPs emissions that has negative impact, thus the project will contribute to protecting people's right to life;

Article 23 (1): "Everyone has the right to work, to free choice of employment, to just and favourable conditions of work and to protection against unemployment" The project, in addition to protecting the environment and enhancing human health, through environmentally sound management of chemicals and wastes, it will also promote technological advantages and market competitiveness of the enterprises, thus maintain and stabilize employment opportunity, and more importantly, in addition to protection against unemployment, it also creates a healthy, safe and favourable working environment.

Briefly describe in the space below how the Project is likely to improve gender equality and women's empowerment

During the PPG phase of this project, considerations were made to 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. 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. It is therefore necessary to undertake further investigation and assessment on female workers at smelting enterprises during project implementation to assess the impacts of UPOPs emission on workers, in order to reduce the negative health impacts of secondary copper smelting process emission on women. 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. By reducing UPOPs releases from the secondary copper smelting processing, health risks for female workers and their children will be reduced. The project will ensure female participation in training and capacity building activities. The two overarching interventions – awareness raising and multi-stakeholder's participation, will contribute to ensuring successful implantation of gender mainstreaming, and the empowerment of women in work place.
Briefly describe in the space below how the Project mainstreams environmental sustainability
Both the Government of China and the national implementing agencies are very committed to implement Stockholm Convention and reduce POPs. The non-ferrous metals sector, including the secondary copper sector, is one of the six key industrial sectors targeted for POPs control. It will provide initiatives to mainstream the objectives of the POPs Convention into the nation's broader development policies and strategies, and on the engagement of a wide range of stakeholders and public authorities throughout the project cycle. In addition to the strong commitment from the governments, the project will strengthen capacity and knowledge sharing at various levels. It will guarantee that technical and managerial expertise and good practice will really be assimilated by Chinese stakeholders and benefit China sustainably. Alternative technologies demonstrated will generate knowledge and experience that will be shared through a systematic approach by means of a National Replication Programme, with a series of promotional and public awareness activities to encourage and attract enterprises to participate. Environmental sustainability is ensure through the national replication efforts that will lead to achievements of environmentally sound management of chemicals and wastes at all enterprises in the industry.

Part B. Identifying and Managing Social and Environmental Risks

QUESTION 2: What are the Potential Social and Environmental Risks? *Note: Describe briefly potential social and environmental risks identified in Attachment 1 – Risk Screening Checklist (based on any "Yes" responses). If no risks have been identified in Attachment 1 then note "No Risks Identified" and skip to Question 4 and Select "Low Risk". Questions 5 and 6 not required for Low Risk Projects.*	QUESTION 3: What is the level of significance of the potential social and environmental risks? *Note: Respond to Questions 4 and 5 below before proceeding to Question 6*			QUESTION 6: What social and environmental assessment and management measures have been conducted and/or are required to address potential risks (for Risks with Moderate and High Significance)?
Risk Description	***Impact and Probability (1-5)***	***Significance (Low, Moderate, High)***	***Comments***	***Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note that the assessment should consider all potential impacts and risks.***

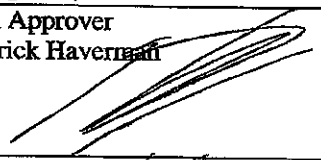
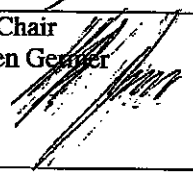
Risk 1: The management team and workers of demonstration plants are not capable of reporting or sharing POPs information timely and scientifically.	I = 2 P =1	**low**		Capacity building is designed as one of the project components to prevent the risk. During project implementation, capacities of enterprises, industries and Local Project Management Office will be strengthened to facilitate effective management and monitoring of the secondary copper sector.
Risk 2: The managers of the demonstration plants will not provide proper and sufficient facilities and measure to protect workers from POPs release, particulate matters and other pollutions.	I = 2 P = 1	**low**		Variety of trainings on POPs knowledge, occupational protection and on-site management will be organized for the management team and workers. Those measures will increase awareness and capacity of factories managers to put the well-being of the workers in the center of their daily work and supervision. Meanwhile, the workers will be empowered to better protect themselves and safeguard their rights to work in a safe environment. On-site visits and meetings will be also conducted by UNDP, FECO and local PMOs to examine and supervise whether there is sufficient facilities and measure are in place for the workers.
Risk 3: Failure to select the BAT/BEP that are able to significantly reduce POPs release	I = 2 P = 1	**low**		To mitigate the 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 has been 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.
Risk 4:	I = P =			
[add additional rows as needed]				

