United Nations Development Programmea

Project Document for projects financed by GEF Trust Funds

Project title: Green Production and Sustainable Development in Secondary Aluminum, Lead, Zinc and Lithium Sectors in China		
Country(ies): People's Republic of China	**Implementing Partner (GEF Executing Entity):** Foreign Environmental Cooperation Center (FECO), Ministry of Ecology and Environment (MEE)	**Execution Modality:** Assisted National Implementation Modality (NIM) with support by UNDP
Contributing Outcome (UNDAF/CPD, RPD, GPD): United Nations Sustainable Development Cooperation Framework (2021-2025): Outcome 3: People in China and the region benefit from a healthier and more resilient environment. UNDP Country Programme Document for China (2021-2025), Pillar 2 (A healthier planet and resilient environment, Output 2.1: Adaptive policies developed at target level (subnational), financed and applied for nature-based systems to align with multilateral agreements and transboundary platforms.		
UNDP Social and Environmental Screening Category: SUBSTANTIAL		**UNDP Gender Marker:** GEN2
Quantum Award ID: 00111692.1		**Quantum Project ID:** 00111692
UNDP PIMS ID number: 6492		**GEF Project ID number:** 10673
LPAC meeting date: *10 June 2022*		
Last possible date to submit to GEF: 11 December 2021		
Latest possible CEO endorsement date: 21 September 2022		
Project duration in months: 60 months		
Planned start date: 15 December 2023		**Planned completion date:** 15 December 2028
Expected date of Mid-Term Review: 16 June 2026		**Expected date of Terminal evaluation:** 16 September 2028
Expected Operational Closure Date: 15 September 2029		**Expected Financial Closure Date:** 15 March 2030

Brief project description:

Secondary non-ferrous metal production is recognized as important sources of UP-POPs. As one of the most toxic pollutants ever known to human, PCDD/Fs, as well as other POPs such as PCBs, have attracted much attention all over the world. In China, the following elaborates on the barriers to the adoption of environmental sound

management in the secondary non-ferrous metal industry:

(a) Incomplete legal/regulatory framework and lack of capacity in policy enforcement at national, industrial and local level;

(b) Recycling disorder has always been an important problem affecting the recycling of non-ferrous metal scrap. There is limited access to international experience in implementing and sustaining a recycling value chain both financially and operationally;

(c) Limited access to international Best Available Techniques/Best Environmental Practices (BAT/BEP) related to secondary non-ferrous metal processing technologies and limited ability/capacity to pilot and demonstrate it; and

(d) Insufficient capacity to undertake monitoring of the UP-POPs and BFRs pollution caused by the secondary non-ferrous metal smelting and recycling, and dealing with both socio-economic and environmental legacies.

The Project Objectives of this project is to reduce and eliminate UP-POPs (PCDD/Fs, HCB and PCNs) and Brominated flame retardants (BFRs) releases through the introduction of BAT/BEP in secondary aluminum and zinc production, and implementation of life cycle management in lead acid battery and lithium ion battery recycling in China, to achieve sound management of chemicals, and enhance human health.

This project is expected to generate multiple benefits for the global environment as it will not only lead to a reduction in UP-POPs and BFRs releases from the sector, but will also reduce the risks to human health, ecosystems and economies by sustainable supply chain management, innovations in green and sustainable chemistry, and adopting common approaches to chemicals management in secondary metallurgical sectors. The adaptation global environmental benefits from this project will result from the Sustainable Development Goals (SDGs) 3.9 and 12.4, which is in "SDG 3: Ensure healthy lives and promote well-being for all at all ages" and "SDG 12: Ensure sustainable consumption and production patterns", respectively.

FINANCING PLAN	
GEF Trust Fund grant	USD 15,750,000
(1) Total Budget administered by UNDP	**USD 15,750,000**
CO-FINANCIERS THAT WILL DELIVER PROJECT RESULTS INCLUDED IN THE PROJECT RESULTS FRAMEWORK (FUNDS NOT ADMINISTERED THROUGH UNDP ACCOUNTS)	
Ministry of Ecology and Environment (Grant)	USD 250,000
Ministry of Ecology and Environment (In-kind)	USD 450,000
Private Sector (Grant)	USD 65,410,000
Private Sector (In-kind)	USD 43,990,000
UNDP (Grant)	USD 90,000
UNDP (In-kind)	USD 160,000
(2) Total confirmed co-financing	**USD 110,350,000**
(3) Grand-Total Project Financing (1)+(2)	**USD 126,100,000**

SIGNATURES:		
Signature: Ministry of Finance of China	**Agreed by Government Development Coordination Authority**	**Date/Month/Year:** 12. 1. 2024
Signature: Yujun Zhang Mr. ZHANG Yujun Director General, Foreign Environmental Cooperation Center Ministry of Ecology and Environment of China	**Agreed by Implementing Partner**	**Date/Month/Year:** 8. 1. 2024
Signature: Ms Beate Trankmann Resident Representative UNDP China	**Agreed by UNDP**	**Date/Month/Year:** 08/01/2024

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II. ACRONYMS

AQSIQ	General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (former of State Administration for Market Regulation, SAMR)
APR	Annual Project Report
ARR	Annual Review Report
AWP	Annual Work Plan
BAT	Best Available Techniques
BEP	Best Environmental Practices
CNMIA	China Nonferrous Metals Industry Association
CMRA	China Nonferrous Metals Industry Association Recycling Metal Branch
CATARC	China Automotive Technology & Research Center
CMIF	China Machinery Industry Federation
CO	UNDP Country Office
DDG	Deputy Director General
EEB	Ecology and Environment Bureau
ERC	(UNDP) Evaluation Resource Center
ESM	Environmentally Sound Management
ESMF	Environmental Social Management Framework
FECO	Foreign Environmental Cooperation Center, Ministry of Ecology and Environment
FSP	Full Sized Project
GEF	Global Environment Facility
GEFSEC	Global Environment Facility Secretariat
IAI	International Aluminum Institute
ILZSG	International Lead & Zinc Study Group
LAB	Lead Acid Battery
LIB	Lithium Ion Battery
M&E	Monitoring and Evaluation
MEE	Ministry of Ecology and Environment
MEP	Ministry of Environmental Protection (former of Ministry of Ecology and Environment, MEE)
MIIT	Ministry of Industry and Information Technology
MOC	Ministry of Culture
MOF	Ministry of Finance
MTR	Mid-Term Review
NDRC	National Development and Reform Commission
NHC	National Health Commission
NRP	National Replication Programme
PCDD/Fs	Polychorinated dibenzodioxins/dibenzofurans
PIF	Project Identification Form
PIR	GEF Project Implementation Report
PMC	Project management costs
PMU	Project Management Unit
POPP	Programme and Operations Policies and Procedures
POPs	Persistent Organic Pollutants
PPG	Project Preparation Grant
PRC	People’s Republic of China
SAC	Standardization Administration
SAl	Secondary aluminum

SES	(UNDP's) Social and Environmental Standards
SLi	Secondary lithium ion battery
SPb	Secondary lead battery
SZn	Secondary zinc
STAP	GEF Scientific Technical Advisory Panel
SAMR	State Administration for Market Regulation
SEPA	State Environmental Protection Administration (former of MEP)
SESP	UNDP Social and Environmental Screening Procedure
TE	Terminal Evaluation
UNDP	United Nations Development Programme
UP-POPs	Unintentionally Produced Persistent Organic Pollutants
WHO	World Health Organization
BPPS NCE-VF	(UNDP) Bureau for Policy and Programme Support, Nature, Climate and Energy, Vertical Fund team

III. DEVELOPMENT CHALLENGE

Global Environmental Problems

1. Although secondary non-ferrous metal production is significant to circular economy, the downside of smelting, processing and re-production of secondary metals is the risk of releasing different types of pollutants, including unintentionally produced persistent organic pollutants (UP-POPs), brominated flame retardants (BFRs), strong acid and heavy metals, that could be released into the environment.

   Plychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/Fs) and other UP-POPs in secondary non-ferrous metal production

2. Secondary non-ferrous smelters primarily recover non-ferrous metal from new and used scrap and dross containing metal. Scrap metal and metal waste may also contain organic materials, such as paints, plastics, and solvents. Secondary non-ferrous smelting may lead to the unintentional formation of persistent organic pollutants (POPs), including polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/Fs), polybrominated dibenzo-p-dioxins and polybrominated dibenz ofurans (PBDDs and PBDFs, together called PBDD/Fs), and dioxin-like compounds (such as polychlorinated biphenyls (PCBs) and polychlorinated naphthalenes (PCNs)), because of the incomplete combustion of impurities in the raw materials[1].

3. Some organic materials on scrap or other sources of carbon such as partially burnt fuels and reductant (e.g., coke) can generate PCDD/Fs when reacting with inorganic chlorides or organically bound chlorine at the temperature range of 250~450ºC. This process can be catalyzed by some metals such as copper, zinc and others. Additionally, the synthesis of PCDD/Fs and PCBs can also take place as the stack gas is cooled through the re-formation window which can be present in stack gas abatement systems[2].

4. Secondary non-ferrous metal production is then recognized as important sources of UP-POPs (Annex C, Part II and III of the Stockholm Convention; Section V and VI of the BAT/BEP Guidance/Guidelines; and UNEP Dioxin Toolkit). As one of the most toxic pollutants ever known to human, PCDD/Fs, as well as other POPs such as PCBs, have attracted much attention all over the world. Dioxins are mainly derived from the incomplete combustion of organic waste in raw materials, especially the burning of organic waste containing chlorine.

   Brominated flame retardants (BFRs) in secondary non-ferrous metal production

5. The most relevant POP-BFRs related to the secondary non-ferrous metal production are polybrominated diphenyl ethers (PBDEs) due to their common use in the transport sector. Several studies have shown that PBDEs are released from metallurgical processes[3].

6. PBDEs are a group of bromine-containing organic compounds often used as brominated flame retardants (BFRs) in a wide range of consumer products, mainly plastics, polymers, composites, textiles, and coatings[4]. Among BFR mixtures, the most widely used commercial additives are pentabromodiphenyl ether

[1] Stieglitz, L., Bautz, H., Roth, W., Zwick, G., 1997. Investigation of precursor reactions in the de-novo-synthesis of PCDD/PCDF on fly ash. Chemosphere. 1997: 34, 1083–1090.

[2] Eduljee, G.H., Dyke, P., 1996. An updated inventory of potential PCDD and PCDF emission sources in the UK. Sci. Total Environ.1996: 177, 303–321.

[3] Cahill TM, Groskova D, Charles MJ, Sanborn J.R., Denison M.S. and Baker L. (2007). Atmospheric Concentrations of Polybrominated Diphenyl Ethers at Near-source sites. Environ. Sci. Technol. 41: 6370–6377.

Choi, S.D., Baek, S.Y. and Chang, Y.S. (2008) Atmospheric Levels and Distribution of Dioxin-like polychlorinated Biphenyls (PCBs) and Polybrominated Diphenyl Ethers (PBDEs) in the Vicinity of an Iron and Steel Making Plant. Atmos. Environ. 42, 2479–2488.

Odabasi, M., Bayram, A., Elbir, T., Seyfioglu, R., Dumanoglu Y., Bozlaker A., Demircioglu H., Altiok, H., Yatkin S., Cetin B. (2009). Electric Arc Furnaces for Steel-Making: Hot Spots for Persistent Organic Pollutants. Environ. Sci. Technol. 43, 5205–5211.

Wang, L.C., Wang, Y.F., Hsi, H.C. and Chang-Chien, G.P. (2010). Characterizing the Emissions of Polybrominated Diphenyl Ethers (PBDEs) and Polybrominated Dibenzo-p-dioxins and Dibenzofurans (PBDD/Fs) from Metallurgical Processes. Environ. Sci. Technol. 44, 1240–1246.

Wang M, Liu G, Jiang X, Li, Wenbin Liu, Minghui Zheng (2016) Formation and emission of brominated dioxins and furans during secondary aluminum smelting processes. Chemosphere 146 60-67.

Lin Y-M, Zhou S-Q, Shih S-I, et al. (2012) Emissions of Polybrominated Diphenyl Ethers during the Thermal Treatment for Electric Arc Furnace Fly Ash. Aerosol and Air Quality Research, 12: 237– 250.

[4] Lyday, P.A., 2000. Bromine, Mineral Information, United States Geological Survey, 988 National Center Reston, VA 20192. http://minerals.usgs.gov/minerals/pubs/commodity/bromine/index.html.

Abbasi, G., Buser, A.M., Soehl, A., Murray, M.W., Diamond, M.L., 2015. Stocks and flows of PBDEs in products from use to waste in the U.S. and Canada from 1970 to 2020. Environ. Sci. Technol. 49 (3), 1521e1528.s

(pentaBDE), octabromodiphenyl ether (octaBDE), and decabromodiphenyl ether (decaBDE)[5]. PentaBDE and octaBDE were added to Annex A of the Stockholm Convention in 2009 and have been phased out worldwide[6]. DecaBDE was just listed in Annex A of the Stockholm Convention in 2017 with specific exemptions for production and use[7]. While PBDEs have emerged as new kind of POPs listed in the Stockholm Convention, for decaBDE, even though reduction in its use has also been recommended, a five-year specific exemption for use in five areas: in vehicles; aircraft; textile products; additives and polyurethane foam, has been granted (UNEP, 2018)[8].

- DecaBDE in battery recycling process

7. As mentioned in *An alternative assessment for the flame retardant Decabromodiphenyl ether (DecaBDE)* issued by USEPA, decaBDE was used in battery cases and trays for automotive[9].

8. Relatively high PBDEs and HBCD concentrations were detected in automobile shredder residues (ASRs) of Japan, which indicates that PBDEs and HBCD are being used extensively for flame retardation purposes in automobiles (Yamamoto et al., 2007). End of life vehicles (ELVs) contain a wide range of pollutants, including heavy metals, freon gases, oil, gasoline, plastic and other polymers that may contain POPs such as PBDEs and HBCD, proper and integrated management and recycling activities are required for ELVs[10]. During the recycling process, ELVs are dismantled, shredded, and separated into metal and residue fractions[11]. Components containing BFRs enter different streams in different treatment stages[12].

9. An investigation of waste lead acid battery enterprise in Tianjin showed that decaBDE in battery case was 8.0 mg/kg. According to the "Requirements for prohibited substances on automobiles (GB/T 30512-2014)[13]", the mass percentage of Polybrominated biphenyls (PBBs) and Poly Brominated Diphenyl Ethers (PBDEs) in the materials of automotive and parts products used in China should not be more than 0.1%, while an exemption is granted to decaBDE.

- DecaBDE in secondary zinc and aluminum sectors

10. On the other hand, fly ashes produced from Electric Arc Furnaces (EAFs)[14] contain high amount of PBDEs which are major raw materials for the secondary zinc smelters. Therefore, PBDEs in cars and vehicles are also required to be addressed in this aluminum and zinc project to reduce UP-POPs and BFRs emissions.

11. PBDD/Fs and mixed brominated-chlorinated PXDD/Fs can be formed if brominated flame retardants are introduced to smelters[15]. PBDD/Fs are formed from precursor which are entering secondary metal smelters

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[5] Boya Zhanga, Bu Zhao, Mengqi Yu, Jianbo Zhang. Emission inventory and environmental distribution of decabromodiphenyl ether in China. Science of the Total Environment. 2017, 599: 1073-1081.

Li, J.; Chen, Y.; Xiao, W. Polybrominated diphenyl ethers in articles: a review of its applications and legislation. Environ. Sci. Pollut. Res. 2017, 24, 4312–4321.

[6] UNEP. Fourth Meeting of the Conference of the Parties to the Stockholm Convention on Persistent Organic Pollutants. 2009. http://chm.pops.int/Home

[7] IISD. Summary of the Meetings of the Conferences of the Parties to the Basel, Rotterdam and Stockholm Conventions: 24 April - 5 May 2017; The International Institute for Sustainable Development Reporting Services, Earth Negotiations Bulletin: New York, USA, 2017. http://enb.iisd.org/download/pdf/enb15252e.pdf (accessed September 13, 2017).

[8] UNEP, 2018. Stockholm Convention on Persistent Organic Pollutants (POPS) Text and Annexes: Secretariat of the Stockholm Convention. http://chm.pops.int/Home

[9] US EPA. An alternative assessment for the flame retardant Decabromodiphenyl ether (DecaBDE); 2014; https://www.epa.gov/sites/production/files/2014-05/documents/decabde_final.pdf.

[10] Heping Liu, Junya Yano, Natsuko Kajiwara, Shin-ichi Sakai. Dynamic stock, flow, and emissions of brominated flame retardants for vehicles in Japan. Journal of Cleaner Production. 2019, 232: 910-924.

[11] Sakai, S., Hirai, Y., Aizawa, H., Ota, S., Muroishi, Y., 2006. Emission inventory of decabrominated diphenyl ether (DBDE) in Japan. J. Mater. Cycles Waste. 8 (1),56-62.

[12] Heping Liu, Junya Yano, Natsuko Kajiwara, Shin-ichi Sakai. Dynamic stock, flow, and emissions of brominated flame retardants for vehicles in Japan. Journal of Cleaner Production. 2019, 232: 910-924.

[13] http://std.samr.gov.cn/gb/search/gbDetailed?id=71F772D7EE4AD3A7E05397BE0A0AB82A

[14] Lin Y-M, Zhou S-Q, Shih S-I, et al. (2012) Emissions of Polybrominated Diphenyl Ethers during the Thermal Treatment for Electric Arc Furnace Fly Ash. Aerosol and Air Quality Research, 12: 237– 250.

[15] Weber R., Kuch B., Ohno T., Sakurai T. (2002a) De novo synthesis of mixed brominated-chlorinated PXDD/PXDF. Organohalogen Compd. 56, 181-184.

Du B, Zheng M, Tian H, Liu A, Huang Y, Li L, Ba T, Li N, Ren Y, Li Y, Dong S, Su G (2010a). Occurrence and characteristics of polybrominated dibenzo-p-dioxins and dibenzofurans in stack gas emissions from industrial thermal processes. Chemosphere 80, 1227 - 1233.

Du B, Zheng M, Huang Y, et al. (2010b) Mixed polybrominated/chlorinated dibenzo-p-dioxins and dibenzofurans in stack gas emissions from industrial thermal processes. Environ Sci Technol. 44(15), 5818-5823. doi: 10.1021/es100867d.

as BFRs, such as plastic/polymers from the transport sector or e-waste[16]. Most BFRs are brominated aromatic compounds with high PBDD/F formation potential with PBDEs and PBB as pre-dioxin/furans[17].

Brominated flame retardants (BFRs), lead acid and lithium ion batteries recycling

12. As an organic flame retardant, brominated flame retardants (BFRs) are cheaper than phosphorus and metal flame retardants, and can effectively improve the fire resistance of products. BFRs are therefore widely used in various industrial products and daily consumer products, such as plastic in electronics, and foam and textiles in furniture and vehicles.

13. Lead acid batteries and lithium ion batteries are widely used in transportation, communication, power and other fields. In order to improve the flame retardancy of the plastic shell, BFRs are probably added to the shell plastics. Although the use of BFRs greatly improves the fire safety level of products, the plastic parts will release BFRs to the environment in the process of crushing, heating and burning, which will endanger the environment and human health.

Root causes

Production of secondary aluminum and secondary zinc sectors

14. The raw material structure of China's secondary non-ferrous metal industry had been mainly depended on imports. According to China Nonferrous Metals Industry Association Recycling Metal Branch (CMRA) statistics, in 2010, the import volume of waste non-ferrous metals reached a peak of 2.85 million tons, and then declined year by year. In 2012, domestically recycled scrap aluminum exceeded imported aluminum for the first time. After 2012, the structure of raw materials has shifted from import to domestic waste.

15. In 2020, 89% of raw materials for secondary aluminum production came from domestic sources (CMRA). As import policy has been further tightened, which still has a certain impact on raw material supply to the secondary non-ferrous metals industry. In the future, the proportion of domestic raw materials will be further increased. With the scrapping cycle and import policy adjustment in China, the annual scrap and recycling volume will rise rapidly. It is estimated that by 2030, China's secondary non-ferrous metal production will reach 18 million tons[18].

16. More than 31,940,000 tons of secondary aluminum were produced globally in 2020. China is the world's largest producer and consumer of secondary aluminum. According to the China Nonferrous Metals Association Recycling Metals Branch (CMRA), there are about 200 plants for secondary aluminum metallurgy in China, which produced 7,400,000 tons in 2020, accounting for roughly 23.1% of global aluminum production. The process of secondary aluminum production consists of feeding, fusion, content adjusting, treatment of liquid aluminum and casting. In China, secondary aluminum raw materials mainly rely on domestic waste scrap.

17. The smelting process of the secondary zinc production consists of feeding, melting, refining and casting in a crucible. As of 2020, there were about 150-200 plants for secondary zinc metallurgy in China, producing 1,450,000 tons in 2020, with 58% recycling rate, being 25% composed of medium-sized enterprise in the sector. China's secondary zinc companies are mostly distributed around hot-dip galvanizing plants, steel companies and large scrap markets, with Hebei, Yunnan, and Shandong being the main producing areas.

18. China’s secondary non-ferrous production is becoming increasingly important due to the high demand of metal, shrinking mine resources and a booming circular economy in China. Although secondary non-ferrous metal production is significant to circular economy, the downside of smelting, processing and re-production of those secondary metals is the risk of releasing different types of pollutants, including UP-POPs, BFRs,

Wang M, Liu G, Jiang X, Li, Wenbin Liu, Minghui Zheng (2016) Formation and emission of brominated dioxins and furans during secondary aluminum smelting processes. Chemosphere 146 60-67.

[16] Sinkkonen S, Paasivirta J, Lahtiper M, Vattulainen A (2004) Screening of halogenated aromatic compounds in some raw material lots for an aluminium recycling plant. Environ. Int. 30, 363-366.

UNEP (2017b) Guidance on best available techniques and best environmental practices for the recycling and disposal of articles containing polybrominated diphenyl ethers (PBDEs) listed under the Stockholm Convention on Persistent Organic Pollutants; Updated January 2017.

[17] Ebert J, Bahadir M. (2003) Formation of PBDD/F from flame-retarded plastic materials under thermal stress. Environ Int. 29(6), 711-716.

Weber R., Kuch B., Ohno T., Sakurai T. (2002a) De novo synthesis of mixed brominated-chlorinated PXDD/PXDF. Organohalogen Compd. 56, 181-184.

[18] Available online at http://www.cmra.cn/cmra/xiehuigongzuo/20180612/232256.html

acid gases and heavy metals, such as lead into the environment. Secondary non-ferrous metal smelter were the major sources of dioxin emission in China[19] (Reference Chinese NIP 2007[20]).

19. Metal containing materials used in secondary non-ferrous metal production varies greatly, and includes mixed scrap, for instance electronic waste (e-waste) parts such as cables, coils, plastic parts, which often contain BFRs and chlorine compounds such as PVC or chlorinated flame retardants. A second relevant source are BFRs and chlorine containing plastic/polymers from the transport sector. These are a major cause for the high POPs emissions in secondary non-ferrous metal production. The two most relevant processes with respect to POPs emission and control are the scrap pre-treatment and smelting processes, in particular the smelting reduction step.

20. Furthermore, at present, the flux used in the production of secondary aluminum industry is partially a chlorine-containing compound, which is the second main chlorine source for the formation of dioxin in the aluminum smelting process. The release of PCDD/Fs and other UP-POPs in the secondary zinc plants can be extremely high. A major source of PCDD/F in the zinc industry are ashes from electric arc furnaces containing high PCDD/F levels and additionally have a high PCDD/F formation potential. The PCDD/Fs included as impurities in the input materials are released in the temperature range of 200 ~ 500°C. The high temperature and metal catalysts of inorganic chlorine compounds and organochloride compounds during smelting and refining and additional produce. Dioxins are produced under these conditions. The raw materials of the secondary lead and lithium industry are relatively simple. The lead-acid batteries and lithium-ion batteries are the main ones. If the batteries are effectively disassembled and sorted, the chlorine-containing organic wastes can be separated, and the probability of producing dioxins will be reduced.

Lead acid and lithium ion batteries recycling (secondary lead and lithium sector)

21. Since China is a signatory to the Basel Convention, which prohibits the import of waste lead-acid batteries, all raw materials for China's recycled lead come from domestic sources, and more than 85% come from waste lead-acid batteries. As of 2020, there were more than 70 plants for secondary lead metallurgy in China, producing 2,400,000 tons in 2020, accounting for 32.5% of the world's total production (CMRA). Since 2010, China's recycled lead has developed rapidly, forming various operational models such as "secondary lead + battery production", "secondary lead + primary lead", "secondary lead + primary lead + battery production" etc. for the secondary lead production.

22. The number and scale of single recycled lead enterprises continue to decline. Five provinces of Henan, Jiangxi, Anhui, Inner Mongolia, and Guizhou have the largest number of enterprises, accounting for 53% of the total number of enterprises in the country. At the same time, the production scale of Anhui, Henan, Jiangxi, Jiangsu, and Guizhou provinces exceeds 60% of the nationally approved total of 11.226 million tons. The recycling of waste lead-acid batteries includes the following steps: (a) Pre-treatment, separating electrolyte, lead paste, plate grid and plastic of waste lead-acid batteries through crushing and sorting. (b) Comprehensive recycling, recovering lead, sulfuric acid, plastic and other high-value elements through different processes. The melting process of waste lead batteries mainly includes low-temperature refining of lead grids, oxygen-rich melting of lead paste, fire or electrolytic refining.

23. In addition, as the largest producer, consumer, and exporter of lithium-ion batteries (LIB), China has publicized information on ten batches of power battery recycling service points as of the end of 2020. There were a total of more than 160 new electric vehicle manufacturers and tiered utilization companies, and more than 9,000 recycling points have been established. Up to now, there is about 14 plants for waste LIB recycling in China, that recycled 600,000 tons of LIBs waste in 2020 (CMRA).

24. Waste LIB recycling companies are mainly concentrated in provinces with developed economy, large stocks of electric vehicles in use, and production bases for cathode materials and cathode precursors, such as Zhejiang and Guangdong. By the end of 2020, about 5 million electric vehicles were in use in China and the market is expected to continue growing rapidly. With the rapid promotion of new electric vehicles, the decommissioning and renewal of power batteries (mainly lithium-ion batteries) will increase significantly. The recycling process of lithium-ion batteries in China is mainly a combined pretreatment-wet recycling process which increase environmental risks considering the batteries contain various valuable (heavy) metals such as cobalt, nickel and manganese while the electrolyte contains various organic solvents.

25. As the largest producer, consumer, and exporter of lithium-ion batteries (LIB), China has maintained about 34% global market in recent years. Generally, LIBs are composed of a cathode, anode, electrolyte and

[19] Chen L-L, Huang T, Chen K-J, Song S-J, Gao H, Ma J-M (2020) Gridded Atmospheric Emission Inventory of PCDD/Fs in China] DOI: 10.13227/j.hjkx.201908056 (in Chinese)

[20] The People's Republic of China (2007) National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants.

separator, and contain conducting carbons, polymers and lithium transition metal oxides, such as $LiCoO_2$, $LiMn2O_4$, $LiNiO_2$ and $LiCoxMnyNizO_2$. Waste LIBs can be classified as hazardous materials due to the existence of heavy metals, including lead, cobalt, copper, nickel, thallium, and silver.

26. The potential leakage of organic electrolytes as well as heavy metals can lead to serious contamination if the waste LIBs are directly incinerated. Aside from toxicity, valuable materials in waste LIBs, such as lithium and cobalt, are worthy to be recycled due to limited natural reserves and increasing demands. Similar to the recovery process of lead acid batteries, if there is no effective pre-treatment during the recovery process, chlorine-containing organic matter will generate UP-POPs, such as PCDD/Fs, during the pyro metallurgical process. The raw materials of the secondary lithium and lead industry are relatively simple. The lithium-ion batteries and lead-acid batteries are the main inputs. If the batteries are effectively disassembled and sorted, the chlorine-containing organic wastes will be separated, and the probability of producing dioxins will be reduced.

27. With the effectiveness of the implementation of the ban on "foreign garbage"[21] and increase of import standards for metal scrap, China will further energize its domestic recycling industry of useful materials. Meanwhile, China will witness a strong increase of replacement of electrical vehicles and electrical bicycles within the next 5 years, which will create a huge market demand for recycling LIBs. In addition, a large amount of vehicles containing lead-acid batteries will continue to enter end of life and result in further demand for lead smelting. Lack of collection schemes and policy support are the main reasons behind the waste battery collection problem. A package of solutions addressing green recycling, green production and chemicals control of those typical secondary sectors is imperative in China's context to safeguard the environment, human health and promotion of circular economy.

Barriers that need to be addressed

28. Two (2) types of measures can be adopted to avoid UP-POPs emissions (see Table 1):

    (a) Primary measures that prevent the formation of UP-POPs, including orderly recovery of recyclable metal scrap, classification and screening of recovered scrap metal in order to minimize substances with high heavy metal content, removing organic matter and plastics, if necessary, to clean the raw materials and to reduce the amount of chlorine, especially organic chlorides, reducing the source of chlorine for the generation of dioxin in the facilities. To control the cooling section and to minimize the amount of ashes in the problematic temperature window for de novo formation (200 to 500 °C).

    (b) Secondary measures that prevent formed UP-POPs to be emitted to the environment, including the use of special or synergistic techniques to remove dioxin, such as bag filter, spray activated carbon or activated carbon filter beds, treatment of fly ash (according to toxic and hazardous waste landfill or solidification treatment), catalyst oxidation technology (using vanadium pentoxide, tungsten trioxide, etc.), plasma technology, etc.

29. The current dioxin UP-POPs reduction measures that can be taken in the secondary non-ferrous metal industry are shown in Table 1.