QUESTION 4: What is the overall Project risk categorization?		
Select one (see SESP for guidance)		**Comments**
Low Risk	X	
Moderate Risk	☐	
High Risk	☐	

QUESTION 5: Based on the identified risks and risk categorization, what requirements of the SES are relevant?		
Check all that apply		**Comments**
Principle 1: Human Rights	☐ √	
Principle 2: Gender Equality and Women's Empowerment	☐	
1. Biodiversity Conservation and Natural Resource Management	☐	
2. Climate Change Mitigation and Adaptation	☐	
3. Community Health, Safety and Working Conditions	☐ √	
4. Cultural Heritage	☐	
5. Displacement and Resettlement	☐	
6. Indigenous Peoples	☐	
7. Pollution Prevention and Resource Efficiency	☐ √	

Final Sign Off

Final Sign Off

Signature	Date	Description
QA Assessor Hong Yun 		UNDP staff member responsible for the Project, typically a UNDP Programme Officer. Final signature confirms they have "checked" to ensure that the SESP is adequately conducted.
QA Approver Patrick Haverman 		UNDP senior manager, typically the UNDP Deputy Country Director (DCD), Country Director (CD), Deputy Resident Representative (DRR), or Resident Representative (RR). The QA Approver cannot also be the QA Assessor. Final signature confirms they have "cleared" the SESP prior to submittal to the PAC.
PAC Chair Carsten Germer 		UNDP chair of the PAC. In some cases PAC Chair may also be the QA Approver. Final signature confirms that the SESP was considered as part of the project appraisal and considered in recommendations of the PAC.

SESP Attachment 1. Social and Environmental Risk Screening Checklist

Checklist Potential Social and Environmental Risks	
Principles 1: Human Rights	**Answer (Yes/No)**
1. Could the Project lead to adverse impacts on enjoyment of the human rights (civil, political, economic, social or cultural) of the affected population and particularly of marginalized groups?	NO
2. Is there a likelihood that the Project would have inequitable or discriminatory adverse impacts on affected populations, particularly people living in poverty or marginalized or excluded individuals or groups? [1]	NO
3. Could the Project potentially restrict availability, quality of and access to resources or basic services, in particular to marginalized individuals or groups?	NO
4. Is there a likelihood that the Project would exclude any potentially affected stakeholders, in particular marginalized groups, from fully participating in decisions that may affect them?	NO
5. Is there a risk that duty-bearers do not have the capacity to meet their obligations in the Project?	YES
6. Is there a risk that rights-holders do not have the capacity to claim their rights?	NO
7. Have local communities or individuals, given the opportunity, raised human rights concerns regarding the Project during the stakeholder engagement process?	NO
8. Is there a risk that the Project would exacerbate conflicts among and/or the risk of violence to project-affected communities and individuals?	NO
Principle 2: Gender Equality and Women's Empowerment	
1. Is there a likelihood that the proposed Project would have adverse impacts on gender equality and/or the situation of women and girls?	NO
2. Would the Project potentially reproduce discriminations against women based on gender, especially regarding participation in design and implementation or access to opportunities and benefits?	NO
3. Have women's groups/leaders raised gender equality concerns regarding the Project during the stakeholder engagement process and has this been included in the overall Project proposal and in the risk assessment?	NO
4. Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and positions of women and men in accessing environmental goods and services? *For example, activities that could lead to natural resources degradation or depletion in communities who depend on these resources for their livelihoods and well being*	NO
Principle 3: Environmental Sustainability: Screening questions regarding environmental risks are encompassed by the specific Standard-related questions below	
Standard 1: Biodiversity Conservation and Sustainable Natural Resource Management	
1.1 Would the Project potentially cause adverse impacts to habitats (e.g. modified, natural, and critical habitats) and/or ecosystems and ecosystem services? *For example, through habitat loss, conversion or degradation, fragmentation, hydrological changes*	NO
1.2 Are any Project activities proposed within or adjacent to critical habitats and/or environmentally sensitive areas, including legally protected areas (e.g. nature reserve, national park), areas proposed for protection, or recognized as such by authoritative sources and/or indigenous peoples or local communities?	NO
1.3 Does the Project involve changes to the use of lands and resources that may have adverse impacts on habitats, ecosystems, and/or livelihoods? (Note: if restrictions and/or limitations of access to lands would apply, refer	NO

[1] Prohibited grounds of discrimination include race, ethnicity, gender, age, language, disability, sexual orientation, religion, political or other opinion, national or social or geographical origin, property, birth or other status including as an indigenous person or as a member of a minority. References to "women and men" or similar is understood to include women and men, boys and girls, and other groups discriminated against based on their gender identities, such as transgender people and transsexuals.

to Standard 5)	
1.4 Would Project activities pose risks to endangered species?	NO
1.5 Would the Project pose a risk of introducing invasive alien species?	NO
1.6 Does the Project involve harvesting of natural forests, plantation development, or reforestation?	NO
1.7 Does the Project involve the production and/or harvesting of fish populations or other aquatic species?	NO
1.8 Does the Project involve significant extraction, diversion or containment of surface or ground water? *For example, construction of dams, reservoirs, river basin developments, groundwater extraction*	NO
1.9 Does the Project involve utilization of genetic resources? (e.g. collection and/or harvesting, commercial development)	NO
1.10 Would the Project generate potential adverse transboundary or global environmental concerns?	NO
1.11 Would the Project result in secondary or consequential development activities which could lead to adverse social and environmental effects, or would it generate cumulative impacts with other known existing or planned activities in the area? *For example, a new road through forested lands will generate direct environmental and social impacts (e.g. felling of trees, earthworks, potential relocation of inhabitants). The new road may also facilitate encroachment on lands by illegal settlers or generate unplanned commercial development along the route, potentially in sensitive areas. These are indirect, secondary, or induced impacts that need to be considered. Also, if similar developments in the same forested area are planned, then cumulative impacts of multiple activities (even if not part of the same Project) need to be considered.*	NO
Standard 2: Climate Change Mitigation and Adaptation	
2.1 Will the proposed Project result in significant[2] greenhouse gas emissions or may exacerbate climate change?	NO
2.2 Would the potential outcomes of the Project be sensitive or vulnerable to potential impacts of climate change?	NO
2.3 Is the proposed Project likely to directly or indirectly increase social and environmental vulnerability to climate change now or in the future (also known as maladaptive practices)? *For example, changes to land use planning may encourage further development of floodplains, potentially increasing the population's vulnerability to climate change, specifically flooding*	NO
Standard 3: Community Health, Safety and Working Conditions	
3.1 Would elements of Project construction, operation, or decommissioning pose potential safety risks to local communities?	NO
3.2 Would the Project pose potential risks to community health and safety due to the transport, storage, and use and/or disposal of hazardous or dangerous materials (e.g. explosives, fuel and other chemicals during construction and operation)?	NO
3.3 Does the Project involve large-scale infrastructure development (e.g. dams, roads, buildings)?	NO
3.4 Would failure of structural elements of the Project pose risks to communities? (e.g. collapse of buildings or infrastructure)	NO
3.5 Would the proposed Project be susceptible to or lead to increased vulnerability to earthquakes, subsidence, landslides, erosion, flooding or extreme climatic conditions?	NO
3.6 Would the Project result in potential increased health risks (e.g. from water-borne or other vector-borne diseases or communicable infections such as HIV/AIDS)?	NO
3.7 Does the Project pose potential risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during Project construction, operation, or decommissioning?	YES
3.8 Does the Project involve support for employment or livelihoods that may fail to comply with national and international labor standards (i.e. principles and standards of ILO fundamental conventions)?	NO
3.9 Does the Project engage security personnel that may pose a potential risk to health and safety of communities	NO

[2] In regards to CO_2, 'significant emissions' corresponds generally to more than 25,000 tons per year (from both direct and indirect sources). [The Guidance Note on Climate Change Mitigation and Adaptation provides additional information on GHG emissions.]