Table 1 - Dioxins Emission Reduction Measures in Secondary Non-ferrous Metal Industries[22]

Measure	Measure	Secondary non-ferrous metal sectors			
		Secondary Aluminum	**Secondary Zinc**	**Secondary lead**	**Secondary Lithium[23]**
Recommended Processes		Processes to consider include reverberatory furnace, rotary and tilting rotary furnaces, induction furnace, and Meltower	Processes to consider include: • Physical separation, melting and other high-temperature treatment techniques	Processes to consider include • Blast furnace (with good process control),	• Processes to consider include: • Pre-treatment methods, such as discharging, electrolyte treatment and

[21] Available online at http://english.www.gov.cn/statecouncil/ministries/201909/08/content_WS5d7506acc6d0c6695ff80115.html

[22] UNEP. Guidelines on best available techniques and guidance on best environmental practices (2007, 2019/2021). http://www.pops.int/Implementation/BATBEP/BATBEPGuidelinesArticle5/tabid/187/Default.aspx

[23] Chagnes, A., Pospiech, B., 2013. A brief review on hydrometallurgical technologies for recycling spent lithium-ion batteries. J. Chem. Technol. Biotechnol. 88 (7), 1191–1199.

Measure	Measure	Secondary non-ferrous metal sectors			
		Secondary Aluminum	**Secondary Zinc**	**Secondary lead**	**Secondary Lithium[23]**
		shaft furnace. All techniques should be applied in conjunction with suitable gas collection and abatement systems.	followed by the removal of chlorides • The use of Waelz kilns, cyclone- or converter-type furnaces to raise the temperature to volatilize the metals and then form the oxides that are then recovered from the gases in a filtration stage	• ISA Smelt/Ausmelt furnace, • Top-blown rotary furnace, • Electric furnace • Rotary furnace	dismantling-crushing, • Physical or chemical processes, such as thermal treatment, alkaline leaching and solvent extraction.
Primary measures	Presorting of Feed Material	Processes to consider include: • Prevention or minimization of the use of chloride salts where possible • Cleaning scrap material of oils, paints and plastics during pre-treatment • Using thermal decoating techniques such as the swarf centrifuge or swarf dryer	Processes to consider include: • Milling and grinding, in conjunction with pneumatic or density separation techniques, can be used to remove plastics • Oil removal conducted through thermal decoating and de-oiling processes	Processes to consider include: • Scrap should be sorted and pre-treated to remove organic compounds and plastics. Whole battery feed or incomplete separation should be avoided. • Milling and grinding, in conjunction with pneumatic or density separation techniques, can be used to remove plastics.	Processes to consider include: • Scrap should be sorted and pre-treated to remove organic compounds and plastics. Whole battery feed or incomplete separation should be avoided. Milling and grinding, in conjunction with pneumatic or density separation techniques, can be used to remove plastics.
	Effective Process Control	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	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	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	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

Measure	Measure	Secondary non-ferrous metal sectors			
		Secondary Aluminum	**Secondary Zinc**	**Secondary lead**	**Secondary Lithium[23]**
Secondary measures	Fume and Gas Collection	Processes to consider include: • Use of sealed feeding systems and furnaces • Control of fugitive emissions by maintaining negative air pressure within the furnace to prevent leaks • Use of hooding if a sealed unit is not possible • Use of furnace or reactor enclosures	Processes to consider include: • Furnace-sealing systems to maintain a suitable furnace vacuum that avoids leaks and fugitive emissions • Use of hooding • Hood additions of material, additions via tuyeres or lances and the use of robust rotary valves on feed systems	Processes to consider include: • Use of sealed feeding systems and furnaces • Control of fugitive emissions by maintaining negative air pressure within the furnace to prevent leaks • Use of hooding hood additions of material, additions via tuyeres or lances and the use of robust rotary valves on feed systems	Processes to consider include: • Use of sealed feeding systems and furnaces • Control of fugitive emissions by maintaining negative air pressure within the furnace to prevent leaks • Use of hooding hood additions of material, additions via tuyeres or lances and the use of robust rotary valves on feed systems
	High Efficiency Dust Removal	Processes to consider include: • Fabric filters, wet/dry scrubbers and ceramic filters • Catalytic coatings on fabric filter bags to destroy PCDD/PCDF by oxidation while collecting particulate matter on which these contaminants have adsorbed	Processes to consider include: • Use of fabric filters, wet/dry scrubbers and ceramic filters	Techniques to be considered are : • fabric filters, • wet and dry scrubbers • ceramic filters. Collected particulate should be recycled in the furnace.	Processes to consider include: • fabric filters, • wet and dry scrubbers • ceramic filters. Collected particulate should be recycled in the furnace.
	Afterburners and Quenching	Considerations include: • PCDD/PCDF formation at 250 °C to 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	Considerations include: • PCDD/PCDF formation at 250 °C to 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	Considerations include: • PCDD/PCDF formation at 250 °C to 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	Considerations include: • PCDD/PCDF formation at 250 °C to 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

Measure	Measure	Secondary non-ferrous metal sectors			
		Secondary Aluminum	**Secondary Zinc**	**Secondary lead**	**Secondary Lithium[23]**
		minimize reformation time	minimize reformation time	minimize reformation time	systems to minimize reformation time
	Adsorption on Activated Carbon	Processes to consider include: • Treatment with activated carbon using fixed or moving bed reactors • Injection of carbon into the gas stream followed by high-efficiency dedusting methods such as fabric filters	Processes to consider 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	Processes to consider 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 using high-efficiency dust removal systems such as fabric filters.	Processes to consider 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 using high-efficiency dust removal systems such as fabric filters.
Emerging research	Catalytic oxidation	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	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	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	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

30. China's secondary non-ferrous metal industry includes secondary lead (SPb), secondary aluminum (SAl), secondary copper (SCu), secondary zinc (SZn), secondary lithium (SLi), and so on. The secondary lead industry is mainly based on recycling of waste lead-acid batteries, while the secondary lithium industry is mainly based on recycling of waste lithium ion batteries. Therefore, a number of barriers that need to be addressed to allow the adoption of environmental sound management in the secondary non-ferrous metal industry:

    a) China's current legal and regulatory framework, management requirements in the field of secondary non-ferrous metal are covered through the various relevant laws, regulations and standards, but still lacks regulatory standards for green production and source control. The industry's baseline data for UP-POPs and BFRs are not very clear, and requires more investigations to gather data to support the construction of the raw material management system.

    b) The selection and application of the clean production technology is of great significance for energy saving and reduced pollutant emissions. Although the secondary lead industry has released BAT guideline and clean production evaluation index system, the secondary aluminium, secondary zinc and secondary lithium industries have not yet issued BAT guideline and clean production evaluation index system.

    c) Secondary aluminum ash has been included in the category of hazardous waste, but the management and standards system of hazardous waste produced in the secondary non-ferrous metal sectors have not yet been established.

d) With the expansion of the industry and the update of process technology, it is necessary to explore the UP-POPs and BFRs reduction technologies, and summarize the experience to extend to the whole industry.

Baseline scenario

31. According to the *Environmental Protection Tax Law of the People's Republic of China* implemented in 2018, the basis of tax calculation is determined according to the pollutant emission, with more emissions, the more payments, or less emission, lesser payment. In order to reduce the amount of smelting slag, smelting enterprises are bound to choosing non-ferrous metal scraps instead of primary mines for production, which will lead to an increase in the demand for domestic scrap non-ferrous metals, and the importance of non-ferrous metals recycling will be further highlighted and increased.

32. In China's secondary non-ferrous production sector, the level of PCDD/Fs control varies. Pretreatment technology, air pollution control technology, and water recycling and waste heat recovery technology have been promoted and applied in medium- and large-size enterprises. However, majority of the small-size manufacturing enterprises have insufficient investment in environmental protection, pollution prevention and control capacities that need to be improved. Considering the economic burden associated with the emission control, many smaller secondary non-ferrous smelting plants that cannot meet the emission control standards might be put out of the market gradually along with the enforcement of environment laws by the governments and increased demand from the public for a healthy environment. It is expected that the large- and medium-size enterprises who are able to apply BAT/BEP will represent the typical profile of the secondary non-ferrous recycling industry in China in the future.

33. The last PCDD/Fs emission inventory for China was developed in 2007 (China's NIP 2007). Potential national release of PCDD/Fs emission to air, water, land, product and residue were estimated at 10,236.8 g TEQ/a as reported in the NIP. The total release from the non-ferrous metal production was estimated at 1,607.3 g TEQ/a, accounting for 15.7% of the total national release. There was no dioxin emission inventory information for the secondary lead and secondary lithium industries. The currently available information on PCDD/Fs releases from non-ferrous metal production from the first NIP is summarized in Table 2 below.

Table 2 - Dioxins Emission of Secondary Aluminum and Zinc Sectors in 2007

No.	Sector	Annual releases of PCDD/Fs (g TEQ/a)		
		Air	Residues	Total
1	Secondary Aluminum	133.5	332	465.5
2	Secondary Zinc	8	0	8

34. Tetrabromodiphenyl ethers (tetraBDE) and pentabromodiphenyl ethers (pentaBDE), hexabromodiphenyl ethers (hexaBDE) and heptamobiphenyl ethers (heptaBDE) were included in the list of controlled substances of the Stockholm Convention in 2009. Hexabromocyclododecane (HBCD) and decabromodiphenyl ether (decaBDE) were included in the list of controlled substances of the Convention in 2013 and 2017, respectively. Among these BFRs, China has issued notices in 2014 and 2016 on the entry into force of the amendments to tetraBDE, pentaBDE, hexaBDE and heptaBDE, and HBCD respectively. So far, decaBDE has not been ratified by the Chinese government and decaBDE is still produced.

35. The annual consumption of decabromodiphenyl ether in China ranges from 20,000 to 40,000 tons, of which nearly 90% is used in plastics. 70% of the plastic containing decaBDE is used in electronic and electrical products. In addition, a large number of decaBDE have also been detected in vehicles (such as seat textile materials and plastic interior). In addition to plastics, decaBDE is partly used in coatings, rubber (e.g., mine conveyor belts) and textiles.

36. In 2020, the total amount of China's secondary non-ferrous metal industry was 14.5 million tons. Among them, the output of secondary aluminum, lead and zinc were 7.4, 2.4 and 1.40 million tons respectively (CMRA). According to China Automotive Technology & Research Center (CATARC) data in 2020, 0.2 million tons power batteries were recycled in China, of which only 30% of the waste power batteries are wet melted. It is presumed that China's recycled lithium production is currently about 3,000 t/a.

37. A detailed monitoring of the material and substance flows of PBDEs in vehicles and related sectors is missing up to now. In the United States, it is estimated that the largest amount of PBDE stocks is in vehicles (Abassi et al 2015)[24]. In addition, the monitoring of End of life vehicles (ELVs) in Japan have shown that vehicles

[24] Abbasi G. Buser A, Soehl A, Murray MW, Diamond ML (2015) Stocks and Flows of PBDEs in Products from Use to Waste in the U.S. and Canada from 1970 to 2020. Environ. Sci. Technol. 2015, 49, 3, 1521–1528

are a major PBDE source (Kajiwara et al. 2014)[25]. On the other hand, high amounts of PBDEs are introduced in the fly ashes produced from Electric Arc Furnaces (EAFs), and PBDEs are major raw materials for the secondary zinc smelters.

38. Through research conducted and experience gained from international sources during the PPG stage, it is learned that most cars that have an aluminum hood, which together with the ELVs were the main raw materials for the secondary aluminum sectors. In the dismantling process, components such as seat of waste car contain a certain amount of BFRs entering different streams in different treatment stages. Therefore, demonstration activities for automotive dismantling companies will reduce the effects of BFRS waste on the environment. The approximate process of the emission reduction of BFRs waste could be described as follows:

    Figure that a car dismantling company could disassemble 5,000 vehicles per year, each of the disassembled cars is 1.5 tons, of which the seat weight is 60kg, 50% of the seat is iron, and the other 50% is a sponge and other soft materials, in this case, the BFR-containing waste would be a total of 150 tons per year. Based on a two-year operation period, this project is expected to achieve reduction of 300 tons of BFR-containing waste in an environmentally sound manner.

    At present, there is no sufficient survey data available on the use of BFRs in secondary non-ferrous metal sectors. Investigation and in-depth studies will be carried out during project implementation. The additional information and data gathered during the further investigation and in-depth studies at project implementation will form the basis to formulate specific activities for further actions to be implemented during the project lifecycle to reduce UP-POPs emissions in these sectors. Therefore, the activities to achieve Output 1.1.1 will further investigate the status of BFRs in secondary non-ferrous metal products to develop, revise and improve green product policies and regulatory frameworks in battery, and the activities to achieve Outputs 2.1.2 and 2.2.1 will evaluate the effective crushing and sorting technology to reduce the plastics entering the recycling process.

Associated baseline national standards framework

39. 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, aluminum, lead and zinc sector. 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. China's government agencies have formulated a large number of technical standards, guidance and policies in the secondary metal sectors, which are important basis of promoting BAT/BEP for the reduction of POPs emissions, circular economy and the integrated waste management framework. The main national standards covering secondary non-ferrous metal production are outlined in Table 3.

Table 3: Regulations and Guidelines on Secondary Non-ferrous Metal Sectors

Sector	Standard Name and Number	Year	Issuing Institution	Applicable Scope
SAl	*Aluminum and aluminum alloys scraps (GB/T 13586-2006)*	2006	General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ), Standardization Administration of the People's Republic of China (SAC)	This standard specifies the classification, requirements, test methods, inspection rules, packaging, marking, transportation and storage of aluminum and aluminum alloy scrap (hereinafter referred to as scrap aluminum). This standard is applicable to domestic and foreign trade of scrap aluminum and recycling of scrap aluminum from recycled non-ferrous metal smelting enterprises and aluminum processing enterprises.
SAl	*Recycling materials for cast aluminum alloys (GB/T 38472-2019)*	2019	State Administration for Market Regulation (SAMR), Standardization Administration of the People's Republic of China (SAC)	The standard stipulates the classification, requirements, test methods, inspection rules, markings, packaging, transportation, storage, quality certificates and purchase orders (or contracts) of recycled cast aluminum alloy raw materials. This standard is applicable to the raw materials for recycled cast aluminum alloys obtained after sorting and processing of recycled aluminum in waste vehicles,

[25] Kajiwara N, Takigami H, Kose T, Suzuki G, Sakai S. (2014) Brominated flame retardants and related substances in the interior materials and cabin dusts of end-of-life vehicles collected in Japan. Organohalogen Compounds 76, 1022-1025.

Sector	Standard Name and Number	Year	Issuing Institution	Applicable Scope
				aluminum appliances, and mechanical equipment.
SAl	*Classification and recycling and utilization of wrought aluminum and aluminum alloy scraps—Part 1：Classification of scraps (GB/T 34640.1-2017)*	2017	AQSIQ, SAC	This standard stipulates the classification and grouping requirements in the waste classification of wrought aluminum and aluminum alloy enterprises.
SAl	*Classification and recycling and utilization of wrought aluminum and aluminum alloy scraps—Part 2：Recycling of scraps (GB/T 34640.2-2017)*	2017	AQSIQ, SAC	The standard stipulates the recycling requirements for external and internal scrap of deformed aluminum and aluminum alloy enterprises. It is suitable for the recycling of waste materials from aluminum processing enterprises.
SAl	*Classification and recycling and utilization of wrought aluminum and aluminum alloy scraps—Part 3：Utilization of scraps (GB/T 34640.3-2017)*	2017	AQSIQ, SAC	The standard stipulates the inspection and pretreatment, reconstitution, melting and casting, and environmental monitoring and discharge of wrought aluminum and aluminum alloy scrap.
SAl	*Announcement No. 6 of 2020 "Specification conditions for the aluminum industry"*	2020	Ministry of Industry and Information Technology (MIIT)	This specification applies to bauxite mining, alumina, electrolytic aluminum, and secondary aluminum enterprises that were established and put into production. It is a guiding document in advancing technological progress and standardized development of the industry. Recycling aluminum enterprises are required to adopt other advanced energy-saving technologies such as flue gas waste heat utilization and advanced smelting furnaces, to support the construction of comprehensive aluminum ash and slag recycling, efficient treatment of waste aluminum smelting flue gas and dust, dioxin prevention and control equipment facilities, to effectively remove impurities such as chlorine-containing substances and cutting oil in raw materials. The comprehensive energy consumption of secondary aluminum enterprises should be less than 130 kg of standard coal/ton of aluminum. The total recovery rate of aluminum or aluminum alloy in secondary aluminum enterprises should be more than 95%, and the resource utilization of aluminum ash and slag is encouraged.
SZn	*Regenerated zinc and zinc alloy ingots GB/T 21651-2018）*	2018	SAMR, SAC	This standard specifies the requirements, test methods, inspection rules, markings, packaging, transportation, storage, quality certificates and purchase orders (or contracts) for secondary zinc and zinc alloy ingots. This standard applies to secondary zinc and zinc alloy ingots produced through smelting and processing of zinc secondary materials. The standard requires that recycled zinc and zinc alloy ingots should be shipped with non-corrosive materials and clean transportation vehicles, and should be stored in a dry, ventilated, non-corrosive warehouse.
SZn	*Regenerated zinc raw material (YS/T 1093-2015)*	2015	MIIT	The standard stipulates the requirements for recycled zinc raw materials, test methods, inspection rules, packaging, transportation, quality certificates, and purchase orders (or contracts). The standard stipulates that the chlorine content of scum is not more than 6%, and the chlorine content of furnace formation is not more than 5%. The chlorine content of carbon-based waste zinc batteries is not more than 10%. The chlorine content of the first, second and third grades of steel fume is not more than 1.0%, 2.5% and 5.0% respectively. Rainproof and waterproof measures should be taken during the transportation of recycled zinc raw materials.
SZn	*Technical specification of treatment and disposal for zinc-containing waste*	2016	AQSIQ, SAC	Waste gas and wastewater generated during the treatment and disposal of zinc-containing waste materials shall meet the emission requirements of GB

Sector	Standard Name and Number	Year	Issuing Institution	Applicable Scope
	materials *(GB/T33055—2016)*			31574. The waste residues generated during the treatment and disposal of zinc-containing waste materials shall be identified in accordance with the provisions of GB5085.7.
SZn, SPb	*Lead and zinc industry standard conditions (Announcement No. 7 of 2020)*	2020	MIIT	Secondary zinc enterprises must use advanced technology and equipment, and must construct smelting slag harmless treatment facilities, and use pyrotechnic technology to support waste heat recovery and utilization systems and flue gas comprehensive treatment facilities. Complete facilities for removing fluorine and chlorine should be built in the treatment of zinc-containing secondary resources containing fluorine and chlorine. The comprehensive energy consumption of the pyro-enrichment process of the secondary zinc enterprise must be lower than 1200 kg standard coal/ton of metallic zinc, and the comprehensive energy consumption of the electro-zinc zinc ingot process of the hydro-zinc smelting process must be lower than 900 kg of standard coal/ton. The total recovery rate of zinc in secondary zinc enterprises should reach 88% and above, and the recycling rate of water must reach above 95%.
SPb	*Secondarily lead and lead alloy ingots* *(GB/T 21181-2017）*	2017	AQSIQ, SAC	This standard specifies the requirements, test methods, inspection rules, markings, packaging, transportation, storage, quality certificates and purchase orders (or contracts) for recycled lead and lead alloy ingots.
SPb	*Recycling and treatment requirements of lead-acid battery for telecommunications* *GB/T 22424-2008*	2008	AQSIQ, SAC	This standard specifies the recycling requirements, treatment methods, and transportation and storage of lead-acid batteries for communications. The standard points out that the establishment of a legitimate and approved recycling organization is the key to the recycling and processing of lead-acid batteries. The recycled lead-acid batteries are not allowed to be dissected, cracked, dismantled, etc. before being transported to a qualified recycling agency. In the process of collecting the batteries and sending them to the disposal site, they should meet the requirements of the "Management Measures for the Transfer of Hazardous Wastes".
SPb	*The norm of energy consumption per unit products of recycling lead (GB 25323-2010)*	2010	AQSIQ, SAC	The standard stipulates the requirements, calculation principles, calculation methods, calculation scope and energy-saving management measures for the unit product energy consumption quota of recycled lead enterprises.
SPb	*Technical Specifications for Pollution Control during Collection and Recycle of Waste Plastics* *HJ/T364-2007*	2007	Ministry of Environmental Protection (MEP) (Former name of Ministry of Ecology and Environment (MEE)	This standard applies to the recycling and recycling of various waste plastics, including imported waste plastics, and does not apply to waste plastics belonging to medical waste and hazardous waste. The plastic recycled from the waste lead-acid battery should be cleaned and meet the relevant requirements of this standard.
SPb	*Technical specification for recycling waste lead acid battery* *GB/T 37281-2019*	2019	SAMR, SAC	This standard specifies the operational technology and management requirements for the collection, storage, transportation, and transfer of waste lead-acid batteries in the social circulation field.
SPb	*Cleaner production standard - Waste lead-acid battery recycling industry* *HJ 510-2009*	2009	MEP	This standard specifies the general requirements for cleaner production in the lead recycling industry of waste lead-acid batteries based on the current industry technology, equipment and management level on the basis of meeting national and local pollutant emission standards. This standard is divided into three levels, the first level represents the international advanced level of cleaner production, the second level represents the domestic advanced level of cleaner production, and the third level represents the basic level of domestic cleaner production.

Sector	Standard Name and Number	Year	Issuing Institution	Applicable Scope
SPb	*Guideline on Available Technologies of Pollution Prevention and Control for Secondary Lead Smelt Industry*	2015	MEP	This guideline is applicable to reclaimed lead smelting enterprises that use lead-containing metal scraps such as lead-acid batteries as the main raw materials.
SPb	*Technical Specifications of Pollution Control for Treatment of Lead-acid Battery* *(HJ519-2020)*	2009	MEP	This standard is applicable to the pollution control of the whole process of resource recycling, including collection, storage, transportation and treatment of waste lead-acid batteries. It can also be used to guide the site selection, construction and post-construction pollution control management of resource recycling enterprises.
SPb	*Announcement No. 60 of 2016 "Regulations and Conditions for the Secondary Lead Industry"*	2016	MIIT	The conditions of this specification are applicable to recycled lead enterprises that use waste lead batteries as their main raw materials.
SPb	*Announcement No. 35 (2015) "Evaluation Index System for Cleaner Production in the Recycled Lead Industry"*	2015	National Development and Reform Commission (NDRC), MEP, MIIT	This indicator system stipulates the general requirements for cleaner production in the secondary lead industry. The indicator system stipulates that the total lead recovery rate needs to be ≥98%, and the waste residue disposal rate and waste water recycling rate reach 100%. Comprehensive energy consumption per unit product (calculated as standard coal) I level benchmark ≤100 kgce/t, level II benchmark ≤120 kgce/t, and level III benchmark ≤130kgce/t.
SLi	*Methods for disposal and recycling of lithium ion battery material wastes* *GB/T 33059—2016*	2016	AQSIQ, SAC	The standard specifies the terms and definitions, method summary, raw materials and equipment, processing conditions and process control requirements, environmental protection and safety requirements for the recycling of lithium-ion battery material waste.
SLi	*Recycling of traction battery used in electric vehicle—Dismantling specification (GB/T 33598-2017)*	2017	AQSIQ, SAC	This standard is applicable to the overall disassembly and disassembly requirements, operating procedures and storage management requirements of used lithium-ion battery for vehicles. It is not applicable to the disassembly of used waste battery components for vehicles.
SLi	*Recycling of traction battery used in electric vehicle-Recycling-Part 2: Materials recycling requirements* *(GB/T 33598.2-2020)*	2020	SAMR, SAC	This standard specifies the terms and definitions, general requirements and pollution control and management requirements for the recycling of automotive power battery materials. This standard applies to the material recovery of lithium-ion power batteries and nickel-hydrogen power batteries for vehicles.
SLi	*Recycling of traction battery used in electric vehicle—Echelon use—Part2 : Removing requirements (GB/T 34015.2-2020)*	2020	SAMR, SAC	This standard specifies the terms and definitions, general requirements, operating requirements, temporary storage and management requirements for the disassembly of power batteries for electric vehicles.
SLi	*Recycling of traction battery used in electric vehicle—Test of residual capacity* *(GB/T 34015-2017)*	2017	AQSIQ, SAC	This standard specifies the terms and definitions, symbols, testing requirements, testing procedures and testing methods for the residual energy testing of waste power batteries for vehicles. It is suitable for the residual energy detection of used lithium-ion power batteries.
SLi	*Recycling of traction battery used in electric vehicle—Management specification—Part 1 : Packing and transporting* *(GB/T 38698.1-2020)*	2020	SAMR, SAC	This standard specifies the terms and definitions, classification requirements, general requirements, packaging requirements, transportation requirements and marking requirements for the recycling and utilization of packaging and transportation of retired power batteries for vehicles. This standard applies to the packaging and road transportation of retired lithium-ion power battery packs, modules, and monomers for electric vehicles.
SLi, SPb	*Classification and code of waste batteries* *(GB/T 36576-2018)*	2018	SAMR, SAC	The standard specifies the terms and definitions, classification methods, coding rules and code structure, classification and codes of used batteries.

Sector	Standard Name and Number	Year	Issuing Institution	Applicable Scope
SLi, SPb	*Technical specification for pyrolysis process of waste batteries recovery* *HG/T 5816-2020*	2020	MIIT	This standard specifies the terms and definitions, general requirements, pyrolysis technical requirements, and environmental protection requirements for pyrolysis in the recycling process of waste batteries.
SLi, SPb	*Technical specification for used batteries take-back (GB/T 39224-2020)*	2020	SAMR, SAC	This standard specifies the overall requirements, collection requirements, sorting requirements, transportation requirements and storage requirements for the recycling of used batteries.
SLi, SPb	*Treatment and disposal methods for the waste liquid from the treatment of waste batteries* *GB/T 33060—2016*	2016	AQSIQ, SAC	This standard specifies the terms and definitions of the treatment and disposal of waste liquid in the treatment of waste batteries, the treatment and disposal methods of electrolyte, the treatment and disposal methods of waste liquid generated in the process of metal ion reuse, and environmental protection and safety requirements.
SAl, SPb, SZn	*Emission standards of pollutants for secondary copper, aluminum, lead and zinc (GB 31574-2015)*	2015	MEP, AQSIQ	Emission limit value of exhaust gas: dioxin ≤0.5 ng TEQ/m^3
SLi, Sal, SZn, SPb	*Technical specification for application and issuance of pollutant permit non-ferrous metal metallurgy industry—secondary non-ferrous metal (HJ 864.3-2018)*	2018	MEE	This standard specifies the basic filing requirements for the application and issuance of pollutant discharge permits for secondary non-ferrous metal (secondary copper, *aluminum, lead and zinc*) pollutant discharge units, the determination of permitted emission limits, the actual emissions accounting, the method for compliance determination, and the self-monitoring, environmental management ledger and discharge permit implementation report and other environmental management requirements, put forward feasible technical requirements for the prevention and control of recycled non-ferrous metals.
SLi, Sal, SZn, SPb	*Announcement No. 90 of 2015 "Dioxin pollution prevention and control technology policy in key industries"*	2015	MEP	The technical routes and technical methods that can be adopted for the prevention and control of dioxin pollution in key industries, including source reduction, process control, end treatment, new technology research and development, etc.

40. In addition, a recommended Extended Producer Responsibility (EPR) in the recycling industry of waste batteries was introduced since 2016 and a series of policy standards have been established as shown in Table 4.

Table 4: Regulations and Guidelines on Extended Producer Responsibility (EPR)

Standard Name and Number	Year	Issuing Institution	Applicable Scope and Requirement
"Implementation Plan of the Extended Producer Responsibility System" [26]	2016	General Office of the State Council	Lithium ion batteries (LIBs) manufacturers should implement product coding and establish a full life cycle traceability system. The construction of LIBs recycling system is carried out first in Shenzhen City and gradually promoted in China. Guide the lead acid batteries (LABs) production enterprises to establish a full life cycle traceability system, adopt autonomous recycling, joint recycling or entrustment recycling model. Recycling LABs at consumer's level through producers' own sales channels or networks established by professional enterprises, or adopt the "old-for-new" mechanism to improve recycling efficiency. Explore the improvement of production enterprises' centralized collection and cross-regional transportation methods. The LABs recycling system will be built first in Shanghai.
"Interim Measures for the Administration of Recycling and Utilization of Power Battery for New Energy Vehicles"	2018	Ministry of Industry and Information Technology	The Measures stipulate the management requirements for the recovery process of waste LABs during production, use, utilization, storage and transportation. Promote the innovation on battery market mechanisms and recycling mode. Encourage the cooperation of battery production enterprises and disposal enterprises, ensure the

[26] http://www.gov.cn/zhengce/content/2017-01/03/content_5156043.htm

Standard Name and Number	Year	Issuing Institution	Applicable Scope and Requirement
		(MIIT)	principle of echelon use first and then recycling. Establish an echelon use based battery management system.
Announcement No. 46, 2019"Guide to the Construction and Operation of New Energy Vehicle Power Battery Recycling Service Sites"	2019	MIIT	The guide puts forward the requirements for the construction, operation and safety and environmental protection of the waste power batteries of new energy vehicles and the waste cascade battery recycling service network.
Coupling function No. 129,2021 "Implementation Plan for the Extension of Pilot Producer Responsibility of Automobile Products"	2021	MIIT	Through the pilot work, set up a batch of benchmarking enterprises of extended producer responsibility of automobile products, and form the implementation mode of extended producer responsibility of automobile products suitable for China's national conditions. The implementation plan specifically to establish a recycling system, to carry out the comprehensive utilization of resources, the implementation of green supply chain management, strengthen the information disclosure for the implementation of the direction, including recycling system for automobile production enterprises through recycling, recovery or joint recovery of model, established in accordance with the law of scrapped automobiles, old parts recycling network and management system. Objective By 2023, the standard recycling level of scrapped vehicles will be significantly improved, forming a recycling mode of scrapped vehicles with a group of replicable and popularizable automobile production enterprises as the main body of responsibility; The utilization level of renewable resources of scrapped vehicles has been steadily improved, and the comprehensive utilization rate of resources has reached 75%. The green supply chain system of automobiles is well established. The recycling rate of automobiles reaches 95%, and the proportion of recycled raw materials used for key components is not less than 5%.

41. Compared to the general waste management regulations in Table 3, the specific regulations related to the hazardous waste management were issued as shown in Table 5.

Table 5: Regulations and Guidelines on Hazardous Waste Management

Standard Name and Number	Year	Issuing Institution	Applicable Scope
General standard for identification of hazardous waste（GB5085.7）	2019	Ministry of Ecology and Environment (MEE)	This standard specifies procedures and rules for the identification of hazardous wastes. It is suitable for the identification of hazardous characteristics of solid waste produced in production, living and other activities, and for the identification of liquid waste.
Standard for pollution control of hazardous waste storage *(GB 18597-2001)*	2001	Ministry of Environmental Protection (MEP), General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ)	This standard specifies the general requirements for the storage of hazardous waste, as well as the requirements for the packaging of hazardous waste, the site selection, design, operation, safety protection, detection and closure of storage facilities. This standard applies to the pollution control and supervision management of the storage of all hazardous wastes (except tailings ponds), and is applicable to the producers, operators and managers of hazardous wastes.
"Standard for Pollution Control of General Industrial Solid Waste Storage and Disposal Site" *(GB18599-2001)*	2001	MEP, AQSIQ	This standard specifies the requirements for the storage, disposal, design, operation management, closure and closure of industrial solid waste, as well as pollution control and monitoring, etc. It is applicable to the construction, operation, supervision and management of the storage and disposal sites of general industrial solid waste that are newly built, expanded, rebuilt and already put into production, but not applicable to hazardous waste and domestic waste landfill sites.
Technical specifications for collection, storage, transportation of hazardous waste *(HJ 2025-2012)*	2012	MEP	The standard sets out the technical requirements to be followed during the collection, storage and transportation of hazardous wastes. It is applicable to the collection, storage and transportation of hazardous waste by hazardous waste producing units and operating units.

Standard Name and Number	Year	Issuing Institution	Applicable Scope
The vehicle mark for road transportation dangerous goods (GB 13392-2005)	2005	Ministry of Transport (MOT)	The standard stipulates the classification, specifications and dimensions, technical requirements, test methods, inspection rules, packaging, marking, loading and unloading, transportation and storage, as well as requirements for installation, suspension and maintenance of vehicles carrying dangerous goods by road. It is applicable to the production, use and management of the marks of dangerous goods vehicles in road transport.
Provisions of vehicle for the carriage of dangerous goods with regard to their specific constructional features (GB 21668-2008)	2008	China Machinery Industry Federation (CMIF)	This standard sets out the structural requirements for vehicles for the transport of dangerous goods and applies to Class N and Class O vehicles and trains consisting of Class N and one Class O vehicle for the transport of dangerous goods.
National List of Hazardous Wastes (2021 edition)	2021	MEE, National Development and Reform Commission (NDRC), Ministry of Public Security (MPS), MOT, National Health Commission (NHC)	Through the implementation of the National Hazardous Waste List, the accuracy of hazardous waste attribute determination and environmental management will be further improved, the classification and classification management of hazardous waste will be promoted, and the environmental management level of hazardous waste will be effectively improved.
Measures for the Administration of Operating Permits for Hazardous Wastes	2004	The State Council	In order to strengthen the supervision and management of their business activities and prevent and control environmental pollution by hazardous waste, the units engaged in the business activities of collection, storage and treatment of hazardous waste shall, in accordance with the provisions of the present Measures, obtain a hazardous waste business license. According to the mode of operation, it is divided into the comprehensive operation license for the collection, storage and disposal of hazardous waste and the operation license for the collection of hazardous waste. These Measures specify the conditions, procedures, supervision and administration and legal responsibilities for applying for and obtaining a hazardous waste management license.
Measures for the Administration of Dangerous Waste Transfer Coupling	1999	MEP	Before transferring hazardous waste, the unit producing hazardous waste shall, in accordance with the relevant provisions of the State, report for approval the plan for transferring hazardous waste. Upon approval, the generating unit shall apply to the competent administrative department of environmental protection of the place to be moved for a duplicate receipt.

42. All industrial production projects in China are required to undergo an environmental impact assessment (EIA) before starting construction. Specific requirements are detailed in the "Environmental Impact Assessment Law" and the "Regulations on the Environmental Protection Management of Construction Projects".

Table 6: Law and Regulations on Environmental Impact Assessment (EIA)

Standard Name and Number	Year	Issuing Institution	Applicable Scope
Regulations on the Management of Environmental Protection of Construction Projects	2017	The State Council	The Regulations stipulate that construction projects that cause pollution must comply with national and local standards for pollutant discharge. In the areas where total emission control of key pollutants is implemented, the requirements for total emission control of key pollutants must be met. Measures must be taken to control the original environmental pollution and ecological damage associated with reconstruction, expansion and technological transformation projects.
Environmental impact assessment Law	2018	The National People's Congress of the People's Republic of China	The Law refers to the methods and systems for analyzing, predicting and evaluating the possible environmental impacts caused by the implementation of planning and construction projects, putting forward countermeasures and measures to prevent or mitigate adverse environmental impacts, and carrying out tracking and monitoring. The construction of projects that have an impact on the environment within the territory of the People's Republic of China and other sea areas under the jurisdiction of the People's Republic of China shall be evaluated in accordance with this Law.

43. Although waste lead batteries have been included in the "National Hazardous Waste List", the whole process of generation, collection, utilization and disposal of waste lead batteries has been incorporated into the supervision of ecological and environmental departments, and the Ministry of Ecology and Environment has also issued the "Technical Specification for Pollution Control of Waste Lead Batteries Treatment" (HJ519-2020), which clarifies the technical process requirements for waste lead battery treatment from the perspective of environmental pollution prevention. However, in practice, due to the cumbersome approval process of inter-provincial transfer of waste lead batteries, the problem of not running hazardous waste transfer coupons or not handing over waste lead batteries to licensed hazardous waste management units still exists, resulting in a large number of waste lead batteries flowing into the channels of individual traders for collection and utilization. Such situations restrict the improvement of the rate of standardized collection and treatment of waste lead batteries. In addition, because the standardized collection and treatment of waste lead batteries relies mainly on legal compulsory means, coupled with lacking of collection rate target assessment-oriented policy and financial incentive mechanism, the low enthusiasm and initiative of local governments to combat illegal transfer of waste lead batteries by strengthening regional joint law enforcement, and that the establishment of an inter-provincial transfer of waste cooperation mechanism to enhance the competitiveness of standardized enterprises and other measures is not high, all these factors restrict the further construction and improvement of the standardized collection system of waste lead batteries.

44. In March 2016, the Outline of the Thirteenth Five-Year Plan for National Economic and Social Development of the People's Republic of China was issued, which proposed the implementation of the Producer Responsibility Extension System, and improve the recycling network of renewable resources. In January 2017, the General Office of the State Council issued the "Producer Responsibility Extension System Implementation Plan", requiring producers to extend their responsibilities to ecological design, the use of recycled raw materials, standardized recycling and expansion of information disclosure. Lead storage batteries were included in the first batch of implementation.

Associated baseline projects

45. Secondary non-ferrous metal industry is one of six priority sectors to be targeted for control of UP-POPs releases. However, no substantive activities were implemented to reduce China's PCDD/Fs releases from the secondary non-ferrous metal industry in the past few years. For the implementation of requirements on reduction of dioxin emission in secondary copper production industry according to the Stockholm Convention and NIP, "*UP-POPs Reduction through BAT/BEP and PPP-based Industry Chain Management in Secondary Copper Production Sector in China*" (hereafter as "the secondary copper project" – GEFID 6966) was funded in GEF-6 cycle. The project aims to reduce releases of UP-POPs from secondary copper production in China through strengthen institutional and management capacities, BAT/BEP demonstration, publicity and promotion activities etc. The secondary copper project officially started implementation in July 2016.

Project impacts

46. Besides the obvious environmental stress reduction that will show up in the future, the main immediate impact of the secondary copper project lies in the broader adoption and transformational change, i.e., the Government and other stakeholders will adopt, expand, and build on this initiative in the future.

47. As direct result of the implementation of the GEF-funded project, the secondary copper industry is gradually promoting regulatory improvements and technology upgrades to reduce dioxin emissions. However, other secondary non-ferrous metal industries also produce large dioxins emissions due to their rapid growth and large scale of production. Thus, relevant process technologies and management models from the secondary copper project can be used for reference in other secondary metal smelting. The experience gained provided valuable reference for the upgrading innovation of other secondary metal smelting, flue gas purification processes to enable the Government, in cooperation with UNDP, to apply the knowledge to develop and submit a GEF project concept for the reduction of UP-POPs and BFRs, and introduction of BAT/BEP in the secondary aluminum and zinc production, that results in this full-size project.

Lessons learned and good practices

48. The project design was based on combination of interventions for strengthening of institutions and regulatory frameworks and demonstration of a new technology as the two principal components. The takeaway lesson from the secondary copper project is that the coherence and combination of enabling environment with pilot technology demonstration is an effective tool for achievement of sector-wide transformation, especially in situations where there is lack of experience with new technologies required for the transformation. Integrated approaches, although complicated, are effective tools to build solid fundaments for transformation.

49. China's commitment to the Stockholm Convention was a very important driver in the preparatory as well as the implementation phase of the secondary copper project, and facilitated the development of a strong ownership of the project both by the public and the private sector stakeholders. The country ownership was further strengthened by ensuring that the project also addressed national priorities, including the reduction of negative effects of dioxins on human health and the environment.

50. Secondary copper smelting and flue gas purification processes are similar to other secondary metals. Relevant process technologies and management models can be used for reference in other secondary metal smelting. However, due to other types of waste metals, waste reduction, control measures, and smelting processes, and the matching facilities, are different. The experience of the secondary copper project can provide reference for the upgrading and re-innovation of other secondary metal smelting processes and flue gas purification processes and equipment, and achieve orderly development of the secondary non-ferrous metal industry;

51. The focus on industrial application of a new technology provides an effective framework to catalyze transformation at scale. Raising awareness among decision makers was also key to building the political will to adopt new regulations and commence the sector-wide transformation through implementation of the NRP.

52. As the project addressed the secondary copper industrial sector, there was a certain number of stakeholders that had to be engaged, both from the Government as well as from the industry side. The project benefitted from close collaboration with the industry through the China Non-Ferrous Metals Industry Association. The Association provided valuable assistance in a number of tasks including selection of the demonstration enterprises, outreach to the industry and organizing training. Consequently, the project was very inclusive and can be presented as an example of a successful public-private partnership with the central, provincial, and local environmental authorities, the industry association, private enterprises and their experts and academia.

53. Thus, the experience and knowledge gained through the formulation and implementation of the second copper project have been applied to the design of this secondary metal project, and the full experience gained of implementation will be used as reference to achieve effective and efficient implementation.

Considerations in Mitigation Impacts of Covid-19 Pandemic

54. Government of China at different levels has taken rigorous measures to prevent COVID-19. As China has instituted strict measures, it has been able to contain the pandemic during its peak spreading period. Together with increased population being vaccinated, domestic cases gradually zeroed out and the national economy has returned to the right track under the guidance of national health policies.

55. The pandemic did have negative impact to the development of this project, including data collection, discussion among stakeholders on policy framework, exchange with the international experts. Due to the pandemic, the stakeholder consultations during the PPG phase were mainly carried out online or by email, via phone call, etc. Since the PPG team started working on the project, several online meetings on identifying key stakeholders, their roles and responsibilities, and interest were conducted as led by FECO and UNDP. Survey questionnaires were designed, discussed, improved, finalized and data analyzed.

56. The project plans to carry out continuous monitoring and assessment of the impacts of COVID-19 on the progress of project implementation, and will undertake appropriate adaptive management. Should the pandemic continues, project management and implementation supervision can be undertaken through various means such as online and telephone interactions, international experiences may be shared through web seminars.

57. UNDP will consider, during project implementation, the principles of the UN framework for the immediate socio-economic response to COVID-19, as well UNDP´s Guidelines on UNDP's integrated response to COVID-19 potential linked and or parallel actions that could help decision-makers look and design beyond recovery, towards 2030, making choices and managing complexity and uncertainty in the green economy area to support the recovery from COVID-19 impacts. It is therefore anticipated that the negative impacts of COVID-19 to project implementation will be managed and minimized.

Consistency with National Priorities

58. This Project is consistent with the Action Plan of China's National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants (NIP), and places high priority in the reduction of UP-POPs and BFRs release.

59. A national level strategy "Guidance on Control and Prevention for PCDD/F Release" also offers the framework on environmentally sound management of PCDD/Fs emission. The NIP lists the regeneration of metallurgical industry as one of six priority sectors subject to the control of UP-POPs releases.

60. In order to support the sustainable development of China's secondary non-ferrous metal industry, a series of industrial policies were introduced such that China will strengthen secondary metal recycling and utilization, focusing on the design of disposal facilities in key areas from 2021 to 2035. In addition, China has begun to implement a recommended Extended Producer Responsibility (EPR) in the recycling industry of waste batteries, which is also consistent with the activities of this project.

61. This project focuses on the emission reduction of both UP-POPs and BFRs release in secondary aluminum, lead, zinc and lithium production process, which is consistent with the NIP that was developed with GEF funding. In line with guidance contained in the NIP and the 14th Five Year Plan (FYP) for POPs elimination, the project will be designed and implemented as an integral part of the country's efforts to improve the environmental performance of the sector. Specifically, the project will support implementation of the NIP by promoting BAT/BEP adoption and thus, minimize UP-POPs and BFRs releases from the sector. In addition, by reducing UP-POPs and, BFRs discharge from the sector, the project will support directly the implementation of the 14th FYP. The project will also contribute to achieving the GEF-7 Corporate Results of increase in phase-out, disposal and reduction of release of POPs.

IV. STRATEGY

Proposed alternative scenario

62. The project will work in fours (4) areas of intervention to remove the barriers stated above, and create long-term solutions for the targeted sectors in China:

    (a) Improve national policy and regulatory framework to effectively facilitate reduction of UP-POPs releases from the secondary non-ferrous production industry, batteries manufacturing and recycling sectors, as well as to foster economic instruments and incentives to encourage the targeted sectors to improve environmental management.

    (b) Implement pilot activities to demonstrate BAT/BEP in the collection and conditioning of waste batteries (one in lead acid batteries and one in lithium ion batteries), and in the secondary metallurgical processes to prevent and minimize the generation of UP-POPs, to improve the management of hazardous waste generated in the whole production and recycling process.

    (c) Develop and implement a National Replication Programme of sustainable recycling and sustainable production, conduct technical trainings for stakeholders and awareness raising workshops for the industry and general public to promote and support scale up activities.

    (d) Document and share knowledge and implementation experience, support technological transformation, facilitate replication and scalability of project results.

63. This project not only focuses on the secondary non-ferrous metal industry's green production model, but also focuses on collection demonstration, raw material recovery and economic incentives. This will significantly reduce the generation and release of UP-POPs such as dioxins, BFRs containing plastics, heavy metals and other pollutants from the source.

64. Based on the results of the demonstration projects, promotion of advanced dioxin pollution prevention technology, upgraded equipment, and enhanced management capacity and experience, will facilitate improvement of environmental management and greener production in the secondary metal enterprises. Taking into account the current scale and average emission levels of the secondary non-ferrous metal industry, Tables 7 and 8 list the potential emission reduction of dioxins per year at the 3-5 demonstration enterprises and through the NRP of 16.125 g TEQ/a and 161.25 g TEQ/a respectively, for the total of 177.375 g TEQ/a. The demonstration projects under Component 2 are expected to be completed in the third year of the project implementation, and the NRP will be initiated immediately upon the completion of the demonstration projects to extend to ten times the capacity of the demonstration projects in the last two years of the implementation. Therefore, for the GEB of this project, a two-year emission reduction period was used for calculating the results of the demonstration projects and the NRP. The potential total emission reduction is 32.25 g TEQ from the demonstration enterprises and 322.5 g TEQ from the NRP. The total release reduction is 354.75 g TEQ for the two-year operation period.

Table 7 - Dioxins Emission Reduction Potential of Pilot Plants in SAl and SZn Industries[27]

No.	Sector	Production (t/a)	Source categories	PCDD/Fs Emission baseline (g TEQ/a)		PCDD/Fs Emission after project implemented (g TEQ/a)		PCDD/Fs Reduction (g TEQ/a)
				Air	Residues	Air	Residues	
1	Secondary Aluminum production	50,000	e(II)	0.2	20	0.025	5	15.175
2	Secondary Zinc production	10,000	g(II)	1	0.01	0.05	0.01	0.95
	Total	**60,000**		**1.2**	**20.01**	**0.075**	**5.01**	**16.125**

[27] This data is calculated by the toolkit. Available online at http://www.pops.int/Implementation/UnintentionalPOPs/ToolkitforUPOPs/ToolkitMethodology/tabid/196/Default.aspx

Table 8 - Dioxins Emission Reduction Potential of NRP Plants in SAl and SZn Industries[28]

No.	Sector	Total Project Capacity (t/a)	Total PCDD/Fs Reduction (g TEQ/a)
1	Secondary Aluminum production	500,000	151.75
2	Secondary Zinc production	100,000	9.50
	Total		**161.25**

65. Public and Private Partnership is critical to apply BAT/BEP for the reduction of UP-POPs and BFRs. 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.

66. In addition to UP-POPs and BFRs reductions, other co-benefits will be identified for more incentives for the wider application of the technologies for UP-POPs reduction, such as the promotion of energy-saving measures to promote the reduction of carbon dioxide emissions by the demonstration enterprises. 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.

67. The project will also be demonstrative for other developed and developing countries. The good practice, upgraded technologies and improved management experience generated from this project will be disseminated and shared with South-eastern Asian countries to facilitate minimizing chemicals emissions and maximize resources recycling.

Alignment with GEF focal area and/or Impact Program strategies;

68. The project is fully aligned with the GEF-7 Chemical and Waste Focal Area Strategy, Program 1 "Industrial Chemical Programs", seeking to address chemicals (UP-POPs) and POPs containing wastes that are used or emitted from or in processes from the management of waste containing these chemicals. In this regard, the project envisages.

    (a) Strengthen environmentally sound practices on secondary metals waste management/disposal;

    (b) Prevent that waste recycling practices that can emit UP-POPs and BFRs from leaking and/or entering material recycling supply chains;

    (c) Introduce and use of BAT/BEP and life cycle management to optimize recycling to minimize and ultimately eliminate releases of UP-POPs and BFRs from critical source categories included in the Stockholm Conventions

    (d) The project will also strive to strengthening of national legislation and regulatory capacity with regard to UP-POPs and BFRs;

    (e) The project will also support sustainable recycling of non-ferrous metals and batteries, sound material-cycle society, and promote the adoption of improved environmentally sound disposal patterns.

69. Upon its successful implementation, the project would have established and promoted critical public-private partnership enabling the green production and sustainable development in secondary aluminum, lead, zinc and lithium sectors in China.

Incremental/additional cost reasoning and expected contributions from the baseline

70. As described in the above, there are many obstacles and challenges faced by the Chinese secondary non-ferrous metal industry. The GEF contribution will be instrumental to introduce international experience through BAT/BEP demonstration, recycling 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 UP-POPs and BFRs releases.

71. With support from the GEF, the project will support the identification, demonstration, and promotion of BAT/BEP for secondary non-ferrous metal production enterprises and life cycle management to optimize recycling for lead acid battery and lithium-ion battery, and will promote strong inter-agency and industry coordination at the national and sub-national levels for enhanced sustainable development within the sector.

[28] This data is calculated by the toolkit. Available online at http://www.pops.int/Implementation/UnintentionalPOPs/ToolkitforUPOPs/ToolkitMethodology/tabid/196/Default.aspx

With this strong coordination, institutional capacity and the legal framework will be strengthened, and BAT/BEP will be demonstrated and replicated nationwide. Without GEF support, this coordination would not occur, and stand-alone work to be done at national and local Ecology and Environment Bureaus (EEBs) would remain at small scale and with low impacts, China would not be able to widely and successfully promote and introduce BAT/BEP measures in the production and recycle processes in the secondary non-ferrous production due to the limited local capacities, technical and financial resources.

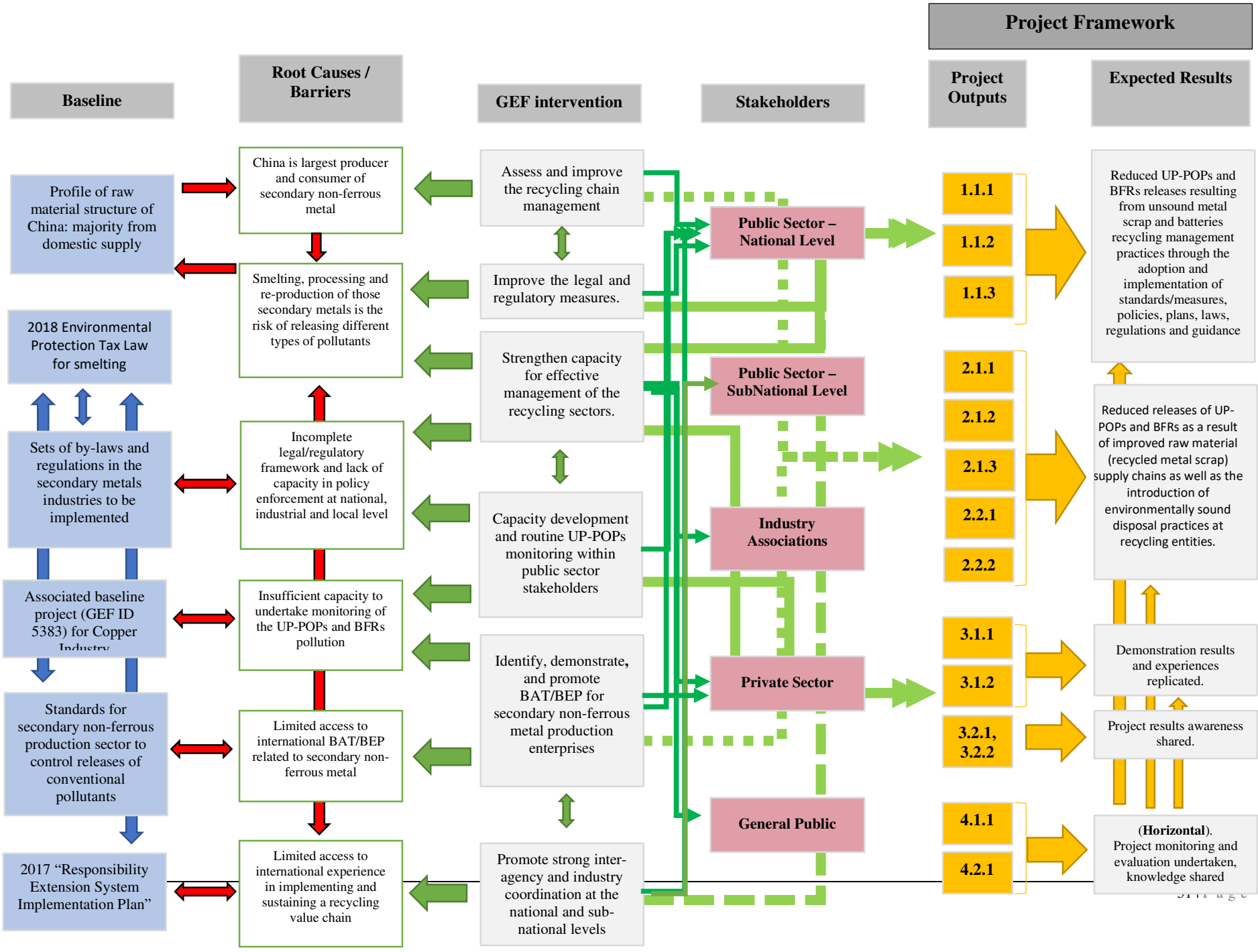
72. By supporting monitoring capacity development and routine UP-POPs monitoring, the proposed project will assist China to properly measure UP-POPs releases from its secondary non-ferrous metal industry and thus, effectively enforce its industrial and environmental policies and standards. Based on such activities, the project will assist China to effectively restructure its secondary non-ferrous metal industry, improve the sectors' economic and environmental performance, and minimize UP-POPs releases from the sectors.

73. In addition, through the implementation of the project, the use of BFRs in lead-acid batteries and lithium-ion batteries will be identified and disposed of in an environmentally sound manner. The project will also promote the use of brominated flame retardants in lead-acid batteries and lithium-ion batteries through the formulation and improvement of the system. It is expected that 300 tons of BFR-related wastes will be reduced through activities in this project.

74. COVID-19 may have a certain impact on the progress of the project implementation, but on the other hand, the project will also take advantage of the opportunity of COVID-19 prevention, strengthen the system construction of demonstration enterprises, and further regulate the behavior of workers. In order to minimize the impact of COVID-19 as much as possible, the internal control system of demonstration enterprises will be improved, and applied in the other secondary non-ferrous metal industry enterprises through NRP.

Theory of Change

75. The project's Theory of Change can be presented in the diagram below:


Project Framework
Baseline
Root Causes / Barriers
GEF intervention
Stakeholders
Project Outputs
Expected Results
Profile of raw material structure of China: majority from domestic supply
2018 Environmental Protection Tax Law for smelting
Sets of by-laws and regulations in the secondary metals industries to be implemented
Associated baseline project (GEF ID 5383) for Copper Industry
Standards for secondary non-ferrous production sector to control releases of conventional pollutants
2017 "Responsibility Extension System Implementation Plan"
China is largest producer and consumer of secondary non-ferrous metal
Smelting, processing and re-production of those secondary metals is the risk of releasing different types of pollutants
Incomplete legal/regulatory framework and lack of capacity in policy enforcement at national, industrial and local level
Insufficient capacity to undertake monitoring of the UP-POPs and BFRs pollution
Limited access to international BAT/BEP related to secondary non-ferrous metal
Limited access to international experience in implementing and sustaining a recycling value chain
Assess and improve the recycling chain management
Improve the legal and regulatory measures.
Strengthen capacity for effective management of the recycling sectors.
Capacity development and routine UP-POPs monitoring within public sector stakeholders
Identify, demonstrate, and promote BAT/BEP for secondary non-ferrous metal production enterprises
Promote strong inter-agency and industry coordination at the national and sub-national levels
Public Sector – National Level
Public Sector – SubNational Level
Industry Associations
Private Sector
General Public
1.1.1
1.1.2
1.1.3
2.1.1
2.1.2
2.1.3
2.2.1
2.2.2
3.1.1
3.1.2
3.2.1, 3.2.2
4.1.1
4.2.1
Reduced UP-POPs and BFRs releases resulting from unsound metal scrap and batteries recycling management practices through the adoption and implementation of standards/measures, policies, plans, laws, regulations and guidance
Reduced releases of UP-POPs and BFRs as a result of improved raw material (recycled metal scrap) supply chains as well as the introduction of environmentally sound disposal practices at recycling entities.
Demonstration results and experiences replicated.
Project results awareness shared.
(Horizontal). Project monitoring and evaluation undertaken, knowledge shared

V. RESULTS AND PARTNERSHIPS

The Project Design

76. 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.

77. Experiences and lessons learned from formulation, design and implementation of other POPs projects in China, in particular, GEF-funded Project ID 6966 "*UP-POPs Reduction through BAT/BEP and PPP-based Industry Chain Management in Secondary Copper Production Sector in China*" which started implementation officially in July 2016, were applied to benefit the design and implementation of this secondary non-ferrous metal project.

78. At the PPG stage, the identification and selection of the demonstration enterprises and the demonstration provinces could not be finalized due to the significant impacts of travel restrictions caused by the COVID-19 situation, as it was necessary to further clarify the current status and demand of the industries and to fully evaluate and summarize the policies, current and alternative technologies, market situations and supervision mechanism. In-depth review and analysis are required to ensure that the potential candidate enterprises to be selected to undertake demonstration activities are appropriate representatives, can effectively promote dioxin and other pollutants emission reduction and improve the comprehensive capabilities of the industry.

79. During the PPG stage, despite the limited allowed movements and the short timeframe, investigated and field trips have been undertaken to more than 10 secondary metal enterprises in Shanghai, Jiangsu, Shandong, Yunnan and other provinces. The enterprises have provided good information and suggestions for the promotion of recycling system demonstrations in the secondary lead and lithium industries, and good data basis for BAT/BEP demonstration in secondary aluminum and zinc production enterprises.

80. Based on the on-site visits and information gathered, it was possible to identify and pre-select more than 10 secondary metal enterprises and to formulate a plan for the identification and selection of BAT/BEP demonstration, the demonstration provinces and the pre-selection of demonstration enterprises that can be implemented immediately after it is reviewed and confirmed at the Inception Workshop. Thus, it is expected that the formal selection of the demonstration provinces and demonstration enterprises and the contractual arrangements for their formal engagement will be completed within 6 months after start of project initiation, and that the demonstration will be completed within 3 years, with the National Replication Programme and its incentive scheme completed in the fourth and fifth years of project implementation. The proposed plan for the identification and selection of potential candidates for the demonstration projects are described in details below.

81. The process and criteria for the identification and selection of the demonstration provinces and enterprises can be summarized as follows.

Identification and selection of demonstration provinces:

82. All provinces in China will be given opportunity to submit application and offers to participate in the demonstration project. The evaluation and selection criteria will be specified in the online open bidding announcement and will also be released to all the provinces by FECO/MEE at the same time. Taking into consideration of the project objectives, project cycle, scope of implementation and other considerations, the main factors to select the demonstration provinces include the following aspects:

    (a) Has secondary metal (Al, Zn, Pb, Li) production and sales enterprises, waste metal recycling or resource utilization enterprises.

    (b) Existence of recovery efficiency and a fundamental effective recycling network.

    (c) Capacity to undertake high quality LABs monitoring and supervision activities.

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

Demonstration provinces selection process:

    (a) Interested provinces will submit their letter of intents and application materials according to the project requirements. The submission letter of the application documents should indicate the

willingness to participate in the project demonstration activities, and promise to provide supporting funds according to the project progress requirements, and establish the project guidance/ coordination team.

(b) Application evidence-materials will include: (i) The basic situation and management status of the province's lead storage battery production, recycling and disposal enterprises. Focus is on introducing the number and capacity status of lead battery production, recycling and disposal enterprises in the province, analyze the problems existing in the information, policies, management, and technology of lead battery production, recycling and disposal companies, and introduce the next phase of planning or plans; (ii) Project preparation and implementation plan: Explain the planned activities, implementation work arrangements, management mode, risk control and safeguard measures in the preparation phase and full-scale project phase of this project in the province; (iii) Investment estimation and fund raising plan: Explain the funding estimation and implementation of the project preparation stage, and initially estimate the funding requirements for the full project stage, including grant funding requirements, supporting funds and fundraising plans; (iv) Suggestions for project preparation and execution.