and/or individuals (e.g. due to a lack of adequate training or accountability)?	
Standard 4: Cultural Heritage	
4.1 Will the proposed Project result in interventions that would potentially adversely impact sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g. knowledge, innovations, practices)? (Note: Projects intended to protect and conserve Cultural Heritage may also have inadvertent adverse impacts)	NO
4.2 Does the Project propose utilizing tangible and/or intangible forms of cultural heritage for commercial or other purposes?	NO
Standard 5: Displacement and Resettlement	
5.1 Would the Project potentially involve temporary or permanent and full or partial physical displacement?	NO
5.2 Would the Project possibly result in economic displacement (e.g. loss of assets or access to resources due to land acquisition or access restrictions – even in the absence of physical relocation)?	NO
5.3 Is there a risk that the Project would lead to forced evictions?[3]	NO
5.4 Would the proposed Project possibly affect land tenure arrangements and/or community based property rights/customary rights to land, territories and/or resources?	NO
Standard 6: Indigenous Peoples	
6.1 Are indigenous peoples present in the Project area (including Project area of influence)?	NO
6.2 Is it likely that the Project or portions of the Project will be located on lands and territories claimed by indigenous peoples?	NO
6.3 Would the proposed Project potentially affect the human rights, lands, natural resources, territories, and traditional livelihoods of indigenous peoples (regardless of whether indigenous peoples possess the legal titles to such areas, whether the Project is located within or outside of the lands and territories inhabited by the affected peoples, or whether the indigenous peoples are recognized as indigenous peoples by the country in question)? *If the answer to the screening question 6.3 is "yes" the potential risk impacts are considered potentially severe and/or critical and the Project would be categorized as either Moderate or High Risk.*	NO
6.4 Has there been an absence of culturally appropriate consultations carried out with the objective of achieving FPIC on matters that may affect the rights and interests, lands, resources, territories and traditional livelihoods of the indigenous peoples concerned?	NO
6.5 Does the proposed Project involve the utilization and/or commercial development of natural resources on lands and territories claimed by indigenous peoples?	NO
6.6 Is there a potential for forced eviction or the whole or partial physical or economic displacement of indigenous peoples, including through access restrictions to lands, territories, and resources?	NO
6.7 Would the Project adversely affect the development priorities of indigenous peoples as defined by them?	NO
6.8 Would the Project potentially affect the physical and cultural survival of indigenous peoples?	NO
6.9 Would the Project potentially affect the Cultural Heritage of indigenous peoples, including through the commercialization or use of their traditional knowledge and practices?	NO
Standard 7: Pollution Prevention and Resource Efficiency	
7.1 Would the Project potentially result in the release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local, regional, and/or transboundary impacts?	YES
7.2 Would the proposed Project potentially result in the generation of waste (both hazardous and non-hazardous)?	YES

[3] Forced evictions include acts and/or omissions involving the coerced or involuntary displacement of individuals, NO groups, or communities from homes and/or lands and common property resources that were occupied or depended upon, thus eliminating the ability of an individual, group, or community to reside or work in a particular dwelling, residence, or location without the provision of, and access to, appropriate forms of legal or other protections.

7.3 Will the proposed Project potentially involve the manufacture, trade, release, and/or use of hazardous chemicals and/or materials? Does the Project propose use of chemicals or materials subject to international bans or phase-outs? *For example, DDT, PCBs and other chemicals listed in international conventions such as the Stockholm Conventions on Persistent Organic Pollutants or the Montreal Protocol*	YES
7.4 Will the proposed Project involve the application of pesticides that may have a negative effect on the environment or human health?	NO
7.5 Does the Project include activities that require significant consumption of raw materials, energy, and/or water?	YES

Annex 4 Letter of Agreement for UNDP Direct Project Services

STANDARD LETTER OF AGREEMENT BETWEEN UNDP AND FOREIGN ECONOMIC COOPERATION OFFICE, MINISTRY OF ENVIRONMENTAL PROTECTION OF THE PEOPLE'S REPUBLIC OF CHINA FOR PROVISION OF SUPPORT SERVICES

Dear Mr. Zhao,

1. Reference is made to consultations between officials of the Foreign Economic Cooperation Office of the Ministry of Environmental Protection (FECO/MEP) of the People's Republic of China (hereinafter referred to as "FECO/MEP") and officials of UNDP China Country Office (hereinafter referred to as UNDP) with respect to the provision of support services by the UNDP China Country Office for the nationally executed project "UPOPs Reduction through BAT/BEP and PPP-based Industry Chain Management in Secondary Copper Production Sector in China" **(hereinafter referred to as Project).** UNDP and the FECO/MEP hereby agree that the UNDP China Country Office may provide such support services at the request of FECO/MEP through its institution designated in the relevant project support document or project document, as described below.