(c) Based on application materials received, the Implementing Partner and an expert panel will conduct formal examination of the submission and determine the selection of the demonstration province.

Demonstration provinces selection criteria

83. The expert panel will score the applications on province situation, anticipated demonstration output, technical route and fund use, and miscellaneous aspects to base their decision on the selection. The main criteria are:

(a) With a strong willingness to carry out relevant demonstration activities, the provincial people's government or the provincial environmental protection department can promptly form a project coordination/steering group involving the provincial ecological environment, finance, development and reform, industry and information and other relevant departments to guide the project preparation phase and the smooth development of activities during the implementation phase of the full-scale project;

(b There are secondary metal companies in the province, which have initiated or have plans to develop policies and regulations and capacity building related to waste metal recycling, and has the conditions to start a demonstration recycling model in the first year of project implementation (expected to be 2022);

(c) Have experience in participating in international cooperation projects (such as Global Environment Facility projects), have a good understanding of the management requirements and operation modes of international cooperation projects, and have good project organization and implementation capabilities.

(d) The supporting funds for the project preparation stage have been implemented, and there is a specific and feasible full-scale supporting fund raising plan for the project stage.

Demonstration provinces will:

(a) Encourage production enterprises to rely on sales networks to establish a reverse recycling network system for waste battery or metal. Encourage production companies to adopt business strategies such as "trade-in-for-new" and "sale-one-receive-one" to increase the reverse recovery rate.

(b) Encourage production and sales companies, waste metal recycling, resource utilization and disposal companies to strengthen cooperation, jointly build a recycling network system, and promote the standardized of waste metal recycling.

(c) In coordination and collaboration with the Implementing Partner and in line with the Environmental and Social Management Framework (ESMF) prepared for the project (UNDP Project Document, Annex 9) assist in overseeing that a targeted assessment or a scoped Environmental and Social Impact Assessment (ESIA) will be undertaken for all project demonstration activities assessing all relevant risks including the potential release and emission of hazardous material. This assessment will be conducted in line with the management measures stipulated for Risks 3, 5, 6 of the SESP prepared for the project (UNDP Project Document, Annex 5) and the process will be guided by the ESMF.

(d) Provide suggestions for the establishment of national-level waste metal recycling management guidelines.

Expected outcomes and components of the project

Project Objectives: Reduce and eliminate UP-POPs (PCDD/Fs, HCB and PCNs) and Brominated flame retardants (BFRs) releases through the introduction of BAT/BEP in the Secondary Aluminum and Zinc production, and implementation of life cycle management in Lead acid battery and Lithium ion battery recycling in China

84. The following describes activities envisioned under each project component consistent with the stipulated Outcomes and Outputs:

Component 1. Strengthening the national policy and regulatory framework to reduce UP-POPs and BFRs releases from secondary non-ferrous metal industry

Based on the review of existing policies and regulations, this component will improve national policy and regulatory frameworks, and supervision and enforcement efficiency to reduce UP-POPs release from secondary mon-ferrous industry and batteries manufacturing and recycling sectors, as well as to foster economic instruments and incentives.

Outcome 1.1 Reduced UP-POPs and BFRs releases resulting from unsound metal scrap and batteries recycling management practices through the adoption and implementation of standards/measures, policies, plans, laws, regulations and guidance.

Output 1.1.1 Policy and regulatory framework for metal scrap management developed, revised and improved and relevant components integrated into the existing policy and regulatory framework.

Activity 1.1.1.1 Develop, revise and improve policies and regulatory frameworks in secondary aluminum and zinc sectors for sound management from the prospective of raw materials standards to reduce the chlorine and brominated flame retardant content in waste metal scrap. Subcontracts and experts will be deployed for the preparation and revision of technical specifications for aluminum- and zinc-containing waste materials classification and recycling.

Activity 1.1.1.2 Develop, revise and improve policies and regulatory frameworks in green battery products and eco-design of green batteries. Subcontracts and experts will be engaged to undertake policy research on green product standard of battery, including assessment of the situation of BFRs-related industry and investigation on BFRs and chlorine content.

Output 1.1.2 Technical by-laws, regulations and guidance aiming to reduce UP-POPs and BFRs release from batteries manufacturing, recycling and disposal practices developed, adopted and implemented.

Activity 1.1.2.1 Develop, revise, adopt and implement policies and regulatory framework in secondary lead and lithium sectors of battery product standards, cleaner production evaluation index systems, industry norms etc. Subcontracts and experts will be contracted to prepare guidelines on BAT/BEP for the pollution prevention and control of SAl and SZn, technical specifications for pollution control on utilization and disposal of aluminum-containing and zinc-containing wastes, and on evaluation index system for cleaner production of SZn.

Activity 1.1.2.2 Develop, revise and improve policies and regulatory frameworks for waste battery full life circle management (collection, dismantling, storage, transportation, and recycling), such as technical guidelines in battery dismantling process., and incorporate relevant content into existing policies and regulatory frameworks on hazardous waste management. Subcontracts and experts will support improving policies on BAT/BEP for the pollution prevention and control of SPb and SLi, evaluation index system for cleaner production of SL, and research on Environmental Management Policies and Standards of Hazardous Waste in Secondary Lithium Industry.

Activity 1.1.2.3 Based on the investigation of the carbon footprint and carbon emissions of the industry's production process, formulating the accounting method and standard of the industry's greenhouse gas emissions, establishing a low-carbon enterprise evaluation system, and promoting enterprise energy conservation and emission reduction. Subcontracts will be established to undertake research on Accounting Methods and Reporting of Greenhouse Gas Emissions from Secondary non-ferrous Metals (Al, Pb, Zn, Li) Smelting Industry, evaluation standards for low-carbon enterprises in the smelting industry of Secondary non-ferrous Metals (Al, Pb, Zn, Li), and research on low-carbon technology in the smelting industry of Secondary non-ferrous Metals (Al, Pb, Zn, Li) smelting industry.

Output 1.1.3 Barriers to BAT/BEP and Extended Producer Responsibility (EPR) implementation removed through e.g. the institution of economic instruments and incentives.

Activity 1.1.3.1 Establish economic means and incentive mechanisms to eliminate the obstacles to the implementation of best available techniques/best environmental practices (BAT/BEP), and to clarify the specific recycling model and work plan of the extension of the producer responsibility system. Research of fiscal and taxation policies on secondary non-ferrous metals (Al, Pb, Zn, Li) sectors will be conducted through subcontracts.

Activity 1.1.3.2 Conduct research on the management requirements for the collection and transportation of waste lead batteries, formulate industry standards and norms such as "Standards for the Management of Waste Lead Battery Recycling Networks" and "Code of Waste Lead Battery Recycling Networks", strengthen the technical requirements for pollution control in the collection, transfer and disposal of waste lead batteries, and promote the standardized collection and reuse of the waste lead batteries. Subcontracts and expert support will be established to carry out this activity.

Component 2 Reduction of UP-POPs and BFRs releases from unsound metal scrap and batteries recycling

This component will support the demonstration of BAT/BEP and life cycle management to optimize recycling for:

(a) The collection and conditioning of waste batteries (one in lead acid batteries and one in lithium ion batteries). These will also (a) establish a recycling model that is conducive to the traceability management of the recycling of LABs and LIBs and reduce UP-POPs and heavy metal pollution caused by illegal collection and related informal recycling; (b) provide suggestions for the establishment of national-level waste LABs and LIBs recycling management guidelines; and (c) establish an energy management system for the battery recycling process, strengthen energy consumption control in transportation, dismantling, storage, dismantling, testing, and utilization, reduce overall energy consumption, and reduce carbon dioxide emissions. The proper management of hazardous waste generated in the whole process outcomes will be captured and shared in awareness and training materials and guidance documents for long term, post-GEF-funded project, and the replication process.

(b) The documented experience from the demonstration will be shared and promoted to more LABs recycling companies locally and nationally to promote wider use of environmental sound management of LIBs recycling.

(c) In the secondary production of metals (one in aluminum and one in zinc), the demonstration activities will focus on generating the evidence base for real time replication and provision of the necessary technology transfer and investment support to generate UP-POPs emission reduction in secondary aluminum and zinc sectors. This will be achieved through demonstration activities at the selected production facilities.

(d) All enterprises that manufacture secondary aluminum and zinc in China will be given opportunity to submit application and offers to the project. The evaluation and selection criteria are specified in the online open bidding announcement and will also be released to all manufacturing enterprises through the industry association at the same time.

Outcome 2.1 Reduced releases of UP-POPs and BFRs as a result of improved raw material (recycled metal scrap and batteries) supply chains as well as the introduction of environmentally sound disposal practices and extended producers responsibility at recycling entities.

Output 2.1.1 Assessment of existing collection systems completed, and appropriate collection schemes established, feasible legislative arrangements, including proper acceptance and outbound material criteria.

Activity 2.1.1.1 Evaluate the actual situation of multiple recycling modes of existing enterprises such as point-to-point recycling, Internet-supported recycling, community site recycling, B2B recycling, etc., and propose measures that need to be improved based on the actual needs to reduce UP-POPs and BFRs emissions, as well as consider carbon-neutral measures to reduce carbon dioxide emissions. Subcontracts will be established to conduct research and assess current situation of waste battery recycling mode in demonstration areas.

Output 2.1.2 Supply chains for local markets further developed, recycling rates increased and maximum quantities of recyclable plastic parts diverted from inadequate disposal.

Activity 2.1.2.1 Conduct research and assessment on environmental management for hazardous waste and BFR-containing waste in the supply chain of scrap metals and manage BFR-containing plastics and other polymers in the recycling process. Research and assessment on environmental management will be conducted through subcontracts to improve management of BFR-containing plastics and other polymers in the recycling process.

Output 2.1.3 Two demonstration projects implemented to demonstrate BAT/BEP and life cycle recycling in the collection and conditioning of waste batteries (one in lead acid batteries and one in lithium ion batteries), applying proper management of hazardous waste generated in the whole process.

Activity 2.1.3.1 Demonstration projects on creating a full-life-cycle management value chain of lead acid batteries in two regions of China (e.g. Yangtze River Delta, Pearl River Delta, Beijing, Tianjin-Hebei regions etc.), including battery storage/transportation points, transportation transfer institutions and regional processing centers. Subcontracts will be formulated to conduct performance evaluation of lead acid battery recovery demonstration. The demonstration projects will choose two demonstration provinces. Specific activities will include: (1) Establishment and improvement of national and provincial level recycling information management systems; (2) Recycling information docking between provinces; (3) Improvement of the construction of the provincial recovery system, including battery production, transport and disposal enterprises; and (4) Secondary lead smelting enterprise BAT/BEP demonstration.

Activity 2.1.3.2 Build a lithium ion battery recycling demonstration based on the full-life-cycle value chain in China (e.g. Yangtze River Delta, Pearl River Delta etc.), including battery storage/transportation points, transportation transfer institutions and regional processing centers. Performance evaluation on lithium ion battery recovery will be conducted, specific demonstration activities include: (1) Establishment and improvement of enterprise recycling information systems; (2) Provincial capacity building, improvement of the construction of provincial-level lithium-ion battery recycling system; (3) Secondary lithium sector BAT/BEP demonstration.

Outcome 2.2 Prevent and minimize the generation of UP-POPs in the secondary metallurgical processes.

Output 2.2.1 Assessment of secondary metallurgic production processes and technologies finalized.

Activity 2.2.1.1 Complete the assessment of UP-POPs and BFRs emission reduction technologies in the production process of recycled metals (aluminum).

Activity 2.2.1.2 Complete the assessment of UP-POPs and BFRs emission reduction technologies in the production process of recycled metals (zinc).

Evaluation of dioxin emission reduction technology in both secondary aluminum and zinc sectors will be conducted through subcontracts, and supervisions will be carried out on capacity building in the secondary aluminum and zinc industries and on social and environmental assessment and management.

Output 2.2.2 Three to five (3-5) demonstration projects implemented to demonstrate BAT/BEP in the secondary production of metals (in aluminum, zinc and End of Life vehicles dismantling).

Activity 2.2.2.1 One to two (1-2) demonstration projects of secondary aluminum implemented to demonstrate the best available techniques/best environmental practices for reducing UP-POPs and BFRs in the production of secondary aluminum. One demonstration project of End of life vehicles (ELVs) dismantling to improve the separate efficiency of BFRs containing plastics, and disposal BFRs containing waste.

Activity 2.2.2.2 One to two (1-2) demonstration projects of secondary zinc implemented to demonstrate the best available techniques/best environmental practices for reducing UP-POPs and BFRs in the production of secondary zinc.

Baseline assessment of UP-POPs and performance evaluation in the secondary aluminum and zinc demonstration enterprises will be conducted through subcontracts, progress and results of demonstration activities will be mentioned, including social and environmental assessment and management.

Proposed evaluation and selection of available BAT/BEP for demonstration, as well as the process for the identification, selection, and the selection criteria for the demonstration enterprises and demonstration provinces are described in Annex 12 of this Project Document.

Component 3. Implementation of a National Replication Programme (NRP)

This component will support the development and initiate the implementation of a National Replication Programme (NRP), starting in the second half of the third year of project implementation, and will end in the first half of the fifth year.

Based on the demonstration of BAT/BEP at two secondary metals production enterprises (one in aluminum and one in zinc) and BAT/BEP and life cycle recycling in the collection and conditioning of waste batteries (one in lead acid batteries and one in lithium ion batteries), technology transformation, implementation experience and project results will be documented. A National Replication Programme of sustainable recycling and green production will be developed, and an initial 10-12 enterprise will be selected to replicate BAT/BEP.

Outcome 3.1 Replication and Promotion of demonstration results and experience.

Output 3.1.1 A national replication plan of sustainable recycling and green production developed and assessed.

Activity 3.1.1.1 Based on the project demonstration results and experience gained through the implementation of previous pilot activities of the GEF-financed, UNDP supported project (*UP-POPs Reduction through BAT/BEP and PPP-based Industry Chain Management in Secondary Copper Production Sector in China, GEFID 6966)* and the demonstration activities of this project under Component 2, lessons learnt and key successful factors are documented and shared. A national replication plan is developed with the support of experts and subcontractors. The rollout of the BAT/BEP is planned and introduced through a national promotion meeting.

Activity 3.1.1.2 The series of incentive projects of BAT/BEP and the full life cycle value chain are evaluated through special verification tools and methods and make clear the activities' execution performance.

Based on the project demonstration results and experience gained through the implementation of the GEF-financed Secondary Copper Production project, this activity will design series of incentive subprojects to replicate and promote results of BAT/BEP demonstration and full life cycle value chain recycling demonstration, monitor progress, verify and evaluate performance for knowledge sharing. It will also explore and source possible access to financing mechanisms (e.g. own funds, commercial loans, government subsidies, green finance etc.)

In addition, the performance of BAT alternatives in SAl and SZn industry will be evaluated on UP-POPs emission reduction. The performance of the battery recovery system in SPb and SLi industry will be evaluated on battery recovery rate of the demonstration enterprises and demonstration provinces.

Output 3.1.2 Results of the implemented demonstration project published and disseminated for replication, about 10-12 participating enterprises will be selected to implement NRP activities.

Activity 3.1.2.1 Design incentive plan for the secondary metal enterprises, conduct training on its implementation, and undertake evaluation of enterprises participating in the incentive schemes.

Activity 3.1.2.2 Implement replication plan by the selected smelting enterprises of secondary aluminum and zinc industries. Subcontracts will be established with the selected enterprises.

Activity 3.1.2.3 Implement incentive plan in lead acid batteries and lithium ion batteries recycling for the full life cycle value chain of storage and transportation points, transportation transfer institutions, regional processing centers, and recycling.

The project could implement the following incentives:

(1) Economic incentives:

- Enterprises will be provided for free consultancy support to businesses to investigate their operations and how resource efficiency can be increased. Lifecycle analysis of production processes analyses where improvements can be made. Support of this type, that offer companies free services to improve their environmental performance.
- Enterprises that meet the project requirements will be provided incentive funds to compensate some of their equipment transformation input. Pollutant emissions reduction and improve product added value, which will bring huge economic benefits and environmental benefits to the enterprises.

- The financial instruments and mechanisms identified under the activity 3.1.2.4 will be used in conjunction with the NRP scheme. Support will be provided to participating enterprises to facilitate their access to the existing and the newly established fiscal/financial incentives as well as financing instruments and mechanisms.

(2) Reputational incentives:

- Reputational incentives motivate companies to change their behaviour as a result of the value they put on their visible performance and perception among consumers, NGOs and the community at large. The development of carbon emission calculation methods and related management standards will help improve the level of energy saving and emission reduction of enterprises and enable them to obtain more economic benefits, thus strengthening the sustainability of the enterprises concerned in terms of technology and finance after the end of the project.

Activity 3.1.2.4 Conduct research and analysis on the existing fiscal/financial incentives and green financing mechanisms in secondary metal industry.

NRP will be implemented as follows:

(a) After signing the incentive activity agreement, the enterprise shall carry out relevant technical transformation, management improvement, data collection, monitoring and other activities according to the content of the technical plan, and report to FECO when important progress is made. FECO conducts process tracking management. The enterprise shall actively cooperate and provide necessary materials and other support. When there are major changes or deviations between the actual implementation process and the technical plan, the company should inform FECO in time and actively negotiate to find a solution.

(b) After the secondary aluminum and secondary zinc enterprises complete the various activities required by the technical plan, the enterprise submits a written application to FECO, and FECO entrusts a dioxin monitoring agency to monitor the emissions of dioxins from the secondary aluminum and secondary zinc facilities.

(c) Companies whose monitoring results meet the evaluation criteria can submit a summary report of incentive activities to FECO, and submit an on-site verification application after the summary report is approved by the formal review.

Outcome 3.2 Promotional events for stakeholders, including awareness raising delivered.

Output 3.2.1 Technical training for stakeholders and awareness raising workshops developed and implemented.

Activity 3.2.1.1 Summarize the demonstration results and experience through entrusting a specialized agency.

Activity 3.2.1.2 Organize a series of national and international workshops to disseminate demonstration results and experience, to promote the NRP implementation.

Output 3.2.2 Awareness raising materials formulated and distributed.

Activity 3.2.2.1 Based on lessons learned throughout project implementation and related cases, specialized data sets would be organized and knowledge products such as training modules, audio, video, publications and promotion materials would be developed, published and made available online.

Activity 3.2.2.2 Conduct training sessions, promotion and public awareness activities.

Component 4. Project Monitoring, Evaluation and Knowledge Management

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, mid-term review and terminal evaluation conducted and project performance evaluated.

Activity 4.1.1.1 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 Review. Develop and implement impact assessment procedures. Conduct social, economic and environmental assessments. Conduct terminal evaluation and project performance evaluation.

Outcome 4.2 Knowledge sharing and information dissemination

Output 4.2.1 Knowledge products on best practices, experiences and lessons learned documented and shared nationally and internationally, including recycling and disposal knowledge on waste lead/lithium batteries and metal scrap.

Activity 4.2.1.1 Knowledge products on best practices, experiences and cases are documented and shared nationally and internationally, including recycling and disposal knowledge on waste lead/lithium batteries and metal scrap, through workshops and utilizing Stockholm and Basel Regional Centers, UNDP Regional Resource Centers etc. and/or directly with other developing countries.

Global Environmental Benefits

85. The direct global environmental benefits will result from a significant reduction of UP-POPs and BFRs releases. At 2020 baseline level, the estimated total of PCDD/Fs releases from the secondary aluminum, lead, zinc production and lithium production sectors were estimated at 3,270.5 g TEQ/a (Including 2,989.6 g TEQ/a in SAl, 139.2 g TEQ/a in SPb, 141.9 g TEQ/a in SZn and 0.3g TEQ/a in SLi). At present, there is no survey data on the use of BFRs in lead-acid batteries and lithium-ion battery plastics, investigation and in-depth studies will be carried out during project implementation and activities will then be formulated to be implemented during the project duration. For the secondary zinc industry, high amounts of PBDEs are introduced in the fly ashes from Electric Arc Furnaces (EAFs)29 (Lin et al. 2012) which are a major raw material for the secondary zinc smelters.

86. Furthermore, PBDD/Fs are formed and released from EAFs 30 (Shen et al. 2021). Their further fate has not yet been assessed for the secondary zinc industry receiving the ashes from EAFs. PBDEs due to their relevant use in the transport sector, is also a major source for secondary aluminum. For the separation of materials containing PBDEs of aluminum and zinc containing waste like end-of-life vehicles, a) shredding with following separation or b) manual dismantling and separation are the main strategies for separation of metals and plastic/polymers. The activities under Output 1.1.1 will investigate the BFRs status in battery product and develop, revise and improve green product policies and regulatory frameworks in battery, and the activities under Output 2.1.2 will evaluate the effective crushing and sorting technology to reduce the plastics entering the recycling process.

87. It is expected that the plant size to be identified during the PPG Phase, with output over 50,000 t and 10,000 t, would be an appropriate demonstration plant in secondary Al and Zn, respectively. It is anticipated that demonstration activities undertaken at the two pilot plants will allow for a reduction of UP-POPs releases as 16.125 g TEQ/a totally. In the NRP program, the project will promote BAT/BEP in dioxin emission reduction in SAl and SZn sectors, with 161.25 g TEQ/a UP-POPs reduction. The total emission reduction of pilot and promote plants are estimated to be 177.375 g TEQ/a. The demonstration projects are expected to be completed around the first half of the third year of project implementation, and the NRP will be initiated immediately after the completion of the demonstration projects. Therefore, the project is expected to have a two-year emission reduction period during the last two years of the five-year implementation duration. According to the 2-year operation period, the total emission reduction of the project is 354.75 g TEQ.

88. In addition to PCDD/Fs, other UP-POPs, such as PCBs, HxCBz, PeCBz and PCNs, are also released from secondary metal production processes. The concentrations of them are generally higher than those of PCDD/Fs, up to several orders of magnitude but the major TEQ stem from PCDD/Fs. Many studies have shown that: in the industrial production process, dioxins, PCBs and polychlorinated naphthalenes have similar formation pathways under certain conditions31. Considering that the high smelting temperature in metal recycling always have the de novo formation temperature windows in the cooling section or the process with associated UP-POPs formation, the key to reducing UP-POPs in the production process of secondary metal is to improve pretreatment, reduce fugitive emissions, efficiently remove dust, add secondary combustion, and strengthen air pollution control devices

[29] Lin Y-M, Zhou S-Q, Shih S-I, et al. (2012) Emissions of Polybrominated Diphenyl Ethers during the Thermal Treatment for Electric Arc Furnace Fly Ash. Aerosol and Air Quality Research, 12: 237–250.

[30] Shen X, Yang Q, Shen J, Yang L, Wang M, Yang Y, Liu G. (2021) Characterizing the emissions of polybrominated dibenzo-p-dioxins and dibenzofurans (PBDD/Fs) from electric arc furnaces during steel-making. Ecotoxicol Environ Saf. 208, 111722. doi: 10.1016/j.ecoenv.2020.111722.

[31] Oh JE, Gullett B, Ryan S, Touati A. Mechanistic relationships among PCDDs/Fs, PCNs, PAHs, ClPhs, and ClBzs in municipal waste incineration. Environ Sci Technol, 2007, 41(13): 4705–4710

Weber R, Iino F, Imagawa T, Takeuchi M, Sakurai T, Sadakata M. Formation of PCDF, PCDD, PCB, and PCN in de novo synthesis from PAH: Mechanistic aspects and correlation to fluidized bed incinerators. Chemosphere, 2001, 44(6): 1429–1438

89. Secondary metal production is also important sources of heavy metal pollution, which are able to infiltrate deep into the respiratory tract, reaching the lungs. Direct drying or combustion of these raw materials containing chlorine element such as polyvinyl chloride and heavy metal will produce a variety of pollutants (PCDD/Fs, COx, NOx, dust and heavy metal compounds, as well as volatile organic carbon compounds). Large amounts of heavy metal-contained dust, fumes, and hazardous waste are discharged, seriously affecting public health. Long-term exposure to heavy metal of an adult can cause nephropathy and decreased performance of nervous systems and extremely affects brain development of a child. The standardized recycling of waste batteries will greatly reduce the discharge of heavy metals in the recycling process and reduce the risk of heavy metals entering the environment.

90. This project is expected to generate multiple benefits for the global environment as it will not only lead to a reduction in UP-POPs and BFRs releases from the sector, but will also reduce the risks to human health, ecosystems and economies by sustainable supply chain management, innovations in green and sustainable chemistry, and adopting common approaches to chemicals management in secondary metallurgical sectors. The adaptation global environmental benefits from this project will result from the Sustainable Development Goals (SDGs) 3.9 and 12.4, which is in "SDG 3: Ensure healthy lives and promote well-being for all at all ages" and "SDG 12: Ensure sustainable consumption and production patterns", respectively.

Climate Risk Screening

91. Over the past three decades, China has experienced rapid economic and social development resulting in a significant reduction in poverty and the attainment of many Millennium Development Goals [World Bank, 2015]. China, with a population of 1.4 billion, and one of the largest economies in the world, plays a critical role in global efforts to reduce greenhouse gas emissions and address the impacts of climate change.32

92. China's climate is characterized by the distinct continental monsoon climate and the complex climate types, which provides complex and multiple natural background and different environments for various human activities. In the meantime, it also frequently gives rise to natural disasters, threatening social and economic activities. East China is one of the regions in the world with typical monsoon climate. The warm and humid airflow, which the summer monsoon brings from the sea, carries abundant rainfalls and provides a desirable natural environment. However, a concentrated rainfall also tends to cause disasters such as floods, storms and storm tides. Located deep in the hinterland, Northwest China lacks surface water owing to its inactive water circulation, and has a typical continental dry climate, which results in a fairly fragile natural and ecological environment. Because of its high elevation, the Qinghai-Tibet Plateau has a special plateau climate with annual average temperature below 0 degrees Celsius in most part. The seasonal change of temperature in China is quite prominent. In most regions, there are 4 distinct seasons, with cold winter and hot summer. According to the temperature indicator, the country is divided into 5 zones from south to north, i.e., tropical, subtropical, warm temperate, temperate and frigid zones. The seasonal changes of temperature in most regions of China are fiercer than that of other regions in the world with the same latitude (China's Policies and Actions for Addressing Climate Change.33

93. As per WHO (2015)34, under a high emissions scenario, mean annual temperature is projected to rise by about 6.1°C on average from 1990 to 2100. If emissions decrease rapidly, the temperature rise is limited to about 1.7°C. Under a high emissions scenario, and without large investments in adaptation, an annual average of 23 million people are projected to be affected by flooding due to sea level rise between 2070 and 2100. If emissions decrease rapidly and there is a major scale up in protection (i.e., continued construction, raising of dikes) the annual affected population could be limited to about 2,400 people. Adaptation alone will not offer sufficient protection, as sea level rise is a long-term process, with high emissions scenarios bringing increasing impacts well beyond the end of the century.

94. In accordance to its Social and Environmental Standards (SES), a pre-Social and Environmental Screening Procedure (pre-SESP) was carried out and the following climate change related risks was identified as Moderate: "the proposed Project may result in significant35 greenhouse gas emissions or may exacerbate climate change". The SESP prepared at PPG stage also indicated that the selection of BAT/BEP for demonstration activities (Output 2.1.3 and Output 2.2.2), energy consumption and level of GHG emissions

[32] https://www.who.int/globalchange/resources/PHE-country-profile-China.pdf?ua=1

[33] The Progress Report 2009, November, 2009; China's Initial National Communication, 10 December 2004.

[34] China's Climate And Health Country Profile – 2015

[35] 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.]

of the considered alternatives will be one of the criteria to be evaluated for best environmental practice and UNDP's SES requirements will be followed where applicable.

95. It is acknowledged that the metals recycling industry consumes substantial quantity of energy in its process, potentially resulting in high level of greenhouse gases emitted. In this regards, as the project aims to support the industries to use BAT/BEP that can reduce the releases of hazardous chemicals, it is expected that they can also bring co-benefits of improved energy efficiency of the recycling/smelting processes.

96. In this regard, through BAT/BEP demonstration and NRP, the project will promote relevant enterprises to save energy and reduce consumption, thus reducing CO2 emissions. It is estimated that through the implementation of the project, the comprehensive energy consumption of secondary aluminum demonstration enterprises and NRP enterprises will be reduced from 130 kgce/t to 110 kgce/t, and the comprehensive energy consumption of secondary zinc demonstration enterprises and NRP enterprises will be reduced from 1,200 kgce/t to 1,122 kgce/t, thus reducing CO2 emission by 52,278.6 t/a.

97. Although the manufacturing industry may not be the one facing the higher risk associated to climate change, factories and infrastructures located near landslide-prone and flooding areas or near coastal areas may be facing a significant major risk. In this regards, according to China's current "Law of the People's Republic of China on Land Administration" and "Law of the People's Republic of China on Urban and Rural Planning", China Urban and Rural Plan includes requirements on construction land size, environmental protection, natural, historical and cultural heritage protection, disaster prevention and mitigation, etc. Before an enterprise can carry out the project, the current authority of natural resources department will review whether the selected demonstration facilities or the construction land of the enterprise is in line with urban and rural planning requirements and construction standards, avoiding environmental and climate risks.

Risks:

In addition to being submitted to a Social and Environmental pre-screening process which rate the risks, in principle, has not identified indigenous peoples presented in the project area (including project area of influence). In line with UNDP's SES Policy, during the PPG stage, through investigation and survey activities, preparation and design of the Stakeholder Engagement Plan and the Gender Analysis and Gender Action Plan, and more particularly, the conducting of the UNDP Social and Environmental Screening Procedures (SESP), the following risks that may threaten the achievement of project results have been identified. In assessing these risks, proper mitigation measures have been developed to address the risks during project implementation. Activities required for the mitigation measures have been included in the activities of the various project components, with corresponding budget allocated for such activities as appeared in pages 39 - 45 of this CEO Endorsement Request.

Outcomes Associated	Description of Risks	Risk Category	Impact, Likelihood and Risk Rating	Risk Treatment / Management Measures
1.1	Government Officials responsible for enforcing legislation may fall short of capacities to meet their obligations in the Project upon the development of the new coordination and regulatory mechanisms	Operational Organizational Regulatory Strategic	I=2 L= 2 Low	This risk is being managed by Project Design (Components 1 and 4) The project, through Components 1 and 4, is expected to manage this risk by providing adequate capacity building related to the instruments developed by the Project. The project will conduct the training needs assessment and develop a targeted training plan (guided by the SES) to ensure that the relevant officials receive adequate training to understand their new extended responsibilities arising from the improved institutional frameworks being developed by the project in terms of legislation, guidelines and mandatory standards. In addition, upon project commencement, a grievance redress mechanism will be established for the project, and its details disseminated to relevant stakeholders to ensure that all concerns and complaints are documented and addressed.
1.1, 2.1 and 2.2	Small or Medium sized enterprises - which are expected to benefit from project outputs and are also expected to internalize and scale up project results after its completion - may not be involved in decision-making process during the	Social and Environmental Financial Operational Organizational Regulatory Strategic	I=3 L= 3 Moderate	This risk is being managed by: - Stakeholders Engagement Plan - SEP - Project Design (Components 1 and 4) - Project Governance and Management Arrangements Stakeholder Engagement Plan (SEP) was developed during the Project Preparation Phase (PPG) and will be implemented to ensure fair representation of small and medium sized enterprises for secondary non-ferrous metal industry who may otherwise be marginalized from participating in any incentive schemes planned for the implementation of BAT/BEP (Output 1.1.3).

	Project implementation in relation to the development of policy and regulatory frameworks that will support the project's replication and sustainability goals			The Components 1 and 4 of the project incorporate activities that facilitate the participation in policy development as well as awareness and capacity building activities that will also support the stakeholders' management, with particular focus on SMEs. Finally, the Project´s Governance and Management Structure envisages the participation of the Industrial Associations as Responsible Parties which will be instrumental in promoting the National Replication Programme: through this arrangement these entities will facilitate the application of new alternative technologies, and will assist the project so information and capacities are transmitted down the chain for the SMEs in regards to the promotion and awareness raising activities, assuring their representation in the project.
2.1	Potential risk to workers' employment, particularly women, in the course of the transition to implementation of BAT/BEP	Social and Environmental Operational Organizational Regulatory	I=3 L= 4 Moderate	This risk is being managed by: - Project Design (Components 2 and 3) - Environmental and Social Management Framework (ESMF) - Environmental and Social Management Plan (ESMP) - Gender Action Plan (GAP) - Labour Management Procedures In line with the Environmental and Social Management Framework (ESMF) prepared for the project (ProDoc Annex 9), scoped Environmental and Social Impact Assessment (ESIA) will be undertaken for all project demonstrations. The ESIA(s) will include an analysis of this risk and propose measures to avoid or reduce redundancies, the method of selection and mitigating the effects, integrating outcomes into a restructuring plan (if needed). The Environmental and Social Management Plan (ESMP) will also be developed, following the ESIA(s), and is expected to include potential training for qualified existing staff on other roles or skills that may be needed at the industry (re-qualification). Where no viable alternatives are identified, a Restructuring Plan will be developed to reduce and mitigate adverse impacts of retrenchment on workers. In addition, Labour Management Procedures will be prepared for all enterprises to assess and align with national legislation and ensure compliance with SES Principle 7. The Gender Action Plan will also support to address potential risks related to the (lack of) inclusion of women employees in the project implementation and the BAT/BEP selection processes.
1.1, 2.1 and 2.2	Inadequate participation of women in consultations, policy decision making and design of modalities for capacity building in uptake of BAT/BEP in the metals recycling industry	Social and Environmental Operational Organizational Regulatory Strategic	I=3 L= 2 Moderate	This risk is being managed by: - Project Design (Components 2 and 3) - Environmental and Social Management Framework (ESMF) - Gender Action Plan (GAP) The Gender Action Plan has addressed potential risks and included measures to mainstream gender in all project components, with specific focus on encouraging women representation in the following: • Adequate inclusion of women employees in the project decision making process and the BAT/BEP selection processes; • Training and supporting more women employees to management positions including being middle and senior managers; • Supporting all the women and men who may lose their jobs to be appropriately relocated; • Making sure the project results dissemination materials be gender sensitive; • The project publicity targets proportionally toward relevant women and girls; and • Collection of sex-disaggregated data wherever relevant.
2.1, 2.2 and 3.1	Risk of release and emissions during decommissioning, transport, storage and disposal of hazardous	Environmental Operational Regulatory Health	I=4 L= 2 Moderate	This risk is being managed by: - Project Design (Components 1, 2 and 3) - Environmental and Social Management Plan (ESMP) - Spill Prevention and Management Plan - Strategic Environmental and Social Assessment (SESA)

	waste during the demonstration pilots			For the Industries that will participate in BAT/BEP Demonstration Activities: The project will provide technical assistance and oversee the deployment of technologies. The Industries/Companies will implement such technologies through using their co-finance (not part of Projec's GEFt Budget). (a) The PPG Phase has undertaken a preliminary assessment of companies and short listed the companies that could engage into the Demonstration Activities. (b) During pre-selection of the demonstration enterprises, priority was given to those located within industrial settings, and industries located near natural habitats, cultural heritage sites and residential areas are, thus avoided. (c) During the first year of implementation, ESIA will be undertaken for the short listed companies to further assess all relevant risks, including the potential release and emissions of hazardous material. (d) As part of the ESMP to be developed in the first year of project implementation, a Spill Prevention and Management Plan will be developed and implemented for all demonstration activities for safe handling and disposal of hazardous waste. (e) In addition, the project will ensure that enterprises that formally engage with the Project/IP in the demonstration activities (Output 2.1.3 and Output 2.2.2) must meet the following condition: "Environmental management: waste, flue gas and water shall be discharged after meeting relevant standards. UP-POPs-containing wastes shall be managed according to relevant requirements on hazardous waste management". For the Project Contractors/Service providers: the project will engage a number of service providers/contractors to support the operationalization of several activities. These will be engaged using procurement (tendering) processes against clear Terms of Reference and Technical Specifications as approved in the Procurement Plan. (a) Under Components 2 and 3, the project will ensure that qualified waste management companies will be recruited through public tendering process. Clear criteria will be set to ensure strong track records and compliance with relevant National and International regulations and standards for handling, treatment and disposal of hazardous waste, including certification provided through Environmental Operational License and Workers certification and training. (b) A Targeted Spill Prevention and Management Plan will be developed and implemented at sites for safe handling and disposal of hazardous waste, including procedures for safely cleanup of accidental wastes releases. For the upstream activities related to improvement policy and regulatory framework (Outputs 1.1.1 and 1.1.2): Strategic Environmental and Social Assessment (SESA) will be carried out during development of the policies and regulations to assess and reduce this risk.
2.1 and 2.2	Risk of flooding of demonstration facilities and other disaster risks	Environmental Operational	I=3 L= 2 Moderate	This risk is being managed by: - Project Design (Components 2 and 3) - Environmental and Social Management Plan (ESMP) - Spill Prevention and Management Plan The PPG Phase has undertaken a preliminary assessment of companies and short listed the companies that could engage into the Demonstration Activities. During pre-selection of the demonstration enterprises, priority was given to those located within industrial settings, and industries located near natural habitats, cultural heritage sites and residential areas are, thus avoided. During the first year of implementation, ESIA will be undertaken for the short-listed companies to further assess all relevant risks, including the potential release and emissions of hazardous material. The project will take into consideration flood risks and risks related to other natural

				disasters in the ESIA and before engaging with the demonstration enterprises (locations prone to these types of disasters will be avoided) As additional precautionary measure, and part of the ESMP to be developed in the first year of project implementation, a Spill Prevention and Management Plan will be developed and implemented to place procedures for clean up and re-habilitation.
2.1, 2.2 and 3.1	Increased GHG emissions and energy consumption from alternative processes to reduce the releases of hazardous chemicals	Social and Environmental Operational Regulatory	I=3 L= 3 Moderate	This risk is being managed by Project Design (Components 1 and 2) When selecting the BAT/BEP for the demonstration activities (Output 2.1.3 and Output 2.2.2), the energy consumption and level of GHG emissions of the considered alternatives will be one of the criteria to be evaluated for best environmental practice and SES requirements will be followed where applicable. The GHG technology landscape and impacts will be consistent with a assessed during ESIA(s) for the selected demonstration sites/enterprises. The ESMP (under Risks 5 and 6) will also incorporate the relative aspects of Standards 8 triggered and incorporate SES requirements where applicable.
2.1, 2.2 and 3.1	Working conditions that do not meet national labor laws and international commitments and exposure to health and safety risk within the demonstration enterprises and hazardous waste disposal enterprises	Social and Environmental Organizational Regulatory Health	I=4 L= 2 Moderate	This risk is being managed by: - Project Design (Components 2 and 3) - Environmental and Social Management Plan (ESMP) - Occupational Health and Safety Plan The PPG Phase has undertaken a preliminary assessment of companies and short listed the companies that could engage into the Demonstration Activities. During the first year of implementation, ESIA will be undertaken for the short-listed companies to further assess all relevant risks, including adherence to national laws on Labor Practices. ESIA will also incorporate the proper assessment on occupational health and safety measures are applied (through an Occupational Risk Assessment). A scoped ESMP that will be developed for the demonstration pilots and will include an Occupational Health and Safety Plan that determines the measures to be adopted to further avoid or mitigate this risk (such as ventilation and wearing personal protective equipment). In addition, the demonstration enterprises will confirm that they have ensured the hazardous waste disposal enterprises they engaged/will engage are duly registered and authorized to conduct such business.
1.1, 2.1, 2.2 and 3.1	Informal recyclers, who may include marginalized and traditional communities, find their access to resources and thus income reduced as a result of new policy and regulatory framework for metal scrap management and to reduce UP-POPs and BFRs release from recycling practices	Social and Environmental Organizational Regulatory Health	I=3 L= 3 Moderate	This risk is being managed by: - Project Design (Component 1) - Strategic Environmental and Social Assessment Development of the policies and regulations in Outputs 1.1.1 and 1.1.2 will be underpinned by a SESA, which will assess the potential for economic displacement. If such a risk is identified to become an issue, a Livelihoods Restoration Framework will be developed to be implemented during roll out of the policies and legislation. Should any of the SESAs find that this risk is relevant to traditional communities, the Project will take steps to ensure relevant requirements of Standard 6 are applied, including obtaining Free Prior Informed Consent (FPIC) and developing a Traditional Communities Framework as part of the relevant policy/legislation.
2.1 and 2.2	Inappropriate behavior by security personnel who may be recruited by the industries	Social and Environmental Organizational Regulatory Health	I=4 L= 2 Moderate	Prior to hiring of any security staff to guard selected demonstration industries (Output 2.1.3 and Output 2.2.2), a Code of Conduct reflecting SES requirements will be prepared so that industry operators ensure their security staff abide by them. Training will be offered to participating individuals to ensure they are aware of their responsibilities. In addition, the Grievance Redress Mechanism for the project will allow the local community to share any concerns or grievances they may have or report any incidents related to this risk.
All	Failure to promote the project affected by COVID-19	Social Health	I=3 L= 3 Moderate	The project will always pay attention to the impact of the COVID-19 on the implementation of the project. When necessary, the project will carry out the socio-economic impact assessment of the impact of COVID-19 on the progress of the project, and promote the implementation of the project according to the plan through various means, such as online meeting, telephone, etc.

Partnerships:

98. The project will work with different partners from both the public and private sector to achieve the above-mentioned results. During the project's preparation, a series of consultations, interviews, telephone review and on-site visits were undertaken with all types of different stakeholders and they will continue being engaged during the project's implementation.

99. Private Sector will participate in project activities, carry out investment on UP-POPs and BFRs reduction, and comply with national and local environmental policies and standards. Private sector actively participates in the project activities in the revision of industry standards and demonstration projects. On one hand, they can obtain some economic incentives. On the other hand, it is conducive to the improvement of corporate pollution prevention technology and environmental management capabilities and enhances the competitiveness of the enterprises.

100. The roles and responsibilities of various stakeholders directly involved in project implementation are described below.

- UNDP will be the GEF Implementing Agency (IA) responsible for the oversight of the project;
- Ministry of Ecology and Environment (MEE), as the administrative authority on ecological and environmental protection, is designated by the State Council as the core agency for coordination of all ecological and environmental protection work including UP-POPs related activates in China. As the focal point for the implementation of the Stockholm Convention in China, MEE is the National Executing Agency (Implementing Partner) for this project;
- The National Steering Group (NSG) is an Inter-ministerial Steering Group and will comprise of MEE and other ministries like the Ministry of Industry and Information Technology (MIIT), the National Development and Reform Commission (NDRC) etc. It will provide overall guidance and coordination for the implementation of the relevant project activities and ensure that inputs and contributions are available as required. The NSG will secure the cooperation, as necessary, with key Ministries and other public/private decision-making bodies, to ensure that execution of activities occurs smoothly and in an integrated way with overall national policies and planning;
- The National Project Team comprising of staff from MEE, MIIT, and NDRC etc. will be established and based in Foreign Environmental Cooperation Center (FECO, formerly the Foreign Economic Cooperation Office) of MEE;
- Participating production enterprises will be the major role-players in the demonstration of technology transfer to and application of BAT/BEP as well as undertaking sound management of waste metal scraps and batteries recycling;
- Associations and research institutions that are well connected with industrial sectors will provide information and coordination in implementing relevant activities and provide technical/policy consultation as well as awareness raising and environmental risk assessments;
- Research institutions and laboratories will be engaged in the gap identification of the regulatory framework, R&D for UP-POPs emission reduction, BFR risk assessment and management of BFR and chlorine-containing metal scrap and waste batteries to minimize exposure to the workers and population. The project also seeks public participation by consulting those who may be affected by the production of secondary metal recycling, such as residents living near the recycled metal recycling industry and employees of these industries.

Stakeholder engagement:

101. Effective stakeholder engagement is critical to the success of GEF-financed projects. Stakeholder engagement improves project performance and impact by enhancing recipient country ownership of, and accountability for, project outcomes and objective; addressing the social and economic needs of affected people; building partnerships among project executing agencies (IA) and stakeholders; and making use of skills, experiences and knowledge particularly from enterprises especially the private sector, communities and local groups, ethnic minority peoples, male and female residents, as well as the project design team, in the design, implementation, monitoring and evaluation of project activities.

102. Effective Stakeholder engagement is the basis for achieving sustainable project implementation. In this regard, a wide range of relevant stakeholders have been consulted during the PPG phase to ensure active project participation and commitment. Specific discussions with key stakeholders such as NDRC, MOF, MIIT and related associations, were held to shape project design and activities, and to ensure goal alignment in support of the project.

103. FECO and UNDP have taken advantage of the consultation platforms used for the project formulation and encouraged more stakeholders to support the design of the full project as well as to endorse its targets. A series of meetings have been organized to discuss the project objectives, potential outcomes and outputs, to ensure active participation and support. The mechanism is expected to also be incorporated in the project implementation, taking into consideration the formal Project Board/Steering Committee structure, so all parties to be involved (either as suppliers or beneficiaries of the project) can be actively involved the implementation of the project and make the outputs better applied.

104. These communication platforms have played an important role in the design of this project by consolidating experiences from baseline projects, assessing the needs of the secondary metals sector and helping to shape the outline of the project proposal as well as its ambitions and feasibility. During project implementation, FECO and UNDP will continue to use the communication platforms established and will expand their application.

105. In addition, during the future implementation process, the project is expected to carry out a variety of study tours according to the actual needs, listen to the opinions and suggestions of various stakeholders, enterprises and communities, so as to make the project meet the interests of all parties.

106. Finally, FECO has established a good cooperation relationship with these stakeholders through the implementation of the secondary copper project, and all stakeholders have made their contributions to the implementation of the secondary copper project. It is believed that these will lay a good foundation for the implementation of this project.

107. In regard to the consultations with Local Communities, CSOs and Private Sector, the project had deployed the consultation process in two folds:

(a) Taking advantage of the consultation mechanism implemented through the GEF Project ID 6966 "*UPOPs Reduction through BAT/BEP and PPP-based Industry Chain Management in Secondary Copper Production Sector in China*", FECO has consulted the stakeholders in the secondary non-ferrous metal industry, such as industry associations and enterprises benefited from the experiences of the GEF 6966 project and looking into expanding the reach to the secondary metals sector.

(b) Additionally, through the annual technical coordination meeting for Stockholm Convention, an annual meeting organized by the association, various training meetings and technical exchange meetings were organized by FECO and the association, and the stakeholders actively supported to provide inputs and guidance to the development of this project.

The Stakeholder Engagement Plan

Objectives of the Stakeholder Engagement Plan

108. This Stakeholder Engagement Plan (SEP) is designed to ensure inclusive, effective, and efficient engagement of key stakeholders throughout the lifecycle of the GEF-supported project of Green Production and Sustainable Development in Secondary Aluminum, Lead, Zinc and Lithium Sectors in China (the project).

Scope of the plan

109. Stakeholder means any individual or group that has an interest in the project or is likely to be affected by the project. **Key stakeholders** are those who have strong interest in, and/or influence over the project design, implementation, and the monitoring and evaluation, and will be directly affected by the project. **Stakeholder Engagement** means a process of disclosure of the project information to, consultation with the stakeholders, and the stakeholders' participation in the project development, implementation, monitoring, evaluation and learning throughout the project cycle, addressing grievances, and on-going reporting to the stakeholders. **The Project directly affected people** cover those who will be directly affected, positively or negatively, by the project. The affected people may live in or on the edge of a project site, or live in the areas of the project influence/impacts.

Methodology and methods

110. During the project preparation stage, based on the GEF Project Information Form (PIF), the consultant tentatively identified the key stakeholders first; then discussed with the UNDP, FECO who are the project implementing agencies (IA), and the other project preparation grant (PPG) team members for further identifying the key stakeholders; followed by field survey of seven metallurgic enterprises in Zhejiang, Shandong, Jiangsu and Yunnan provinces to understand current collection and recycling situation of Lead-acid and Li-ion batteries and secondary production of the four nonferrous metals and the stakeholders involved, and to discuss life-cycle recycling of the batteries and the key stakeholders, in order to ensure that

all key stakeholders will be equally engaged in the project design, implementation, and monitoring and evaluation.

111. Identification of stakeholders will be an on-going and adaptation management process throughout the project cycle of life. More key stakeholders will be included whenever identified during the project implementation, monitoring and evaluation. The stakeholder engagement plan developed should be adjusted and improved whenever and wherever necessary.

Alignment with relevant policies

112. This plan was developed in accordance with the GEF 2020 Strategy, the GEF policy on stakeholder engagement (2017), GEF Guideline on the Implementation of the Policy on Stakeholder Engagement (2018), GEF principles and guidelines on engagement with indigenous peoples (2012), GEF Policy on Gender Equality (2017), and UNDP Social and Environmental Standards (2019).

Stakeholder Analysis

113. The stakeholder analysis aims to identify the key stakeholders related to the project and assess their roles, responsibilities for, interests in life cycle recycling of lead-acid and li-ion batteries, and secondary production of the four nonferrous metals in China. Major barriers for female staff and female residents to engagement in the project are also assessed. The key stakeholders and their roles are summarized in Table 9.

Table 9: Summary of Key Stakeholder Analysis

Key Stakeholders	Mandate Relevant to the project	Roles in the project
National level administrative authorities		
Ministry of Finance (MOF)	MOF manages loans (grants) from multi- and bi-lateral development organizations and foreign governments.	a) Overall responsibility for national GEF programme; b) Review, endorse and supervise preparation and implementation of this proposal as the Country GEF Official Focal Point. The MOF was briefed on project development and will endorse the final Project Document.
National Development and Reform Commission (NDRC)	NRRC is responsible for promotion of the strategy of sustainable development through its lead role in the five-year planning process. NDRC makes proposal on strategy, plan, and relevant policies on using foreign funds.	NRDC will be a key partner in project mainstreaming efforts related to its lead role in the five-year planning process and will support mainstreaming of life-cycle recycling into five-year planning process for relevant sectors.
Ministry of Ecology and Environment (MEE)	Supervise and administer to ensure the attainment of national emission reduction targets; Supervise efforts to prevent environment pollution; Formulate and implement regulations for pollution of the air, water, sea, soil, noise, light, odor, solid waste, chemicals, and vehicles; Guide and coordinate educational campaigns over ecological environmental protection; Formulate and implement educational campaign outlines for ecological environmental protection; Promote societal and public participation in environmental protection efforts;	a) Ongoing management of implementation of the project and management of the project; b) Issue national policy and standards to regulate environmental performance of China's secondary lead production sector; c) Supervise enforcement of environmental policies.
Foreign Environmental Cooperation Centre (FECO), Ministry of Ecology and Environment, China	Responsible for performing the Stockholm Convention in China	As the Executing Agency of the project, FECO is responsible for the project design, advise and supervise the project implementation.

Key Stakeholders	Mandate Relevant to the project	Roles in the project
Ministry of Industry and Information Technology (MIIT)	Overall planning and promotion of national information technology development Planning of manufacture industry development	Provide technical and policy support to MOF, MOC and MEE on development and implementation of the secondary metal (lead, aluminum and zinc) and li-ion batteries production industry management system including identification of technology requirements.
United Nations Development Programme (UNDP)	UNDP works in about 170 countries and territories, helping to achieve the eradication of poverty, and the reduction of inequalities and exclusion. UNDP helps countries to develop policies, leadership skills, partnering abilities, institutional capabilities and build resilience in order to sustain development results.	UNDP is GEF Implementing Agency for the project and is therefore responsible for oversight and monitoring project implementation and ensuring adherence to UNDP and GEF policies and procedures.
Local government and local level administrative authorities		
Local Government and Ecology and Environment Bureaus (EEB)	Within their jurisdictions: Supervise and administer to ensure the attainment of national and local emission reduction targets Supervise efforts to prevent environment pollution; Formulate and implement regulations for pollution of the air, water, sea, soil, noise, light, odor, solid waste, chemicals, and vehicles; Guide and coordinate educational campaigns over ecological environmental protection; Formulate and implement educational campaign outlines for ecological environmental protection; Promote societal and public participation in environmental protection efforts.	Within their own jurisdictions: a) Planning and development approvals; b) Support public information dissemination and local social impact mitigation; c) Monitor environmental performance; d) Enforce environmental policies and requirements applicable to secondary lead management.
Industry Association		
Non-Ferrous Metal Association of China, Chinese Non-ferrous Metal Association Recycling Metal Branch, China Industry Technology Innovation Strategies Alliance, China Power battery forcible recovery of industrial technology innovation strategic alliance, Electric Vehicle Power Battery Recycling Strategic Alliance)	Within their own areas: Coordinate and support compliance actions within the sector; Facilitate information exchanges among members; Facilitate formulation of sector development strategies; Industrial strategy development of secondary metals.	a) Coordinate and support compliance actions within the sector; b) Facilitate information exchanges among members; c) Facilitate formulation of sector development strategies; d) Industrial strategy development of secondary metals; e) Enterprises management support.
The project demonstration and national replication enterprises		
Private Sectors	Investing and making profits from production of secondary metallurgy of nonferrous metals, and collection of waste lead-acid and/or waster Li-ion batteries	a) Participate in project activities; b) Carry out investment on UP-POPs, BSRs, and heavy metal reduction; c) Comply with national and local environmental policies and standards
Local communities and general public		
Local communities	Living in the influential area of the project enterprises including life cycle recycling,	Participate in the project training planning and training activities, such as training on BAT/BEP

Key Stakeholders	Mandate Relevant to the project	Roles in the project
	and those surrounding the project related waste battery collection	and collection of life cycle recycling of waste lead-acid and/or li-ion batteries.
Ethnic minorities	In the above communities, some ethnic minorities might be live there	Ditto
General Public	Consumers of products which might have heavy metal issues Residents whose surrounding air and soil might be impacted by UP-POPs with related exposure chicken/egg	a) Improve consumers' awareness on UP-POPs, BFRs, and heavy metal issues related to the secondary nonferrous metal production; b) Exercise consumers' rights to influence environmental performance of the sector.
Universities, research institutions and CSOs		
Academic institutes, colleges, universities, and/or relevant individuals	Universities and research organizations focus on teaching, research and conservation knowledge development and policy recommendations	Conduct field surveys, monitoring, data collection and database development for the project Provide technical expertise on life cycle recycling of waste lead-acid and/or li-ion batteries Provide technical expertise on secondary production of the four nonferrous metals
CSOs	Have their focuses and special interests on recycling of waste lead-acid and/or li-ion batteries, and/or secondary production of the four nonferrous metals.	Potential to provide technical expertise and bring in international experience, networking and platform for communication. Possible co-implementers for some activities such as training, communication and public awareness under projects.

Sources: PIF, consultations with the EA and other PPG team members, field visits of seven relevant enterprises, etc.

114. Due to the traditional values that men are responsible for affairs outside of home while women do household duties, there might be a few barriers to female workers and female residents' engagement in the project, especially technical trainings. The barriers and the measure are stated in Table 10.

Table 10: Barriers to Women's Engagement and the Countermeasures

Female group	Barrier types	Barriers to Engagement	Countermeasures
Women workers displaced due to project	Equal participation in technical training and training on impacts of UP-POPs, BFRs and countermeasures	It is often that women have less participation opportunities than men in training. This tradition may constrain the displaced women's participation in the project trainings, including training for reemployment	It is proposed in the project Gender Mainstreaming Action Plan that the project enterprises ensure equal training of the displaced women workers on production of secondary metallurgy of the four nonferrous metals, train them on impacts of UP-POPs and BFRs, and the countermeasures with training time and location suitable to women.
Females involved and those will be involved in collection of waste lead-acid and/or li-ion batteries	Equal participation in the project training on scientific collection of waste lead-acid and li-ion batteries, and equal participation in training on impacts of UP-	It is often that women actually less participate than men in training. This tradition may constrain the females who are involved and those will be involved in collection of waste lead-acid and/or li-ion batteries	It is proposed in the project Gender Mainstreaming Action Plan that the project enterprises equally train females for them to scientifically collect waste lead-acid and li-ion batteries, train them on impacts of UP-POPs and BFRs, and the countering measures.

	POPs, BFRs, and countermeasures.		

Sources: consultations with the EAs, other PPG team members, field visits of seven enterprise and their employees in 2021.

Stakeholder Engagement Plan

115. Based on the stakeholder analysis, stakeholders were consulted and surveyed during the project preparation, which were shown in Table 1811. Stakeholder engagement plan for the project implementation, monitoring and evaluation has also been developed based on the analysis and survey which is presented in Table 1912.

Stakeholder engagement during the project preparation

116. Since the PPG team started working on the project, several meetings and field survey on identifying key stakeholders, their roles, interests, and responsibilities, were conducted led by FECO and UNDP; and seven relevant enterprises were visited and consulted for designing and implementation of the project.

Table 11: Stakeholder engagement promoted in the project preparation (PPG) phase

Means of Engagement	Stakeholders engaged	Objectives	Time	Major results
Inception workshop	PPG team, UNDP, FECO, MEE, Associations, etc.	- Make familiar with the PIF emphasized gender - Achieve common and deep understanding of the project, the outcomes, objectives, the institutional arrangement, etc. - Further identify key stakeholders	April 16, 2021	Clear understanding of the project identification of the key stakeholders
Field visits and survey of relevant enterprises	Tianneng Company in Changxing County of Zhejiang Province: 12 managers etc. (6 male, 6 female) Chaowei Company in Changxing County of Zhejiang Province: 18 employees including 10 managers (6 male, 4 female) and 8 frontline workers (4 male, 4 female) Shandong Aolong Company in Weifang City of Shandong Province: GEM Company in Wuxi City of Jiangsu Province: 11 managers etc. (6 male, 5 female) Xinlianhuanbao Company in Gejiu City of Yunnan Province: 9 managers etc. (5 male, 4 female) Xiangyunfeilong Company in Xiangyun County of Yunnan Province: 9 managers	(i) understanding collection and recycling situation of waste lead-acid and li-ion batteries, and secondary Zine and Aluminum production, including working situation of the male and female employees; and release risks and impact of UP-POPs and BFRs; (ii) understanding participation willingness of the enterprises including the male and female employees (iii) make the enterprises including the male and female employees clearly understand the project such as the project objective, the expected	19 May - 1 June 2021	The PPG team and the project IAs (UNDP and FECO) known the current situation of the collection and recycling of waste batteries and the secondary Zinc and Aluminum production, existing problems, potential measures, etc. The enterprises understood the project objective, the outcomes, the proposed outputs, activities, and required counterpart funds All visited seven enterprises have willingness to participate in the projects

Means of Engagement	Stakeholders engaged	Objectives	Time	Major results
	etc. SWCMC[36] of MEE China Nonferrous Metals Industry Association（CNMIA China Battery Industry Association（CBIA PPG team, UNDP, FECO	outcomes, outputs, main activities, counterpart funds; and (iv) discuss with the stakeholders on the project design, implementation etc.		
Workshops for development of the project documents	UNDP, FECO, CNMIA, CBIA, PPG team	Provide more information for the PPG team to complete the draft project document	23 June 2021	Got more relevant information
Validation workshop	PPG team, UNDP, FECO, MEE, Industry Associations, etc.	Consultation, coordination and validation of project design and activities by key stakeholders	9 November 2021	Suggestions for improvement of project design and buy-in of the project

Stakeholder engagement during the project implementation

117. Based on the above-mentioned consultations and GEF policy on stakeholder engagement, the following stakeholder engagement plan for the project implementation phase has been developed (Table 1912).