2. The UNDP China Country Office may provide support services for assistance with reporting requirements and direct payment. In providing such support services, the UNDP China Country Office shall ensure that the capacity of the FECO/MEP-designated institution is strengthened to enable it to carry out such activities directly. The costs incurred by the UNDP China Country Office in providing such support services shall be recovered from the administrative budget of the office.

3. The UNDP China Country Office may provide, at the request of FECO/MEP or its designated institutions, the following support services for the activities of the project:

a) Identification and/or recruitment of project international consultants;

b) Identification and arrangement of overseas training activities;

c) Other project related actions as needed and requested in addition to the country office's project oversight support covered under the GEF Implementing Agency fee.

4. The procurement of project international consultants and services for overseas training activities by the UNDP China Country Office shall be in accordance with the UNDP regulations, rules, policies and procedures. Support services described in paragraph 3 above shall be detailed in an annex to the project support document or project document, in the form provided in the Attachment hereto. If the requirements for support services by the country office change during the life of a project, the annex to the project support document is revised with the mutual agreement of the UNDP Country Director and the designated institution.

5. The relevant provisions of the Standard Basic Assistance Agreement between the Government of China and UNDP signed on January 29, 1979 (the "SBAA"), including the provisions on liability and privileges and immunities, shall apply to the provision of such support services. The Government shall retain overall responsibility for the nationally managed programme or project through FECO/MEP or its designated institution. The responsibility of the UNDP China Country Office for the provision of the support services described herein shall be limited to the provision of such support services detailed in the annex to the project support document or project document.

6. Any claim or dispute arising under or in connection with the provision of support services by the UNDP China Country Office in accordance with this letter shall be handled pursuant to the relevant provisions of the SBAA and the project support document or project document.

7. The manner and method of cost-recovery by the UNDP China Country Office in providing the support services described in paragraph 3 above shall be specified in the annex to project support document.

8. The UNDP China Country Office shall submit progress reports on the support services provided and shall report on the costs reimbursed in providing such services, as may be required.

9. Any modification of the present arrangements shall be effected by mutual written agreement of the parties hereto.

10. If you are in agreement with the provisions set forth above, please sign and return to this office two signed copies of this letter. Upon your signature, this letter shall constitute an agreement between the FECO/MEP and UNDP on the terms and conditions for the provision of support services by the UNDP China Country Office for nationally managed projects.

Patrick Haverman	Zhao Weijun
Deputy Country Director	Deputy Director General
United Nations Development Programme	Foreign Economic Cooperation Office
	Ministry of Environmental Protection
May, 2016	May, 2016

Attachment

DESCRIPTION OF UNDP COUNTRY OFFICE SUPPORT SERVICES

1. Reference is made to consultations between the Foreign Economic Cooperation Office of the Ministry of Environmental Protection (FECO/MEP), the institution designated by the Government of China and officials of UNDP with respect to the provision of support services by the UNDP country office for the nationally managed GEF funded project "*UPOPs Reduction through BAT/BEP and PPP-based Industry Chain Management in Secondary Copper Production Sector in China*" (PIMS No. 5383).

2. In accordance with the provisions of the letter of agreement signed on May, 2016 and the project document, the UNDP country office shall provide support services for the project as described below.

3. Support services to be provided:

Support services	**Schedule for the provision of the support services**	**Cost to UNDP of providing such support services (where appropriate)**	**Amount and method of reimbursement of UNDP (where appropriate)**
Recruiting international consultants	To be recruited during 2016 and 2021 as per AWP	As per UPL, the service fee per case is US$953	ATLAS billing – estimated amount $3,812
Arrangements for overseas training activities	To be conducted during 2016 and 2021 as per AWP	As per UPL, the service fee per case is US$2,500	ATLAS billing – estimated amount $5,000
TOTAL			$8,812

4. Description of functions and responsibilities of the parties involved:

Description of functions and responsibilities of the parties involved as per the project document. UNDP China Country Office will provide the services as stated above upon the request of FECO/MEP. The reimbursement of the UNDP support cost will be recorded as per transactions based on the established UNDP financial regulations and rules.

Annex 5 GEF POPs tracking tool

(Attached separately at submission time in Excel)