[36] Solid Waste and Chemicals Management Center of MEE

Table 12: Stakeholder Engagement during Project Implementation

Engagement methods	Objectives	Key Stakeholders being engaged	Main responsible agencies	Location for engagement or for info disclosure	Time	Resources
Engagement before the project implementation						
Dissemination of the project document on websites	Public access to the project information Outreach of the project	Any interested individual and organization, male and female, Han and Ethnic minorities	UNDP, FECO, PMU,	Disclosed on websites of the UNDP, and FECO	Before the project implementation	The project budget
Validation workshop for the project PPG document	Finalize the project document	Project relevant governmental agencies, enterprises, etc.	UNDP, FECO, PPG team etc.	PMU	Before the project document finalization	The project PPG budget
Engagement in project implementation						
Inception workshop Bi-annual work plan making and/or update	Reach an agreement on the project detailed arrangement	All the key stakeholders	UNDP, the PMU	TBD	Project implementation period	The project budget
Consultation, workshop etc.	Develop criteria for selection of the demonstration enterprises	The project steering committee Relevant enterprises	UNDP, the PMU	Bidding information disclosed online	In the beginning of the project implementation	The project budget
Consultation, workshop etc.	Develop criteria for selection of enterprises to be involved in the national replication plan	The project steering committee The project demonstration enterprises Other relevant enterprises	UNDP, the PMU	Bidding information disclosed online	During the project implementation	The project budget
Component 1: Strengthening the national policy and regulatory framework to reduce UP-POPs and BFRs releases from secondary non-ferrous metal industry						
Outcome 1.1 Reduced UP-POPs and BFRs releases resulting from unsound metal scrap and batteries recycling management practices through the adoption and implementation of standards/measures, policies, plans, laws, regulations and guidance. Output 1.1.1 Policy and regulatory framework for metal scrap management developed, revised and improved and relevant components integrated into the existing policy and regulatory framework. Output 1.1.2 Technical by-laws, regulations and guidance aiming to reduce UP-POPs and BFRs release from batteries manufacturing, recycling and disposal practices developed, adopted and implemented. Output 1.1.3 Barriers to BAT/BEP and Extended Producer Responsibility (EPR) implementation removed through e.g., the institution of economic instruments and incentives.						

Engagement methods	Objectives	Key Stakeholders being engaged	Main responsible agencies	Location for engagement or for info disclosure	Time	Resources
Consultation, workshop, interview, survey, etc.	Develop and/or improve environment policies and technical standards for reduction of UP-POPs and BFRs released from secondary nonferrous metal production, and life cycle recycling of waste lead-acid and waste li-ion batteries	The project steering committee, MEE, Relevant enterprises, Relevant associations, Relevant research and universities	UNDP, FECO, the PMU	TBD	During the project implementation	The project budget
Component 2: Reduction of UP-POPs and BFRs releases from unsound metal scrap and batteries recycling						
Outcome 2.1 Reduced releases of UP-POPs and BFRs as a result of improved raw material (recycled metal scrap and batteries) supply chains as well as the introduction of environmentally sound disposal practices and extended producers responsibility at recycling entities. Output 2.1.1 Assessment of existing collection systems completed, and appropriate collection schemes established, feasible logistical arrangements, including proper acceptance and outbound material criteria. Output 2.1.2 Supply chains for local markets further developed, recycling rates increased and maximum quantities of recyclable plastic parts diverted from inadequate disposal. Output 2.1.3 Two demonstration projects implemented to demonstrate BAT/BEP and life cycle recycling in the collection and conditioning of waste batteries (one in lead acid batteries and one in li-ion batteries), applying proper management of hazardous waste generated in the whole process. Outcome 2.2 Prevent and minimize the generation of UP-POPs in the secondary metallurgical processes. Output 2.2.1 Assessment of secondary metallurgic production processes and technologies finalized. Output 2.2.2 Two demonstration projects implemented to demonstrate BAT/BEP in the secondary production of metals (one in aluminum and one in zinc)						
Competitive bidding for the project demonstration enterprises	Selection of the best suitable enterprises as the project demonstration enterprises	All enterprises with participation willingness	The PMU	The RFP will be disclosed on website of FECO and UNDP	In the beginning of the project implementation	The project budget
Consultation, workshop, survey, etc.	Select BAT/BEP to be implemented in the demonstration enterprises	The project BAT/BEP including male and female technicians and other relevant employees	The demonstration enterprises	The demonstration enterprises	During the project implementation	The project budget
Participation in the project training planning	Effectively develop the training	Relevant male and female, Han and ethnic minority employees	The demonstration enterprises	TBD	During the project implementation	

Engagement methods	Objectives	Key Stakeholders being engaged	Main responsible agencies	Location for engagement or for info disclosure	Time	Resources
Publicize objective and results of the BAT/BEP implementation	Make the participants understanding benefits of the project, the BAT/BEP, which will facilitate the general public's support of the enterprises	residents living within 500m from the demonstration enterprises, to students in local schools, and to local government officials	The demonstration enterprises	The demonstration enterprises, and/or the surrounding area	During the project implementation	The project budget
Consultation, workshop, etc.	Discussion and finalization of life cycle recycling of waste lead-acid and waste li-ion battery	Male and female technicians and other relevant employees of the demonstration enterprises; Relevant associations; Relevant research institutions, and universities; Male and female residents of the related waste battery collection sites	The demonstration enterprises	The demonstration enterprises; The related waste battery collection sites and/or the surrounding communities	During the project implementation	The project budget
Publicize the pilot life cycle recycling to general public on website, etc.	Raise general public' awareness on people's behaviour of carelessly discard of waste batteries lead to release of UP-POPs and BFRs, and the negative impact of UP-POPs and BFRs on human health and environment	All people with willingness to understand recycling of waste batteries.	The demonstration enterprises The collection departments of the demonstration enterprises	Websites, blackboards, etc. of the demonstration enterprises and the collection departments	During the project implementation	The project budget
Face-to-face promotion	Enhance knowledge and awareness of residents surrounding the waste battery collection sites	Male and female residents (Han and other ethnicities) living surrounding the waste battery collection sites (usually within 500m)	Collection departments of the demonstration enterprises'	The collection sites and/or the surrounding communities	During the project implementation	The project budget
People sell or give waste lead-acid and waste li-ion batteries to the collection sites	Increase collection rates of the waste batteries	People producing or having the waste batteries	The collection departments	The collection sites	During the project implementation	Cost of the collection department

Engagement methods	Objectives	Key Stakeholders being engaged	Main responsible agencies	Location for engagement or for info disclosure	Time	Resources
Component 3: Implementation of a National Replication Programme						
Outcome 3.1 Replication and Promotion of demonstration results and experience. Output 3.1.1 A national replication plan of sustainable recycling and green production developed. Output 3.1.2 Results of the implemented demonstration project published and disseminated for replication. Outcome 3.2 Promotional events for stakeholders, including awareness raising delivered. Output 3.2.1 Technical training for stakeholders and awareness raising workshops developed and implemented. Output 3.2.2 Awareness raising materials formulated and distributed						
Competitively bidding for the NRP enterprises	Selection of the best suitable enterprises	All enterprises with willingness to participate	The PMU	RFP disclosed on FECO website	During the project implementation	The project budget
Consultation, workshops, etc.	Determine and finalize BAT/BEP for the NRP enterprises	Relevant male and female technicians and other employees of the NRP enterprises; Relevant associations; Relevant research institutes and/or universities	The NRP enterprises	The NRP enterprises or other suitable places	During the project implementation	The project budget
Train male and female employees of the NRP enterprises on the BATs/BEPs	Implement the BAT/BEP effectively and efficiently	All relevant male and female employees of the NRP enterprises	The NRP enterprises	TBD	During the project implementation	The project budget
Participation in development of training plans	Effectively develop training plans	Relevant male and female, Han and ethnic minority employees of the NRP enterprises	The NRP enterprises	TBD	During the project implementation	
Publicize the BAT/BEP to communities surrounding the NRP enterprises, to local schools and local government departments	Make the participants understand the BAT/BEP and the objective of reduction of UP-POPs and BFRs	Male and female residents living surrounding the NRP enterprises, boy and girl students of the local schools, male and female officials of the local government agencies	The NRP enterprises	The NRP enterprises	During the project implementation	The project budget
Consultation, workshop, etc.	Discuss and finalize management models of life cycle recycling of	Male and female technicians and other employees of the NRP enterprises;	The NRP enterprises	The NRP enterprises	During the project implementation	The project budget

Engagement methods	Objectives	Key Stakeholders being engaged	Main responsible agencies	Location for engagement or for info disclosure	Time	Resources
	waste lead-acid and waste li-ion batteries	Relevant associations; Relevant research institutions and/or universities				
Consultation, workshop, etc.	Discussion and finalization of life cycle recycling of waste lead-acid and waste li-ion battery	Male and female technicians and other relevant employees of the NRP enterprises; Relevant associations; Relevant research institutions, and universities; Male and female residents of the related waste battery collection sites	The NRP enterprises	The NRP enterprises; The related waste battery collection sites and/or the surrounding communities	During the project implementation	The project budget
Publicize the pilot life cycle recycling to general public on website, etc.	Raise general public awareness on people's behaviour of carelessly discard of waste batteries lead to release of UP-POPs and BFRs, and the negative impact of UP-POPs and BFRs on human health and environment	All people with willingness to understand recycling of waste batteries.	The NRP enterprises The collection departments of the NRP enterprises	Websites, blackboards, etc. of the NRP enterprises and the collection departments	During the project implementation	The project budget
Face-to-face propaganda	Enhance knowledge and awareness of residents surrounding the waste battery collection sites	Male and female residents (Han and other ethnicities) living surrounding the waste battery collection sites (usually within 500m)	Collection departments of the NRP enterprises'	The collection sites and/or the surrounding communities	During the project implementation	The project budget
People sell or give waste lead-acid and waste li-ion batteries to the collection sites	Increase collection rates of the waste batteries	People producing or having the waste batteries	The collection departments	The collection sites	During the project implementation	Cost of the collection department
Component 4: Project Monitoring, Evaluation and Knowledge Management						
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.						

Engagement methods	Objectives	Key Stakeholders being engaged	Main responsible agencies	Location for engagement or for info disclosure	Time	Resources
Outcome 4.2 Knowledge sharing and information dissemination Output 4.2.1 Knowledge products on best practices, experiences and lessons learned documented and shared nationally and internationally, including recycling and disposal knowledge on waste lead/lithium batteries and metal scrap.						
a) Participation in project monitoring						
Consultation with male and female employees of the demonstration and NRP enterprises	The male and female employees equally involved in the project progress monitoring	The project implementers in the demonstration and NRP enterprises	The project monitoring officer The demonstration and NRP enterprises	Internet, phone, WeChat, face-to-face interview, etc.	During the project implementation	The project budget
Consultation with male and female employees in the project related waste battery collection departments	The male and female employees equally involved in the project progress monitoring	Male and female employees in the project related battery collection department	The project monitoring officer The project related battery collection department	Internet, phone, WeChat, face-to-face interview, etc.	During the project implementation	The project budget
b) Mid-term review and terminal evaluation						
Consultation with relevant stakeholders	Evaluation done effectively	Key project stakeholders	The independent evaluation consultants	Suitable places and/or channels identified during the evaluation	During the evaluations	Project budget for M&E
Dissemination of the approved review/evaluation reports to broad public	Make the information accessible to broad public	Any interested individual and organization	GEF, UNDP, FECO	Disclosed on websites of the GEF, UNDP, the FECO	4 weeks after the evaluation reports finalized	Project budget for M&E
c) Information request procedure for broad public						
Publicizing contact details for information requests from public	Project non-confidential information accessible to public.	Any individual and organization interested in the project	PMU, relevant project agencies	Disclosed on websites of the project and/or FECO	Immediately after inception workshop	Project budget for communications
Public request information to the contacts by email or by written document	Project knowledge accessible to institutions or individuals	individual or organization requested project information	PMU, relevant project agencies	Emails or written documents to relevant project office / PAs	Any time during the project implementation	Project budget for communications
The Project's reply to the information requests	The requests were replied	individual and organization requested project information, relevant project	PMU, relevant project agencies	same way replying to the request	Within 2 weeks after received the request	Project budget for communications

Engagement methods	Objectives	Key Stakeholders being engaged	Main responsible agencies	Location for engagement or for info disclosure	Time	Resources
		agencies				
For all project activities: Grievance redress mechanism						
Step 1: affected people submit grievance if any to the contacts of demonstration enterprises or medical facilities	express grievance	People or organizations submitted grievance	Relevant demonstration agency	Written grievance	Any time during the project implementation	Project budget for M&E
Step 2: demonstration agencies address the grievance	Address grievance	People or organizations submitted grievance	PMU, relevant demonstration agency	Suitable ways	Two weeks after received the complaint	Project budget for M&E
Step 3: if dissatisfied, the affected people submit his/her grievance to the project PMU	Address grievance	People submitted grievance	PMU	Suitable ways	Two weeks after received the complaint	Project budget for M&E
Step 4: if still dissatisfied, the affected people can appeal to relevant administrative authorities	Address grievance	People submitted grievance	PMU, The administrative authorities	Suitable ways	Appliance with policies of the authorities	Appliance with policies of the authorities

118.The full report on the Stakeholder Engagement Plan is attached as Annex 8 of this project document.

South-south cooperation

119. In many low- and middle-income countries, many toxic hotspots associated with the unsafe recycling and smelting of waste metal scrap and used batteries can be found. This project's approach, if successful, can be replicated in many countries and some regions around the world. Results from the project will be crucial for future proposals in both the selected countries, and in Asia and other regions, including potential projects under GEF.

120. Because the dynamics of the recycling mode in particular for used batteries are not well understood, the recycling mode assessment proposed here for China is key to identifying what type of solutions and actions are feasible, practical and cost-effective. Conducting the analysis in China should provide a broad overview of the range of different types of challenges likely to be encountered globally, and will contribute greatly to addressing this issue in Asia.

Gender equality and Women's Empowerment:

121. From the perspective of project design, the project will undertake gender behaviors, attitudes and impact studies, conduct occupational health surveys and assessments with typical enterprises. The results have been incorporated as key aspects in the project design to strengthen corporate operational capabilities and enhance environmental awareness of personnel.

122. In line with the gender equality policies and strategies of both UNDP and the GEF, a Gender Mainstreaming Action Plan (GMAP) has been developed. The GMAP includes strategies and actions to promote women's and men's equal participation in, make contribution to, and benefit from the project which considers different roles, needs, priorities, power, and responsibilities of relevant women and men.

The Gender Mainstreaming Action Plan

Objective of the Gender Mainstreaming Action Plan

123. The objective of this GMAP is to ensure women and men equally and equitably participate in, benefit from, and make contribution to the project in a culturally adequate manner.

Methodology for Development of the Plan

124. This Gender Mainstreaming Action Plan was developed in accordance with the GEF Policy on Gender Equality (2018), GEF policy on Environmental and Social Safeguards (2019), GEF Policy on Public Involvement in GEF Projects (2012), and Guidelines for the Implementation of the Public Involvement Policy (2015); and UNDP Gender Equality Strategy 2018-2021, UNDP Social and Environmental Standards (2021), the UNDP Guidance Note on Gender Analysis, etc.

125. The plan was developed based on review of relevant project documents, research papers, consultation with the project's Project Management Unit (PMU), the project implementing agency, visits of seven enterprises including Tianneng Group Company and Chaowei Group Company in Changxing County of Zhejiang Province, Huayou Cobalt Group Company in Tongxiang City of Zhejiang Province, Ao-long Company in Shandong Province, GEM Group Company in Wuxi City of Jiangsu Province, Xinlian Group Company and Xiangyun Group Company in Yunnan Province, communicated with male and female employees of the enterprises, surveys on labor division of the enterprises, etc.

Gender Analysis

Gender Situation

Gendered POPs Impact

126. Persistent organic pollutions (POPs) are considered as the silent killers due to their bio-accumulative and long persistent natures. POPs are not only hazardous to our ecosystem and ecological equilibrium but also lead to various health issues affecting the human population worldwide. The different diseases due to POPs are endocrine disturbance, cancer, cardiovascular, reproductive, etc.[37]. Fundamentally, the health consequences of POPs in females are confounded and dictated by biological factors such as menarche, pregnancy, lactation and menopause.

[37] https://www.sciencedirect.com/science/article/abs/pii/S0167732218321135

Some effects were more pronounced in women. Women are thought to be at greater risk for developing cardiovascular disorders as a consequence of symptoms of the metabolic syndrome as opposed to men[38].

127. A setback of menopause is the reduction in estrogen levels, making women more vulnerable to osteoporosis, and some dioxin-like PCBs have been found to exacerbate bone weakness in postmenopausal women[39]. Positive associations between risk for developing breast cancer and exposure to pollutants including PCBs, PFCs and dioxin-like chemicals. Han women from Northern China showed an association between PCBs, DDE and PAHs with polycystic ovary syndrome.[40] POPs affect sexual function and fertility in adults, as well as developmental toxicity in offspring and current levels of POPs in women can also impact future generations. Exposure to POPs affect fertility and reproductive health in especially women. Exposure to POPs is also unfavorable to fetal growth and development bearing in mind the inept metabolism, organ development and rapid growth during this stage[41]. Exposures to POPs such as PCBs, dioxins and DDT at levels that are higher than the average exposure levels of the general population may possibly have long-term impact on cognitive function in children[42].

128. The above studies indicate that females especially occupational female workers need more knowledge related to UP-POPs and skills and measures that protect them from exposure to UP-POPs in the project.

Gender Situation in the PRC in General

129. The People's Republic of China (the PRC) recognizes the importance of gender equality and devotes great efforts on promoting gender quality since its founding in 1949. Significant advances in gender equality have been made since 1949. Gender equality is currently the basic state policy. Legally, women and men have equal social, political, and economic rights. Despite this progress, however, gender inequality in practice persist in various forms such as disparity in women's political representation and participation. According to the World Economic Forum issued Global Gender Gap Report 2020, gender gaps in economic participation and opportunity, political empowerment including management and decision making were still big in the PRC.

130. **Global Gender Gap Index**. It is known from the World Economic Forum (WEF) - Global Gender Gap Reports-2020 that China's rank of Global Gender Gap Index went down from 63rd in 2006 to 106th in 2019. There was a huge gender gap in economic participation and opportunity such as legislators, senior officials and managers, and the political empowerment such as women in managerial positions. Female legislators, senior officials and managers were much less than male ones and women in managerial position was also much less than male ones (*Figure 1*). This implies that efforts to promote gender equality especially in these areas during the project implementation is needed and women's inclusion in the project decision making is necessary. It is also important to fully consider women's situation in the relevant project related policies development.

131. **Participation in trainings**. Women usually have less employment opportunities and less access to technical trainings. For example, Table 13 presents situation of employment and technical training in Yunnan Province in 2018. In all aspects listed in the table, employment, skilled workers, participation in technical training, women's proportions were less than 50%.

[38] Bentley-Lewis R, Koruda K, Seely EW. The metabolic syndrome in women. Nature Clinical Practice. Endocrinology & Metabolism 2007; 3 (10):696–704.

[39] Paunescu AC, Dewailly E, Dodin S, Nieboer E, Ayotte P. Dioxinlike compounds and bone quality in Cree women of Eastern James Bay (Canada): a cross-sectional study. Environmental Health 2013; 12(1):54.

[40] Yang Q, Zhao Y, Qiu X, Zhang C, Li R, Qiao J. Association of serum levels of typical organic pollutants with polycystic ovary syndrome (PCOS): a case-control study. Human Reproduction. 2015; 30(8):1964-73.

[41] Eskenazi B, Bradman A, Castorina R. Exposures of children to organophosphate pesticides and their potential adverse health effects. Environmental Health Perspectives 01 June 1999; 107(Suppl3):409-19.

[42] Thundiyil JG, Solomon GM, Miller MD. Transgenerational exposures: persistent chemical pollutants in the environment and breast milk. Pediatric Clinic North America 2007; 54(1):81-101, ix.

Table 13: Employment and Training Participation by Gender in Yunnan in 2018

	Women （%）
Employees	45.1
Employees in urban institutions	37.5
Employees in State-owned institutions	37.2
Newly added skilled laborers	40.3
Rural laborers with practical skills	40.2
Farmer participation in farming training	38.6
Farmer participation in non-farming training	33.0

OU, X. China Women's News. http://www.cnwomen.com.cn/2019/12/17/99185274.html

132. **Labor force participation**: data from the fifth and sixth National Population Censuses show that although the labor force participation (LFP) rates of both men and women were declining, women's LFP rate was declining with a faster pace. The LFP rate has been falling for both women and men, but the gender gap in the LFP rate has been increasing since 2000[43]. Since the market-oriented economic reforms, Chinese women's LFP rate has declined. Especially after the privatization of state-owned enterprises in the 1990s, women's LFP rate dropped by a large margin. Women have far fewer job opportunities than men in the labor market[44]. This implies that the project needs pay great attention to women workers displaced due to the project.

133. **Gender inequality in textbooks**. Since 1987 when De Zhang and Wenyan Hao criticized the gender-discrimination in the textbooks for primary school students in China[45], the gender disparities still exist in the textbooks for over 30 years, which were mainly related to unequal pictures, occupations, actors of stories, personality and capacity of the actors etc.[46] Gender inequality negatively affected primary school students' knowledge and values of gender, and deteriorated gender stereotypes. While gender equality in textbooks for primary school and junior middle school students can play an important role in raising awareness and increase correct knowledge on gender equality[47]. The studies remind that dissemination of the project experience needs to be gender sensitive.

134. **Gender inequality in films**. Hongyun Zhang criticized that many films emphasized women's appearance and women's role as good mother while did not pay enough attention to women's rights, independency, confidence, and career development. Gender-discrimination in film reinforced traditional norms and values of "women are inferior to men", and "subordination of female to male"[48]. An investigation[49] on 800 films in America between 2007 and 2015 shows that females are still noticeably absent on-screen in film. Among the 35,205 speaking characters on-screen[50], less than a third of all roles go to girls and women (Figure 2). This implies that film to publicize the project experience and raise public awareness on UP-POPs need to include more women on-screen, and more stories with women in the center. Storytelling is important, but stories usually do not give women the same opportunities to appear.

[43] Bohong Liu, etc. Gender Equality in China's Economic Transformation, a report, UN Women, 2014.

[44] Id.

[45] De Zhang, Wenyan Hao. An important issue in the textbook for primary school [J]. Modern Primary Education. 1987 (02): 91-94 (in Chinses).

[46] Meihong Huang. Gender roles in textbook for primary school [J]. Journal of Educational Development. 2017 (02): 54-58 (in Chinese)

[47] Xianzheng Huang. Gender in the textbook for primary schools. Education and Teaching Study. 2017, 31(04): 101-107 (in Chinese)

[48] Hongyun Zhang, Analysis on gender discrimination in film. Movie Review. 2007(02) (in Chinese).

[49] https://www.bilibili.com/video/av21294159

[50] A character has to do is say one word.

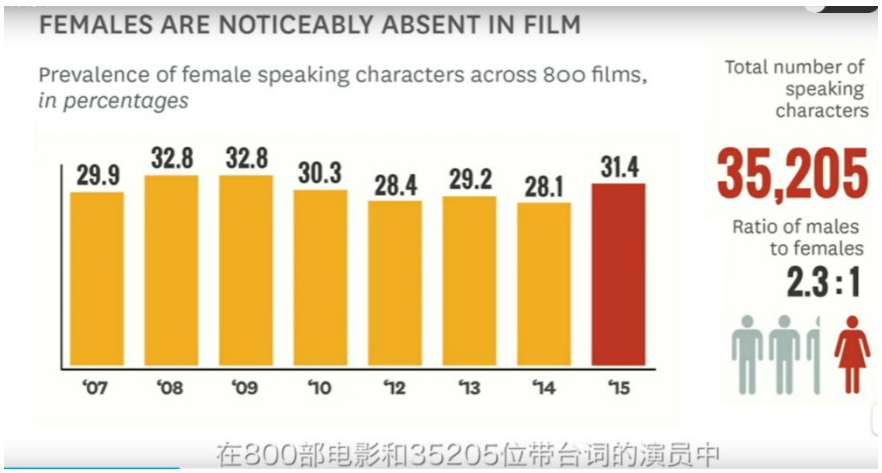


Figure 1: Females are noticeably absent in film



Figure 2: Gender Gap in China 2019

Gender gaps and potential gendered impacts

135. It is known from above analysis on gender situation in China, in manufacture sector, and in the visited enterprises, that gender disparities are mainly in the managerial positions and decision-making. There are less women in the management positions, and more women are engaged in the frontline work. Women continue to face challenges in equal and equitable accessing to training, participation, and decision making due to traditions, cultural norms, etc.

136. Without adequately and appropriately narrowing down or eliminating the gender gaps and taking effective gender-responsive measures in the design and the implementation of the project, women would be continually with limited access to trainings, decision making, and other benefits and services, which are most relevant to GEF project.

Gender-responsive theory of change

137. Women account for a certain share of employees in the secondary production of non-ferrous metal and collection areas of the waste lead-acid and li-ion batteries. Women on one hand are susceptible to pollution of the UP-POPs and BFRs during the secondary production of non-ferrous metal, meanwhile, as employees, they are also agents to make contribution to reduce or eliminate emission of UP-POPs and BFRs. By participating in the project design and implementation such as training, management, and decision-making, women employees will not only be less exposed to pollution of the UP-POPs and BFRs through their enhanced relevant knowledge and skills, and more important is that they can make efforts and contribute their ideas, thoughts and potential to reduce emission of up-POPs and BFRs.

138. Equal involvement of women in the project consultation and decision-making can greatly facilitate equal and equitable opportunities for women to express themselves, to voice their needs, priorities, ideas, and opinions, and equally and equitably integrate women's concerns in the project design and implementation, which will lay a foundation for the project to develop and take culturally-appropriate and responsive measures to minimize or eliminate barriers to women's engagement and to maximize women's contribution to the project. Meanwhile, it also equally and equitably benefits women.

139. Women's equal engagement in selection of the best available techniques (BAT) and/or best environmental practices (BEP) related to the project and the project will enhance the technical innovation efficiency and effectiveness and minimize UP-POPs and BFRs emission accordingly. Women's equal participation in training on UP-POPs and BFRs related knowledge and trainings on techniques of eliminating UP-POPs and BFRs related emission will protect themselves from exposure to UP-POPs and BFRs as well as protect environment and the surrounding communities from UP-POPs and BFRs impact. Promoting more women to the management position can take full use of women's potential, can encourage more women to make great efforts to their work and make more contribution to the project and the enterprises. Equal and equitable training of women will empower women technically, and enable women to work with confidence. Engaging more women in the project-related decision making and equal training women technically is not only women's rights. Integrating women's perspective into the project decision-making will also greatly make contribution toward project's social, economic and environmental impacts, and make the project results sustainable.

Barriers to Women's Engagement

140. Traditional values and norms that men are major bread-earners and women's responsibilities focus on domestic things and women take easier work are barriers to women workers' equally being included in corporate management and decision-making. Some actions are proposed in the Gender Mainstreaming Action Plan (GMAP) to overcome the barriers and facilitate women's equal and equitable participation in decision-making such as the selection of BAT/BPT, and technical trainings.

Gender Mark

141. The project has potential to generate outputs that greatly advance gender equality, and further make contribution to realize the project results and objective. According to the UNDP gender marker definition, gender mark of the project is GEN2.

Table 14: UNDP Gender Marker

UNDP Gender Marker	Coding Definition
0 (GEN0)	Outputs that are 'not expected to contribute noticeably' to gender equality
1 (GEN1)	Outputs that will contribute 'in some way' to gender equality, but not significantly
2 (GEN2)	Outputs that will make 'significant' contribution to gender equality
3 (GEN3)	Projects/outputs that have gender equality as a 'principal' objective

Consistency with UNDP and GEF Policies and Strategies

142. UNDP prioritizes gender mainstreaming as the main strategy to achieve gender equality. Faster progress is achieved in reducing gender inequality and promoting women's empowerment is one of the six signature solutions proposed in the UNDP Strategic Plan 2018-2021. Development of this Gender Mainstreaming Action Plan (GMAP) is in line with the UNDP Strategic Plan. Development of the GMAP follows the core operation principle of strengthening its focus on gender mainstreaming and women's empowerment of the GEF, and is in accordance with the GEF policy on Gender (2018) that requires all GEF Partner Agencies to have established either (a) policy, (b) strategies, or (c) action plans that promote gender equality.

143. The action plan will facilitate gender equality in terms of participation in the project design, project training with full expression of women's perspective and needs, selection of the BAT/BEP, equally and equitably inclusion in technical training, and promotion more women as managers, and/or moving more women up as middle or senior managers. Inclusion of gender-sensitive indicator in the project results framework is one of the requirements of UNDP Gender Strategy for 2018-2021. Women's equally participation in the project design, implementation and monitoring and evaluation is the requirement of GEF policy on public involvement.

Analysis of the Project Implementing Partner's Capacities

144. The project implementing partner, FECO of the Ministry of Ecology and Environment of the PRC (MEE), has implemented a number of international development projects including UNDP-GEF projects, for example, project of UP-POPs Reduction through BAT/BEP and PPP-based Industry Chain Management in Secondary Copper Production Sector in China. The agency has high capacity and experience in taking appropriate consideration of gender in implementation of the national replication plan.

145. It was known from the field survey that not all the surveyed enterprises have experience in implementing GEF/UNDP project, which implies that the demonstration enterprises and NRP enterprises selected for implementing this project may not have enough knowledge on GEF/UNDP gender policies and gender requirements. It is recommended that the project provide gender training on GEF/UNDP gender policies and requirements, and methods and skills to facilitate gender mainstreaming and empowerment of women and girls to all the demonstration and NRP enterprises during the project implementation.

Gender Mainstreaming Strategies and Action Plan

Gender Mainstreaming Strategies

146. Recognized differences between positions, roles, employment, education, age, and involvement in decision-making of men and women, the project will adopt the following strategies to not only avoid deteriorating gender inequality, but to promote gender equality in an inclusive manner and apply gender-responsive approach:

(i) Inclusion adequate women employees in the project decision making process and the BAT/BEP selection processes;

(ii) Promotion of more women employees to management positions including being middle and senior managers;

(iii) Ensuring all the displaced women and men to be appropriately resettled;

(iv) Making sure the project results dissemination materials be gender sensitive;

(v) The project publicity targets proportionally toward relevant women and girls; and

(vi) Collection of sex-disaggregated data wherever relevant.

Gender mainstreaming action plan

147. While general gender mainstreaming strategies will apply across all interventions at the demonstration and the replication enterprises, the following specific actions are proposed in order to highly empower women and promote gender equality. The plan was developed to ensure that the principles of gender equality are firmly embedded in activities undertaken by the project in line with applicable GEF and UNDP gender policies. The proposed actions are presented in **Error! Reference source not found.**.

Table 15: Gender Mainstreaming Action Plan

Action Areas	Proposed Actions	Indicators	Completion Targets	Baselines	Responsible agencies	Timeline	Cost and budget
Component 1: Strengthening the national policy and regulatory framework to reduce UP-POPs and BFRs releases from secondary non-ferrous metal industry.							
Outcome 1.1 Reduced UP-POPs and BFRs releases resulting from unsound metal scrap and batteries recycling management practices through the adoption and implementation of standards/measures, policies, plans, laws, regulations and guidance. Output 1.1.1 Policy and regulatory framework for metal scrap management developed, revised and improved and relevant components integrated into the existing policy and regulatory framework. Output 1.1.2 Technical by-laws, regulations and guidance aiming to reduce UP-POPs and BFRs release from batteries manufacturing, recycling and disposal practices developed, adopted and implemented. Output 1.1.3 Barriers to BAT/BEP and Extended Producer Responsibility (EPR) implementation removed through e.g., the institution of economic instruments and incentives							
Decision making group	Inclusion of adequate women in the project management committee	# of woman in the decision-making group	At least one woman in the decision-making group	0	PMU	2023-2028	No extra cost
Component 2: Reduction of UP-POPs and BFRs releases from unsound metal scrap and batteries recycling.							
Outcome 2.1 Reduced releases of UP-POPs and BFRs as a result of improved raw material (recycled metal scrap and batteries) supply chains as well as the introduction of environmentally sound disposal practices and extended producers responsibility at recycling entities. Output 2.1.1 Assessment of existing collection systems completed, and appropriate collection schemes established, feasible logistical arrangements, including proper acceptance and outbound material criteria. Output 2.1.2 Supply chains for local markets further developed, recycling rates increased and maximum quantities of recyclable plastic parts diverted from inadequate disposal. Output 2.1.3 Two demonstration projects implemented to demonstrate BAT/BEP and life cycle recycling in the collection and conditioning of waste batteries (one in lead acid batteries and one in li-ion batteries), applying proper management of hazardous waste generated in the whole process. Outcome 2.2 Prevent and minimize the generation of UP-POPs in the secondary metallurgical processes. Output 2.2.1 Assessment of secondary metallurgic production processes and technologies finalized. Output 2.2.2 Two demonstration projects implemented to demonstrate BAT/BEP in the secondary production of metals (one in aluminum and one in zinc)							
Introduction of BAT/BEP	Equal inclusion of women in the BAT/BEP selection processes	# and % of women in the BAT/BEP selection processes	At least 15% women in the BAT/BEP selection processes	0	The demonstration enterprises	Beginning of the project implementation	No extra cost
The project displaced employees	Appropriate job relocation of all the project displaced women and men employees	# of employees displaced due to the project, # of displaced employees appropriately resettled with sex-disaggregation	All male and female employees displaced are appropriately resettled, either adjusted to other posts in the enterprises together with relevant training or in other ways	0	The demonstration enterprises	2023-2028	The demonstration enterprises' budget
The project training	♦ Equal and equitably participation of female and male employees of waste	# and % of women employees trained	For secondary nonferrous production:	0	The demonstration enterprises	2023-2028	No extra cost

Action Areas	Proposed Actions	Indicators	Completion Targets	Baselines	Responsible agencies	Timeline	Cost and budget
	battery collection and nonferrous metal recycling in planning the project training, including trainees, training contents, time locations etc., ♦ Training contents include specific job-skills and relevant knowledge on, impact of, and controlling measures of UP-POPs and BFRs ♦ Equal and equitable training of women employees especially the project displaced and those involved in collection of waste lead-acid and/or li-ion batteries through selecting training time and location suitable to women.	# and % of women employees the project displaced trained # and % of women involved in collection of waste lead-acid and/or li-ion batteries trained	♦ At least 20% of employees participated in the project training planning will be women, ♦ At least 20% of trained employees will be women, ♦ All women displaced by the project will be trained, For waste battery collection, ♦ At least 10% of employees participated in the project training planning will be women, ♦ At least, 10% of trained employees will be women. For both: ♦ Training contents covering relevant knowledge on, impact of, and controlling measures to UP-POPs and BFRs				
The project related management positions	Promotion of more women to management positions related to the project	Additional women managers promoted during the project implementation	At least one female employee promoted to management position or to higher management positions in each of the demonstration enterprises	0	The demonstration enterprises	2023-2028	No extra cost
Protection of employees from occupational diseases	Protection of employees from the project related occupational hazards	Protection measures	All female and male employees working in the areas with risks of exposing to UP-POPs or BFRs took protection measures	100%	The demonstration enterprises	2023-2028	Cost of the demonstration enterprises
	Keep occupational health check system for all male and female employees	♦ Historical records/files of female employees, especially those with occupational disease kept, ♦ Follow-up actions to the employees with occupational disease	100% of female employees having occupational diseases will be followed up with appropriate measures	100%	The demonstration enterprises	2023-2028	Cost of the demonstration enterprises
Component 3: Implementation of a National Replication Programme.							
Outcome 3.1 Replication and Promotion of demonstration results and experience.							

Action Areas	Proposed Actions	Indicators	Completion Targets	Baselines	Responsible agencies	Timeline	Cost and budget
Output 3.1.1 A national replication plan of sustainable recycling and green production developed. Output 3.1.2 Results of the implemented demonstration project published and disseminated for replication. Outcome 3.2 Promotional events for stakeholders, including awareness raising delivered. Output 3.2.1 Technical training for stakeholders and awareness raising workshops developed and implemented. Output 3.2.2 Awareness raising materials formulated and distributed							
	Preparation of publicity brochures or manuals with gender sensitive	Gender-sensitive brochures	• At least 30% pictures with people including females	0	PMU, The consulting agency	Around completion of the project demonstration	Project budget
Promotion and dissemination of experience and achievements of secondary metallurgical processes and the battery collection and recycling	Through internet, WeChat, face-to-face, etc., the project conducts online and/or offline training equally to male and female employees and managers in the NRP enterprises and the waste battery life cycle recycling system.	Sex-disaggregated trainees	• At least 20% of employees of the project NRP enterprises trained will be women • Females in the battery collection area proportionally trained.	0	The NRP enterprises	During the project demonstration	Project budget
National replication plan	More women will be involved in the BAT/BEP selection processes of the replication enterprises	Women in the BAT/BEP selection processes	• At least 20% women in the BAT/BEP selection processes	0	The NRP enterprises	During the NRP implementation	No extra cost
	Ensure appropriate job relocation of all the project displaced women and men employees	Employees displaced due to the NRP implementation Displaced employees appropriately resettled with sex-disaggregation	• All male and female employees displaced are appropriately resettled, either adjusted to other working posts in the enterprises together with relevant training or in other ways	0	The NRP enterprises	During the NRP implementation	The NRP enterprises
	Women employees will be equally involved in the training planning and be trained for implementing the NRP Training contents include more UP-POPs-AKHPM, and specific job-skills	# and % of women employees participated in developing the training plan # and % of women be trained during the implementation of the NRP	• At least 20% of employees participated in training planning are women, • At least 20% of employees trained in the NRP enterprises will be women, • Training contents covering UP-POPs and BFRs.	0	The NRP enterprises	During the NRP implementation	The NRP budget

Action Areas	Proposed Actions	Indicators	Completion Targets	Baselines	Responsible agencies	Timeline	Cost and budget
	Protection of employees from occupational hazards	Protection measures	• All female and male employees working in the areas with risks of exposing to UP-POPs or BFRs took protection measures				
	Keeping occupational health check system for the male and female employees	• Historical records/files of male and female employees, especially those with occupational disease kept • Follow-up actions to the employees with occupational disease	• 100% of male and female employees having occupational diseases will be followed up with appropriate treatment measures	100%	The NRP enterprises	During the NRP implementation	The NRP enterprise cost
	Public awareness raising on environment will be gender-sensitive	# and % of females in the general public promoted	• Around 50% of public promoted will be women	0	The NRP enterprises	During the NRP implementation	NRP budget
Component 4: Project Monitoring, Evaluation and Knowledge Management							
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. Outcome 4.2 Knowledge sharing and information dissemination. Output 4.2.1 Knowledge products on best practices, experiences and lessons learned documented and shared nationally and internationally, including recycling and disposal knowledge on waste lead/lithium batteries and metal scrap.							
Timing and quality of annual (APRs, PIRs etc.) and M&E reports	Inclusion of key indicators of this GMAP implementation situation in the annual and M&E reports	Sex-disaggregated data in the reports	• Sex-disaggregated trainees • Sex-disaggregated general public promoted/reached • Other key targets in this GMAP	0	PMU	During the project implementation	Project budget
Knowledge products and promotional materials.	Ensuring the project knowledge production and promotion materials to be gender-sensitive	Gender-sensitive knowledge production and promotion materials	• Gender-sensitive languages, • At least 30% of pictures showing people include women • At least 20% good employee cases if any showcasing women	0	PMU, Relevant consulting agency	During the project implementation	The project budget
For all the project activities							
Gender focal points	The demonstration and NRP enterprises appoint gender focal points	# of gender focal points	Each demonstration enterprise and each NRP enterprise appoint one staff as gender focal point	0	The enterprises	During the project implementation	No extra cost

Action Areas	Proposed Actions	Indicators	Completion Targets	Baselines	Responsible agencies	Timeline	Cost and budget
Sex-disaggregated data	Collection of sex-disaggregated data	Sex-disaggregated data	All the data disaggregated by sex wherever appropriate	0	The enterprises	In the beginning of the demonstration or the NRP project implementation	No extra cost
	Inclusion of sex-disaggregated indicator in the project results framework	Sex-disaggregated indicator	At least the project direct beneficiaries be sex-disaggregated	0	PPG team	During the project preparation	No extra cost

Innovativeness, Sustainability and Potential for Scaling Up:

148. A package of solutions addressing the green production, chemicals control and green recycling of those typical secondary sectors is very imperative in China's context to safeguard the environment, human health and the sustainable development of the society. This project not only focuses on the industry's green production model, but also focuses on raw material recovery and economic incentives. This will significantly reduce the generation and release of dioxins, heavy metals and other pollutants from the source.

149. In addition, China is currently the world's largest scrap metal procurement market. As the "One Belt and One Road" (Belt and Road Initiative - BRI) strategy is favorable and domestic labor costs continue to rise, some companies have gradually shifted some of their primary dismantling operations and equipment to surrounding "Belt and Road" countries. Raw material sorting, primary processing, and then returned to the domestic market in the form of products. Therefore, the smooth development of this project also has a good demonstration and promotion significance for neighboring countries.

150. The Government of China is committed to implement the Stockholm Convention and the reduction of POPs.

151. The non-ferrous metals sector is one of the six key industrial sectors targeted for POPs control. It will provide initiatives to mainstream the objectives of the Stockholm 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.

152. In addition to the strong commitment from the Government, the project will innovate the approaches in these sectors by strengthening capacities 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.

153. The project does not only yield environmental and economic benefits for sectoral enterprises participation. Through raising production effectiveness and reducing manufacturing inputs, it will generate lower production costs and provide a positive incentive for enterprise to participate. Concomitant reductions in UP-POPs and BFRs emissions and releases bring the environmental benefits sought by the wider community.

154. It is expected that the plant size with output over 50,000 tons and 10,000 tons would be the appropriate enterprises to be selected for the demonstration activities in secondary aluminum and zinc, respectively. It is anticipated that demonstration activities undertaken at the two pilot plants will yield a reduction of UP-POPs releases of 16.125 g TEQ/a totally.

155. With the NRP, the project will promote BAT/BEP in dioxin emission reduction for about 10-12 companies in the industries (SAl and SZn), with 161.25 g TEQ/a UP-POPs reduction. The total emission reduction of the demonstration enterprises and the promoted NRP are estimated to be 177.375 g TEG/a. According to the 2-year operation period (the fourth and fifth year of implementation), the total emission reduction of the project is 354.75 g TEQ.

156. In addition, the project will timely summarize the achievements of BAT/BEP demonstration and NRP, as well as good technology and management experience, and apply them to the formulation of policy standards and the writing of policy recommendations, so as to contribute to the continuous emission reduction of dioxin and other pollutants in China's secondary non-ferrous metal industry through the promulgation and implementation of policy standards.

157. Alternative technologies demonstrated will generate knowledge and experience that will be shared through a systematic approach, with a series of promotional and public awareness activities to encourage and attract enterprises to participate. Environmental sustainability is ensured through the national replication efforts that will lead to achievements of environmentally sound management of chemicals and wastes at all enterprises in the industry.

158. The project will also continue to promote the upgrading and innovation of pollution prevention and control technology in China's secondary non-ferrous metal industry through various conference propaganda, preparation of publicity materials and books, etc., constantly expand the scope of influence of the project, and strive to maximize the project results and benefits.

159. In many low- and middle-income countries, many toxic hotspots associated with the unsafe recycling and smelting of waste metal scrap and used batteries can be found. This project's approach, if successful, can be replicated in

developed countries and some regions around the world. Results from the project will be crucial for future proposals in both the selected countries, and in Asia and other regions, including potential projects under GEF.

160. Developed countries has mature recycling system on the lead acid battery. Recycling rate of lead acid battery is quite high. Metal recycling rate is also higher than China. International exchange of the experiences are important. As the dynamics of the recycling mode in particular for used batteries are not well understood, the recycling mode assessment proposed here for China is key to identifying what type of solutions and actions are feasible, practical and cost-effective. Conducting the analysis in China should provide a broad overview of the range of different types of challenges likely to be encountered globally, and will contribute greatly to addressing this issue in developed countries.

VI. PROJECT RESULTS FRAMEWORK

This project will contribute to the following Sustainable Development Goal (s): 3 good health and well-being; 5 gender equality; 8 decent work and economic growth; and 9 industry, innovation and infrastructure.

This project will contribute to the following country outcome (UNDAF/CPD, RPD, GPD): United Nations Sustainable Development Cooperation Framework (2021-2025) Outcome 3: People in China and the region benefit from a healthier and more resilient environment.

UNDP Country Programme Document for China (2021-2025), Pillar 2 (A healthier planet and resilient environment), Output 2.1: Adaptive policies developed at target level (subnational), financed and applied for nature-based systems to align with multilateral agreements and transboundary platforms.

	Objective and Outcome Indicators (no more than a total of 20 indicators)	Baseline[51]	Mid-term Target[52]	End of Project Target
Project Objective: Reduce and eliminate UP-POPs (PCDD/Fs, HCB and PCNs) and Brominated flame retardants (BFRs) releases through the introduction of BAT/BEP in the Secondary Aluminum and Zinc production, and implementation of a life cycle management in Lead acid battery and Lithium ion battery recycling in China	**Mandatory** GEF Core Indicator 11 Indicator 1: # direct project beneficiaries disaggregated by gender (individual people)[53]	0 direct project beneficiary	50,000 direct project beneficiaries (25,000 female, 25,000 male); 100,000 indirect project beneficiaries (50,000 female, 50,000 male)	100,000 direct project beneficiaries (50,000 female, 50,000 male); 300,000 indirect project beneficiaries (150,000 female, 150,000 male)
	Mandatory GEF Core Indicator 9 Indicator 2: Quantity of UP-POPs reduction at the demonstration locations	None	7.5 g TEQ dioxin in two demonstration enterprises reduced through BAT/BEP demonstration in project period	32.25 g TEQ dioxin in two demonstration enterprises reduced through BAT/BEP demonstration and 322.5 g TEG dioxin reduction through the NRP, for the total amount of 354.75 g TEQ for a two year operation period
	GEF Core Indicator 6: Indicator 6.2: Quantity of CO_2 emission avoided by the demonstration enterprises and National Replication Programme (NRP)	None	Through BAT/BEP demonstration, reducing CO2 emission by 4,752.6 t	Through BAT/BEP demonstration and NRP, comprehensive energy consumption will be reduced from 1,200 kgce/t to 1,122 kgce/t, reducing CO_2 emission by 52,278.6 t/a
	Indicator 3: Number of new technologies demonstrated	None	At least 1 BAT/BEP key technologies demonstrated to meet pollution control standards	At least 2 BAT/BEP key technologies demonstrated to meet pollution control standards
	Indicator 4: Number of battery recycling mode	None	At least 1 battery recycling mode	At least 2 battery recycling modes

[51] Baseline, mid-term and end of project target levels must be expressed in the same neutral unit of analysis as the corresponding indicator. Baseline is the current/original status or condition and needs to be quantified. The baseline can be zero when appropriate given the project has not started. The baseline must be established before the project document is submitted to the GEF for final approval. The baseline values will be used to measure the success of the project through implementation monitoring and evaluation.

[52] Target is the change in the baseline value that will be achieved by the mid-term review and then again by the terminal evaluation.

[53] Provide total number of all direct project beneficiaries expected to benefit from all project activities until project closure. Separate the total number by female and male. This indicator captures the number of individual people who receive targeted support from a given GEF project and/or who use the specific resources that the project maintains or enhances. Support is defined as direct assistance from the project. Direct beneficiaries are all individuals receiving targeted support from a given project. Targeted support is the intentional and direct assistance of a project to individuals or groups of individuals who are aware that they are receiving that support and/or who use the specific resources.

Project component 1	**Strengthening the national policy and regulatory framework to reduce UP-POPs and BFRs releases from secondary non-ferrous metal industry**			
Project Outcome[54] 1.1 Reduced UP-POPs and BFRs releases resulting from unsound metal scrap and batteries recycling management practices through the adoption and implementation of standards/measures, policies, plans, laws, regulations and guidance	Indicator 5: Number of technical standards finalized	No specific technical standard document available for collection, logistics, pre-treatment, material recovery and hazardous waste disposal	At least 2 technical standard documents finalized	At least 4 technical standard documents finalized
	Indicator 6: Effectiveness of policy implementation	Lack of specific laws and regulations directed to environmentally sound management of the secondary metal industry	At least 1 evaluation report on effectiveness of existing policy implementation and suggestions for improvement	At least 2 evaluation reports on effectiveness of existing policy implementation and suggestions for improvement. At least 5 policy drafts on secondary metal management
Outputs to achieve Outcome 1.1 Output 1.1.1 Policy and regulatory framework for metal scrap management developed, revised and improved and relevant components integrated into the existing policy and regulatory framework, (e.g. national standards on max. chloride content, technical specification for waste battery recycling and dismantling focusing on hazardous waste management.) Output 1.1.2 Technical by-laws, regulations and guidance aiming to reduce UP-POPs and BFRs release from batteries manufacturing, recycling and disposal practices developed, adopted and implemented. Output 1.1.3 Barriers to BAT/BEP and extended producer responsibility implementation removed through e.g. the institution of economic instruments and incentives.				
Project component 2	**Reduction of UP-POPs and BFRs releases from unsound metal scrap and batteries recycling**			
Outcome 2.1 Reduced releases of UP-POPs and BFRs as a result of improved raw material (recycled metal scrap and batteries) supply chains as well as the introduction of environmentally sound disposal practices and extended producers responsibility at recycling entities	Indicator 7: Battery recycling demonstration models in waste lead-acid battery	None	At least 1 waste LAB recycling pilot program initiated	At least 1 feasible waste LAB recycling model established
	Indicator 8: Battery recycling demonstration models in waste lithium ion battery	None	At least 1 waste LIB recycling pilot program initiated	At least 1 feasible waste LIB recycling model established
Outputs to achieve Outcome 2.1 Output 2.1.1 Assessment of existing collection systems completed, and appropriate collection schemes established, feasible legislative arrangements, including proper acceptance and outbound material criteria. Output 2.1.2 Supply chains for local markets further developed, recycling rates increased and maximum quantities of recyclable plastic parts diverted from inadequate disposal. Output 2.1.3 Two demonstration projects implemented to demonstrate BAT/BEP and life cycle recycling in the collection and conditioning of waste batteries (one in lead acid batteries and one in lithium ion batteries), applying proper management of hazardous waste generated in the whole process.				
Outcome 2.2 Prevent and minimize the generation of UP-POPs in the	GEF Core Indicator 10 Indicator 9: BAT/BEP demonstration in SAl sectors	None	At least 1 BAT/BEP technical routes established	AT least 1-2 BAT/BEP demonstration plants implemented

[54] *Outcomes are medium term results that the project makes a contribution towards, and that are designed to help achieve the longer-term objective. Achievement of outcomes will be influenced both by project outputs and additional factors that may be outside the direct control of the project.*

secondary metallurgical processes	GEF Core Indicator 10 Indicator 10: BAT/BEP demonstration in SZn sectors	None	At least 1 BAT/BEP technical routes established	At least 1-2 BAT/BEP demonstration plants implemented
Outputs to achieve Outcome 2.2 Output 2.2.1 Assessment of secondary metallurgic production processes and technologies finalized. Output 2.2.2 Two demonstration projects implemented to demonstrate BAT/BEP in the secondary production of metals (one in aluminum and one in zinc).				
Project component 3	**Implementation of a National Replication Programme (NRP)**			
Outcome 3.1 Replication and Promotion of demonstration results and experience	Indicator 11: National replication plan	None	National replication plan incorporating experience gained developed	National replication plan incorporating lessons learned implemented
	Indicator 12: Promotion plan design and implementation	None	BAT/BEP integrated into development plan of secondary metal project	Dismantling and smelting enterprises designed and implemented.
Outputs to achieve Outcome 3.1 Output 3.1.1 A national replication plan of sustainable recycling and green production developed. Output 3.1.2 Results of the implemented demonstration project published and disseminated for replication.				
Outcome 3.2 Promotional events for stakeholders, including awareness raising delivered	Indicator 13: Knowledge products and promotion materials	None	1 Knowledge products based on lessons learned developed and disseminated	3 Knowledge products developed and disseminated to promote demonstration results
	Indicator 14: Training and promotional activities	None	5 Training sessions, promotion and public awareness activities conducted	10 Training sessions, promotion and public awareness activities conducted
Outputs to achieve Outcome 3.2 Output 3.2.1 Technical training for stakeholders and awareness raising workshops developed and implemented. Output 3.2.2 Awareness raising materials formulated and distributed.				
Project component 4	**Project Monitoring, Evaluation and Knowledge Management**			
Outcome 4.1 Project monitoring and evaluation	Indicator 15: Timing and quality of annual (APRs, PIRs etc.) and M&E reports	Indicative M&E plan, budget and timeframe	M&E activities implemented as scheduled and on budget, project implementation monitored to achieve project objectives	M&E activities implemented as scheduled and on budget, project implementation monitored to achieve project objectives
	Indicator 16: Quality appraisal in Mid-Term Review and Terminal Evaluation	None	Matters identified for adaptive management	Adaptive management undertaken and project's effectiveness and achievements evaluated
Outputs to achieve Outcome 4.1 Output 4.1.1 M&E activities undertaken with annual review, mid-term review, social and economic assessment, mid-term review and terminal evaluation conducted and project performance evaluated.				
Outcome 4.2 Knowledge sharing and information dissemination	Indicator 17: Lessons learnt and experience documented and disseminated; post-project action plan formulated and workshops conducted	None	Lessons and experience documented and disseminated through 10 workshops conducted to benefit 1,000 direct and 3,000 indirect beneficiaries	Lessons and experience documented and disseminated through 30 workshops conducted to benefit 2,000 direct and 10,000 indirect beneficiaries

	Indicator 18: International knowledge and experience gained	None	2 International knowledge sharing workshops conducted to promote knowledge gained and lessons learned	4 International knowledge sharing workshops conducted to share knowledge and promote BAT/BEP
Outputs to achieve Outcome 4.2 Output 4.2.1 Knowledge products on best practices, experiences and lessons learned documented and shared nationally and internationally, including recycling and disposal knowledge on waste lead/lithium batteries and metal scrap				

VII. MONITORING AND EVALUATION (M&E) PLAN

UNDP/GEF Standard Monitoring and Evaluation Requirements

Minimum project monitoring and reporting requirements as required by the UNDP Programme and Project Management Standards (PPM)

Project-level monitoring and evaluation will be undertaken in compliance with UNDP requirements as outlined in the UNDP POPP (including guidance on GEF project revisions) and UNDP Evaluation Policy.

The UNDP Country Office is responsible for ensuring full compliance with all UNDP project M&E requirements that include project monitoring, UNDP quality assurance requirements, quarterly risk management, and evaluation requirements:

(a) Project field visit is to be generally carried out at least once per year and documented for the project. Back to Office reports (BTOR) of site visits and country missions are prepared and filled at PIMS+ for auditing purposes. And are shared with UNDP Staff responsible for Project Oversight.

(b) Regular oversight meetings review progress with project implementation units to ensure the project activities are on track.

(c) A Project Board Review Meeting will take place, at least once per year, to review, among other, the findings of the project oversight meetings.

The project results, corresponding indicators and mid-term and end-of-project targets in the project results framework will be monitored annually and evaluated periodically during project implementation. If baseline data for some of the results indicators is not yet available, it will be collected during the first year of project implementation. The Monitoring Plan included in Annex details the roles, responsibilities, and frequency of monitoring project results.

Minimum project monitoring and reporting requirements as required by the GEF:

Additional mandatory GEF-specific M&E requirements will be undertaken in accordance with the GEF Monitoring Policy and the GEF Evaluation Policy and other relevant GEF policies[55]. The costed M&E plan included below, and the Monitoring plan in Annex, will guide the GEF-specific M&E activities to be undertaken by this project.

In addition to these mandatory UNDP and GEF M&E requirements, other M&E activities deemed necessary to support project-level adaptive management will be agreed during the Project Inception Workshop and will be detailed in the Inception Report.

Inception Workshop and Report: A project inception workshop will be held within 60 days of project CEO endorsement, with the aim to:

a. Familiarize key stakeholders with the detailed project strategy and discuss any changes that may have taken place in the overall context since the project idea was initially conceptualized that may influence its strategy and implementation.

b. Discuss the roles and responsibilities of the project team, including reporting lines, stakeholder engagement strategies and conflict resolution mechanisms.

c. Review the results framework and monitoring plan.

d. Discuss reporting, monitoring and evaluation roles and responsibilities and finalize the M&E budget; identify national/regional institutes to be involved in project-level M&E; discuss the role of the GEF OFP and other stakeholders in project-level M&E.

e. Update and review responsibilities for monitoring project strategies, including the risk log; SESP report, Social and Environmental Management Framework and other safeguard requirements; project grievance mechanisms; gender strategy; knowledge management strategy, and other relevant management strategies.

f. Review financial reporting procedures and budget monitoring and other mandatory requirements and agree on the arrangements for the annual audit.

55 See https://www.thegef.org/gef/policies_guidelines

g. Plan and schedule Project Board meetings and finalize the first-year annual work plan.

h. Formally launch the Project.

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GEF Project Implementation Report (PIR)

The annual GEF PIR covering the reporting period July (previous year) to June (current year) will be completed for each year of project implementation. Any environmental and social risks and related management plans will be monitored regularly, and progress will be reported in the PIR. The PIR submitted to the GEF will be shared with the Project Board. The quality rating of the previous year's PIR will be used to inform the preparation of the subsequent PIR.

GEF Core Indicators:

The GEF Core indicators included as Annex 15 will be used to monitor global environmental benefits and will be updated for reporting to the GEF prior to MTR and TE. Note that the project team is responsible for updating the core indicator status. The updated monitoring data must be shared with MTR/TE consultants prior to required evaluation missions, so these can be used for subsequent groundtruthing. The methodologies to be used in data collection have been defined by the GEF and are available on the GEF website.

Independent Mid-term Review (MTR):

An independent mid-term review (MTR) will be completed by the mid-point of the project. The terms of reference, the MTR process and the final MTR report will follow the standard templates and MTR guidance for UNDP-supported GEF-financed projects available on the UNDP Evaluation Resource Center. The MTR must be submitted to the GEF by the mid-point of the project but no later than 48 months after CEO Endorsement. Mid-point is determined by taking the expected ProDoc signature date plus number of months duration and finding the middle date. (For example, if a project has a 5-year duration, the MTR must be submitted 2.5 years after ProDoc signature.) To meet the submission deadline, final MTR reports must be completed and submitted to BPPS NCE team no later than 2 months in advance of the submission deadline to allow sufficient time for internal review/clearance that is required prior to submission.

Provisions must be taken to complete and submit the MTR within the submission deadline. Therefore, the MTR process must start no later than 8 months before the expected date of submission of the MTR.

The MTR will be 'independent, impartial and rigorous'. The evaluator(s) that UNDP will hire to undertake the assignment will be independent from organizations that were involved in designing, executing or advising on the project to be reviewed. Equally, the evaluators should not be in a position where there may be the possibility of future contracts regarding the project under review.

The GEF Operational Focal Point and other stakeholders will be actively involved and consulted during the MTR process. Additional quality assurance support is available from BPPS/NCE.

The final MTR report will be publicly available in English and will be posted on the UNDP ERC by the MTR submission date included on cover page of this project document. A management response to MTR recommendations will be posted in the ERC within six weeks of the MTR report's submission to the GEF.

Terminal Evaluation (TE):

An independent terminal evaluation (TE) will take place upon completion of all major project outputs and activities. The terms of reference, the evaluation process and the final TE report will follow the standard templates and TE guidance for UNDP-supported GEF-financed projects available on the UNDP Evaluation Resource Center. TE must be submitted to the GEF no later than 6 months after the Completion Date. This is a hard deadline that, if not met, can only be extended through a formal extension request. To meet the submission deadline, final TE reports must be completed and submitted to BPPS NCE team no later than 2 months in advance of the deadline to allow sufficient time for internal review/clearance that is required prior to submission.

Provisions must be taken to complete and submit the TE within the submission deadline. Therefore, TE must start no later than 8 months before the expected date of submission of the TE (or 11 months prior to the estimated operational closure date).

The evaluation will be 'independent, impartial and rigorous'. The evaluator(s) that UNDP will hire to undertake the assignment will be independent from organizations that were involved in designing, executing or advising on the

project to be evaluated. Equally, the evaluators should not be in a position where there may be the possibility of future contracts regarding the project being evaluated.

The GEF Operational Focal Point and other stakeholders will be actively involved and consulted during the terminal evaluation process. Additional quality assurance support is available from BPPS NCE.

The final TE report will be publicly available in English and posted on the UNDP ERC by the TE submission date included on cover page of this project document. A management response to the TE recommendations will be posted to the ERC within six weeks of the TE report submission to the GEF.

Per the GEF Terminal Evaluation requirements, for cancelled full-sized projects, Terminal Evaluations are required if the GEF grant expenditure exceeds more than US$ 2 million.

Final Report:

The project's final GEF PIR along with the terminal evaluation (TE) report and corresponding management response will serve as the final project report package. The final project report package shall be discussed with the Project Board during an end-of-project review meeting to discuss lesson learned and opportunities for scaling up.

Agreement on intellectual property rights and use of logo on the project's deliverables and disclosure of information**:** To accord proper acknowledgement to the GEF for providing grant funding, the GEF logo will appear together with the UNDP logo on all promotional materials, other written materials like publications developed by the project, and project hardware. Any citation on publications regarding projects funded by the GEF will also accord proper acknowledgement to the GEF. Information will be disclosed in accordance with relevant policies notably the UNDP Disclosure Policy[56] and the GEF policy on public involvement[57].

Monitoring and Evaluation Plan and Budget:		
GEF M&E requirements	**Indicative costs (US$)**	**Time frame**
Inception Workshop	8,000	Within 60 days of CEO endorsement of this project.
Inception Report	None	Within 90 days of CEO endorsement of this project.
M&E of GEF core indicators and project results framework, including 4 Project Board meetings	20,000	Annually and at mid-point and closure
GEF Project Implementation Report (PIR)	None	Annually typically between June-August
Monitoring of safeguards management framework, environmental and social risks, and coordinating management plan as relevant	33,000	On a rolling basic
Monitoring of Gender Action Plans	30,000	On a rolling basis
Supervision missions	None	Annually
Independent Mid-term Review (MTR)	42,000	By April 2026
Independent Terminal Evaluation (TE)	42,000	By July 2028
Additional Supervisory and Verification Procedures	None	On a rolling basis
TOTAL indicative COST	**175,000**	

[56] See http://www.undp.org/content/undp/en/home/operations/transparency/information_disclosurepolicy/

[57] See https://www.thegef.org/gef/policies_guidelines

VIII. GOVERNANCE AND MANAGEMENT ARRANGEMENTS

Roles and responsibilities of the project's governance mechanism:

Implementing Partner: The Implementing Partner for this project is the Foreign Environmental Cooperation Center (FECO) of the Ministry of Ecology and Environment (MEE).

The Implementing Partner is the entity to which the UNDP Administrator has entrusted the implementation of UNDP assistance specified in this signed project document along with the assumption of full responsibility and accountability for the effective use of UNDP resources and the delivery of outputs, as set forth in this document.

The Implementing Partner is responsible for executing this project. Specific tasks include:

- Project planning, coordination, management, monitoring, evaluation and reporting. This includes providing all required information and data necessary for timely, comprehensive and evidence-based project reporting, including results and financial data, as necessary. The Implementing Partner will strive to ensure project-level M&E is undertaken by national institutes and is aligned with national systems so that the data used and generated by the project supports national systems.
- Overseeing the management of project risks as included in this project document and new risks that may emerge during project implementation.
- Procurement of goods and services, including human resources.
- Financial management, including overseeing financial expenditures against project budgets.
- Approving and signing the multiyear workplan.
- Approving and signing the combined delivery report at the end of the year; and,
- Signing the financial report or the funding authorization and certificate of expenditures.

Responsible Parties:

Three categories of Responsible Parties will be engaged in the implementation of this project:

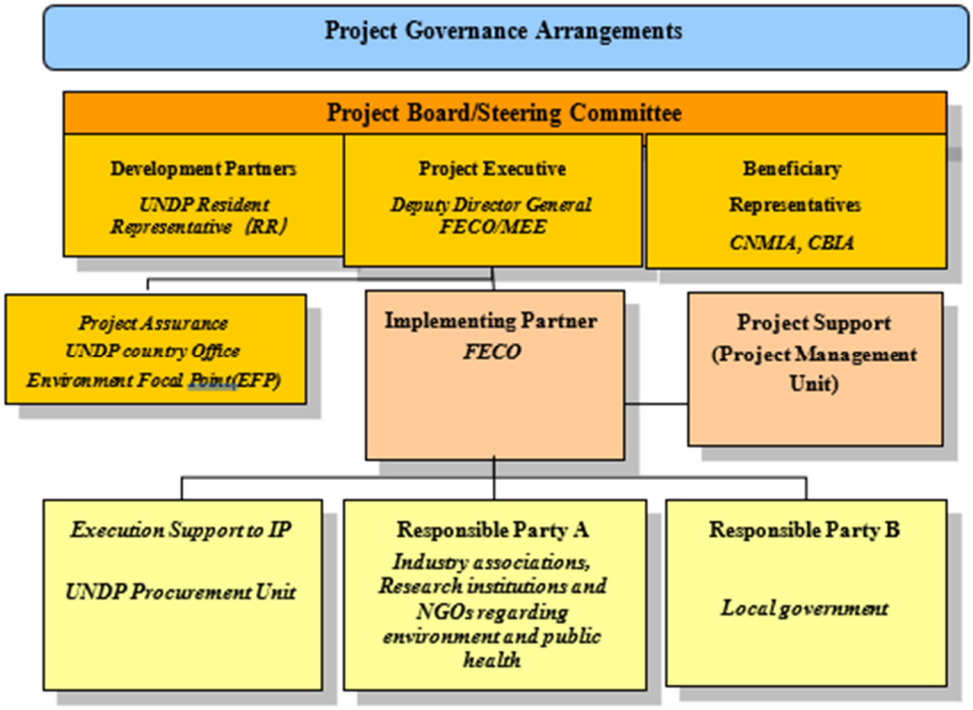
Responsible Party A: Responsible Party A are industry associations including Non-Ferrous Metal Association of China, Chinese Non-ferrous Metal Association Recycling Metal Branch, China Industry Technology Innovation Strategies Alliance, China Power battery forcible recovery of industrial technology innovation strategic alliance, Electric Vehicle Power Battery Recycling Strategic Alliance), research institutions and NGOs with concerns regarding environmental protection and public health. They are responsible for providing technical guidance, support and consultations to facilitate project implementation and decision making of governance and management.

Responsible Party B: The Responsible Party B are local government and Ecology and Environment Bureaus. Guided by the Implementing Partner, they are responsible for carrying out demonstration project activities to promote and facilitate pollution prevention and control, emission reduction, monitoring, supervision and enforcement actions. They will be instrumental in promoting the National Replication Programme and facilitating application of new alternative technologies, assisting in the promotion and awareness raising activities to achieve emission reduction and sound management of chemicals.

UNDP: UNDP is accountable to the GEF for the implementation of this project. This includes overseeing project execution undertaken by the Implementing Partner to ensure that the project is being carried out in accordance with UNDP and GEF policies and procedures and the standards and provisions outlined in the Delegation of Authority (DOA) letter for this project. **The UNDP GEF Executive Coordinator, in consultation with UNDP Bureaus and the Implementing Partner, retains the right to revoke the project DOA, suspend or cancel this GEF project.** UNDP is responsible for the Project Assurance function in the project governance structure and presents to the Project Board and attends Project Board meetings as a non-voting member.

A firewall will be maintained between the delivery of project oversight and quality assurance performed by UNDP and charged to the GEF Fee and any support to project execution performed by UNDP (as requested by and agreed to by both the Implementing Partner and GEF) and may be charged to the GEF project management costs (only if approved by GEF). The segregation of functions and firewall provisions for UNDP in this case is described in the next section.

Project governance structure for Assisted NIM with support by UNDP:



First line of defense

UNDP oversight of project support to IP cannot be UNDP staff providing project assurance or providing programmatic oversight support to the RR

Second line of defense

Regional Bureau oversees RR and Country Office compliance at portfolio level.

- BPPS NCE RTA oversees technical quality assurance and GEF compliance. BPPS NCE PTA overseas RTA function.
- UNDP GEF Executive Coordinator and Regional Bureau Deputy Director can revoke DOA/cancel/suspend project or provide enhanced oversight.

The UNDP Resident Representative assumes full responsibility and accountability for oversight and quality assurance of this Project and ensures its timely implementation in compliance with the GEF-specific requirements and UNDP's Programme and Operations Policies and Procedures (POPP), its Financial Regulations and Rules and Internal Control Framework. A representative of the UNDP Country Office will assume the assurance role and will present assurance findings to the Project Board, and therefore attends Project Board meetings as a non-voting member.

Proposed Execution Arrangements

The project has been initially designed for the implementation arrangements of "Full National Implementation" (Full NIM or NIM), in which no execution services were expected to be provided by UNDP to the Implementing Partner (FECO/MEE).

However, the project requires additional provisions for the recruiting of Independent Monitoring and Supervision Services/Auditing of the project milestones. In this regard, "Assisted NIM with support by UNDP" Modality is proposed under the updated arrangements, and a proper separation of functions for oversight of the Implementing Partner executing the project and execution by UNDP on behalf of the Implementing Partner is in place.

The limited support by UNDP for the execution proposed will be delivered on the basis that:

- A Letter of Agreement (LOA) with the Government of China will be signed to establish the basis for the additional independent verification and supervision in which execution support and costing for providing the services will be recovered through Direct Project Costing (DPC) procedures from the Project Budget.
- UNDP Country Office will be responsible for signing the LOA with the Government of China and assist the execution oversight of the Independent International Verifier (or Verification Entity). UNDP Procurement Unit (Central Services, BMS) will be responsible for conducting the procurement process, recruiting, and

managing the Contract with the Independent International Verifier (or Verification Entity). UNDP Country Office will provide execution support in aspects of coordinating with BMS to ensure a smooth procurement process.

- The Independent Entity will be responsible to recruit the appropriate Supervision/Monitoring/Auditing specialized personnel, as well as any additional technical expertise as required to deliver the independent supervisory role as outlined in Additional (Independent) Supervisory section below. The Independent Monitoring and Supervising team will be led by International Staff(s), and to the maximum extent, the other members of the team should also be composed of International Experts.
- The specific oversight requirements, required by GEF for the verification process as mentioned above, will be managed by BPPS C&W in consultation with UNDP Country Office and BPPS VF Oversight & Compliance Unit. BPPS C&W will be responsible for reviewing and endorsing the verification reports in consultation with GEF Secretariat's Chemicals and Waste Team.
- The Project Board will regularly be informed about the supervisory activities undertaken by the Independent Monitoring and Supervisory Entity and managed by NCE, as well as the results of its additional verification. In detail, the Project Board will be convened at least once annually to review the overall progress of the project's overall implementation, as outlined in Section VIII of this Project Document.

Additional (Independent) Supervisory

(a) Administrative Execution Instrument Level:

- UNDP will use Cash Transfer Instruments to transfer the project funds to the Implementing Partner, to a separate and auditable Bank Account, as means to facilitate execution of the project activities.
- Each Cash Transfer will be conditioned to the achievement of agreed milestones for measuring execution performance. This performance will be measured taking into consideration Technical, Financial and Investment Activities.

(b) Procedure for Cash Transfers to the Implementing Partner:

- UNDP will disburse Cash Transfers to FECO based on:

  i. Assessment of the performance verification against listed Work Plan, Indicators and Milestones;
  ii. Assessment of application/usage of funds released under the previous Cash Transfer (First Cash Transfer will be limited to 10% of the Annual Work Plan Budget and refers to the initial down payment for the IP to initiate execution activities).
  iii. A Verification to be undertaken by the Independent Monitoring and Supervisory Entity that will be recruited and entrusted by UNDP. The Verification Team will be led by an International Expert.

(c) Procedure for Verification of milestones and Supervision of Cash Transfers:

- Independent Monitoring and Supervisory Entity, appointed by UNDP, will carry out physical visits, where applicable, to the implementation sites of the project to verify specific milestones.
- Independent Monitoring and Supervisory Entity will undertake second level assessment and assurance of the Independent Audit Reports carried out by the Project's contractors and will carry out additional interviews and visits to the Audit Companies, as required and as applicable.
- Independent Monitoring and Supervisory Entity will rate the execution of the agreed milestones towards Results Rating include 6 scales: i.e., Highly Satisfactory (HS), Satisfactory (S), Moderately Satisfactory (MS), Moderately Unsatisfactory (MU), Unsatisfactory (U), Highly Unsatisfactory (HU) and will recommend – or not – to UNDP to release the agreed subsequent milestones of the LOA.

  i. The Results of the verification will be further reviewed by the Chemicals & Waste (NCE/GPN/BPPS) Team under close consultation with the GEF Secretariat.
  ii. The verification report will be shared with the GEF Secretariat and endorsement by UNDP Chemicals & Waste (NCE/GPN/BPPS) Team.

- UNDP Country Office will carry out the required verification of the Funding Authorization and Certificate of Expenditures Form (FACE Form), and issue cash transfers in full alignment with the Harmonized Approach to Cash Transfer (HACT) framework, which will not be replaced but complemented by the above-mentioned supporting documents.
- The above-mentioned milestones verification procedures won't replace any of the Independent GEF Monitoring and Verification Requirements listed in the above Section VII.2 (PIRs, MTR, TE and Final Report etc.).

UNDP project support: The Implementing Partner and GEF OFP have requested UNDP to provide support services in the amount of USD 28,300 for the full duration of the project, and the GEF has agreed for UNDP to provide such execution support services and for the cost of these services to be charged to the project budget. The execution support services – whether financed from the project budget or other sources - have been set out in detail and agreed between UNDP Country Office and the Implementing Partner in a Letter of Agreement (LOA). This LOA is attached to this Project Document (Annex 18).

To ensure the strict independence required by the GEF and in accordance with the UNDP Internal Control Framework, these execution services will be delivered independent from the GEF-specific oversight and quality assurance services.

Segregation of duties and firewalls vis-à-vis UNDP representation on the project board:

As noted in the Minimum Fiduciary Standards for GEF Partner Agencies, in cases where a GEF Partner Agency (i.e. UNDP) carries out both implementation oversight and execution of a project, the GEF Partner Agency (i.e. UNDP) must separate its project implementation oversight and execution duties, and describe in the relevant project document a: 1) Satisfactory institutional arrangement for the separation of implementation oversight and executing functions in different departments of the GEF Partner Agency; and 2) Clear lines of responsibility, reporting and accountability within the GEF Partner Agency between the project implementation oversight and execution functions.

In this case, UNDP's implementation oversight role in the project – as represented in the project board and via the project assurance function – are performed by UNDP Resident Representative (RR) and UNDP Country Office Environment Focal Point (EFP). UNDP's execution role in the project (as requested by the implementing partner and approved by the GEF) is performed by UNDP Procurement Unit , who will report to UNDP Office of Procurement.

Roles and Responsibilities of the Project Organization Structure:

a) Project Board: All UNDP projects must be governed by a multi-stakeholder board or committee established to review performance based on monitoring and evaluation, and implementation issues to ensure quality delivery of results. The Project Board (also called the Project Steering Committee) is the most senior, dedicated oversight body for a project.

The two main (mandatory) roles of the Project Board are as follows:

1) **High-level oversight of the execution of the project by the Implementing Partner** (as explained in the "Provide Oversight" section of the POPP). This is the primary function of the project board and includes annual (and as-needed) assessments of any major risks to the project, and decisions/agreements on any management actions or remedial measures to address them effectively. The Project Board reviews evidence of project performance based on monitoring, evaluation and reporting, including progress reports, evaluations, risk logs and the combined delivery report. The Project Board is responsible for taking corrective action as needed to ensure the project achieves the desired results.

2) **Approval of strategic project execution decisions of the Implementing Partner** with a view to assess and manage risks, monitor and ensure the overall achievement of projected results and impacts and ensure long term sustainability of project execution decisions of the Implementing Partner (as explained in the "Manage Change" section of the POPP).

Requirements to serve on the Project Board:

- ✓ Agree to the Terms of Reference of the Board and the rules on protocols, quorum and minuting.
- ✓ Meet annually; at least once.

- ✓ Disclose any conflict of interest in performing the functions of a Project Board member and take all measures to avoid any real or perceived conflicts of interest. This disclosure must be documented and kept on record by UNDP.
- ✓ Discharge the functions of the Project Board in accordance with UNDP policies and procedures.
- ✓ Ensure highest levels of transparency and ensure Project Board meeting minutes are recorded and shared with project stakeholders.

Responsibilities of the Project Board:

- ✓ Consensus decision making:
    - The project board provides overall guidance and direction to the project, ensuring it remains within any specified constraints, and providing overall oversight of the project implementation.
    - Review project performance based on monitoring, evaluation and reporting, including progress reports, risk logs and the combined delivery report;
    - The project board is responsible for making management decisions by consensus.
    - In order to ensure UNDP's ultimate accountability, Project Board decisions should be made in accordance with standards that shall ensure management for development results, best value for money, fairness, integrity, transparency and effective international competition.
    - In case consensus cannot be reached within the Board, the UNDP representative on the board will mediate to find consensus and, if this cannot be found, will take the final decision to ensure project implementation is not unduly delayed.
- ✓ Oversee project execution:
    - Agree on project manager's tolerances as required, within the parameters outlined in the project document, and provide direction and advice for exceptional situations when the project manager's tolerances are exceeded.
    - Appraise annual work plans prepared by the Implementing Partner for the Project; review combined delivery reports prior to certification by the Implementing Partner.
    - Address any high-level project issues as raised by the project manager and project assurance;
    - Advise on major and minor amendments to the project within the parameters set by UNDP and the donor and refer such proposed major and minor amendments to the UNDP BPPS Nature, Climate and Energy Executive Coordinator (and the GEF, as required by GEF policies);
    - Provide high-level direction and recommendations to the project management unit to ensure that the agreed deliverables are produced satisfactorily and according to plans.
    - Track and monitor co-financed activities and realisation of co-financing amounts of this project.
    - Approve the Inception Report, GEF annual project implementation reports, mid-term review and terminal evaluation reports.
    - Ensure commitment of human resources to support project implementation, arbitrating any issues within the project.
- ✓ Risk Management:
    - Provide guidance on evolving or materialized project risks and agree on possible mitigation and management actions to address specific risks.
    - Review and update the project risk register and associated management plans based on the information prepared by the Implementing Partner. This includes risks related that can be directly managed by this project, as well as contextual risks that may affect project delivery or continued UNDP compliance and reputation but are outside of the control of the project. For example, social and environmental risks associated with co-financed activities or activities taking place in the project's area of influence that have implications for the project.
    - Address project-level grievances.
- ✓ Coordination:

- Ensure coordination between various donor and government-funded projects and programmes.
- Ensure coordination with various government agencies and their participation in project activities.

Composition of the Project Board: The composition of the Project Board must include individuals assigned to the following three roles:

1. **Project Executive:** This is an individual who represents ownership of the project and chairs (or co-chairs) the Project Board. The Executive usually is the senior national counterpart for nationally implemented projects (typically from the same entity as the Implementing Partner), and it must be UNDP for projects that are direct implementation (DIM). In exceptional cases, two individuals from different entities can co-share this role and/or co-chair the Project Board. If the project executive co-chairs the project board with representatives of another category, it typically does so with a development partner representative. The Project Executive is the Deputy Director General of FECO/MEE.
2. **Beneficiary Representative(s):** Individuals or groups representing the interests of those groups of stakeholders who will ultimately benefit from the project. Their primary function within the board is to ensure the realization of project results from the perspective of project beneficiaries. Often representatives from civil society, industry associations, or other government entities benefiting from the project can fulfil this role. There can be multiple beneficiary representatives in a Project Board. The Beneficiary representatives are: China National Metal Industry Association (CNMIA) and China Battery Industry Association (CBIA).
3. **Development Partner(s):** Individuals or groups representing the interests of the parties concerned that provide funding, strategic guidance and/or technical expertise to the project. The Development Partner is UNDP Resident Representative.

b) **Project Assurance:** Project assurance is the responsibility of each Project Board member; however, UNDP has a distinct assurance role for all UNDP projects in carrying out objective and independent project oversight and monitoring functions. UNDP performs quality assurance and supports the Project Board (and Project Management Unit) by carrying out objective and independent project oversight and monitoring functions, including compliance with the risk management and social and environmental standards of UNDP. The Project Board cannot delegate any of its quality assurance responsibilities to the Project Manager. Project assurance is totally independent of project execution.

   A designated representative of UNDP playing the project assurance role is expected to attend all board meetings and support board processes as a non-voting representative. It should be noted that while in certain cases UNDP's project assurance role across the project may encompass activities happening at several levels (e.g., global, regional), at least one UNDP representative playing that function must, as part of their duties, specifically attend board meeting and provide board members with the required documentation required to perform their duties. The UNDP representative playing the main project assurance function is the Project Manager of the UNDP China Country Office.

c) **Project Management – Execution of the Project:** The Project Manager (PM) (also called project coordinator) is the senior most representative of the Project Management Unit (PMU) and is responsible for the overall day-to-day management of the project on behalf of the Implementing Partner, including the mobilization of all project inputs, supervision over project staff, responsible parties, consultants and sub-contractors. The Project Manager typically presents key deliverables and documents to the board for their review and approval, including progress reports, annual work plans, adjustments to tolerance levels and risk registers.

   A designated representative of the PMU is expected to attend all board meetings and support board processes as a non-voting representative.

   The primary PMU representative attending board meetings is the Project Manager.

IX. FINANCIAL PLANNING AND MANAGEMENT

The total cost of the project is **USD 126,100,000**. This is financed through a GEF grant of **USD 15,750,000** administered by UNDP, and additional support of **USD 110,350,000** as cash and in-kind co-financing. UNDP, as the GEF Implementing Agency, is responsible for the oversight of the GEF resources and the cash co-financing transferred to UNDP bank account only.

Co-financing: The actual realization of project co-financing amounts will be monitored by the UNDP Country Office and the PMU on an annual basis in the GEF PIR and will be reported to the GEF during the *mid-term review* and terminal evaluation process as follows:

Co-financing source	Co-financing type	Co-financing amount (US$)
Ministry of Ecology and Environment	Grant	250,000
Ministry of Ecology and Environment	In-kind	450,000
Private Sector[58]	Grant	65,410,000
Private Sector	In-kind	43,990,000
UNDP	Grant	90,000
UNDP	In-kind	160,000
Total Co-financing		**110,350,000**

Budget Revision and Tolerance: As per UNDP POPP, the Project Board may agree with the Project Manager on a tolerance level for each detailed plan under the overall multi-year workplan. The agreed tolerance should be written in the project document or approved project board meeting minutes. It should normally not exceed 10 percent of the agreed annual budget at the activity level, but within the overall approved multi-year workplan at the activity level. Within the agreed tolerances, the project manager can operate without intervention from the project board. Restrictions apply as follows:

Should the following deviations occur, the Project Manager/IP through UNDP Country Office will seek the approval of the BPPS/NCE-VF team to ensure accurate reporting to the GEF. It is **strongly encouraged** to maintain the expenditures within the approved budget at the budgetary account and at the component level:

a) Budget reallocations must prove that the suggested changes in the budget will not lead to material changes in the results to be achieved by the project. A strong justification is required and will be approved on an exceptional basis. Budget re-allocations among the components (including PMC) of the approved Total Budget and Work Plans (TBWP) that represent a value greater than 10% of the total GEF grant.

b) Introduction of new outputs/activities (i.e., budget items) that were not part of the agreed project document and TBWP that represent a value greater than 5% of the total GEF grant. The new budget items must be eligible as per the GEF and UNDP policies.

c) Project management cost (PMC): budget under PMC component is capped and cannot be increased.

UNDP is not in a position to increase the total budget above the amount approved by the donor, therefore any over-expenditure would have to be absorbed from non-GEF resources by the Implementing Partner (GEF Executing Entity).

Project extensions:

The UNDP-BPPS-NCE team Executive Coordinator must approve all requests for extension of the Project Completion Date and for other milestone extensions with hard deadlines. All extensions impose additional time and cost burdens at all levels and the GEF project budget cannot be increased beyond its originally approved amount. A single extension may be granted on an exceptional basis and subject to the conditions and maximum durations set out in the UNDP POPP. The project management costs during the extension period must remain within the originally

[58] The formal selection of the demonstration enterprises and the contractual arrangements for their formal engagement will be completed in first 6 months of the project implementation.

approved amount, and any increase in PMC costs shall be covered by non-GEF resources; the additional UNDP oversight costs during the extension period must be covered by non-GEF resources, in accordance with UNDP's policy as set out in UNDP POPP.

For any extension request, UNDP CO and IP will consult and jointly present a clear plan indicating how and from which specific sources the additional oversight costs that will be incurred by UNDP will be covered during the extended period. The BPPS-NCE Executive Coordinator will consult the Regional Bureaux (RBX) and may reject the extension request if no (external co-financing by the IP or internal UNDP CO resources) can be identified.

All extension requests, along with all supporting documentation, shall be submitted by the IP to the UNDP CO in line with the requirements and within the deadlines set out in the UNDP SOPs and policies in UNDP POPP.

Audit: The project will be audited as per UNDP Financial Regulations and Rules and applicable audit policies. Audit cycle and process must be discussed during the Inception workshop. If the Implementing Partner is an UN Agency, the project will be audited according to that Agencies applicable audit policies.

Transfer or disposal of assets: In consultation with the Implementing Partner and other parties of the project, UNDP is responsible for deciding on the transfer or other disposal of assets. Transfer or disposal of assets is recommended to be reviewed and endorsed by the project board following UNDP rules and regulations. Assets may be transferred to the government for project activities managed by a national institution at any time during the life of a project, however **must be done before the operational closure date**. In all cases of transfer, a transfer document must be prepared and kept on file[59]. The transfer should be done before Project Management Unit complete their assignments.

Completion Date: The project completion date is the date of Project Document Signature plus project duration. This date can only be extended through a formal extension request. Prior to completion date, all UNDP-financed inputs must be provided and related activities for the Project completed. No activities, except for the final clearance of the Terminal Evaluation Report and the corresponding management response and the end-of-project review Project Board Meeting should take place after the Completion Date.

Project Closure: Project closure will be conducted as per UNDP requirements outlined in the UNDP POPP. All costs incurred to close the project must be included in the project closure budget and reported as final project commitments presented to the Project Board during the final project review. The only costs a project may incur following the final project review are those included in the project closure budget.

- **Operational Closure**: **Operational closure must happen within 9 months from project completion date.** Prior to operational closure, the Terminal Evaluation must have been submitted and the corresponding TE management response and the end-of-project review Project Board meeting must have been completed. The Implementing Partner through a Project Board decision will notify the UNDP Country Office when operational closure has been completed. Before Operational Closure, the project must have completed the transfer or disposal of any equipment that is still the property of UNDP.
- **Financial Closure: Financial closure must happen within 6 months of operational closure or after the date of cancellation.** The project will be financially closed when the following conditions have been met: a) the project is operationally completed or has been cancelled; b) the Implementing Partner has reported all financial transactions to UNDP; c) UNDP has closed the accounts for the project; d) UNDP and the Implementing Partner have certified a final Combined Delivery Report (which serves as final budget revision).

[59] See https://popp.undp.org/_layouts/15/WopiFrame.aspx?sourcedoc=/UNDP_POPP_DOCUMENT_LIBRARY/Public/PPM_Project%20Management_Closing.docx&action=default.

Between operational and financial closure, the implementing partner will identify and settle all financial obligations and prepare a final expenditure report. The UNDP Country Office will send the final signed closure documents including confirmation of final cumulative expenditure and unspent balance to BPPS/NCE for confirmation before the project will be financially closed in Quantum by the UNDP Country Office.

Cancellation and Suspension: All projects considering going through cancellation or suspension must follow UNDP and GEF requirements. Guidance can be found in the UNDP POPP (SOPs for management actions of Vertical Fund projects escalated to the Executive Coordinator and Guidance for GEF project revisions).

Refund to GEF: Should a refund of unspent funds to the GEF be necessary, this will be managed directly by the BPPS/NCE team Directorate in New York. No action is required by the UNDP Country Office on the actual refund from UNDP project to the GEF. Unspent project balance is not permitted to be transferred to any other projects.

X. TOTAL BUDGET AND WORK PLAN

Total Budget and Work Plan			
Quantum Business Unit	UNDP-CHN		
Quantum Project ID:	00111692	Quantum Project Title:	Green Production and Sustainable Development in Secondary Aluminum, Lead, Zinc and Lithium Sectors in China
Quantum Award ID:	00111692.1	Quantum Award Title:	*China Secondary Metals Full Size*
UNDP-GEF PIMS No.	6492		
Implementing Partner	Foreign Environmental Cooperation Center (FECO), Ministry of Ecology and Environment (MEE)		

Quantum Outcome (GEF Component)	Quantum Output (GEF Outcome)	Quantum Activity (GEF Output)	Quantum Responsible Party (UNDP, IP, or Responsible Party)	Quantum Fund ID	Quantum Donor ID	Quantum Budgetary Account Code	Quantum Budget Account Description	Amount Year 2023 (USD)	Amount Year 2024 (USD)	Amount Year 2025 (USD)	Amount Year 2026 (USD)	Amount Year 2027 (USD)	Amount Year 2028 (USD)	Total (USD)	See Budget Note:
Component 1 Strengthening the national policy and regulatory framework to reduce UP-POPs and BFRs releases from secondary non-ferrous metal industry	*Outcome 1.1 Reduced UP-POPs and BFRs releases resulting from unsound metal scrap and batteries recycling management practices through the adoption and implementation of standards/measures, policies, plans, laws, regulations and guidance.*	*Output 1.1.1 Policy and regulatory framework for metal scrap management developed, revised and improved and relevant components integrated into the existing policy and regulatory framework*	*FECO/MEE*	*62000*	*10003*	*71300*	*Local Consultant (Policy advisor)*	-	20,000	20,000	-	-	-	40,000	1
				62000		*72100*	*Contractual Services - Companies (abc)*		56,000	111,400	118,200	31,400	-	317,000	2
				62000		*71600*	*Travel*	*1,000*	4,000	4,000	4,000	4,000	1,000	18,000	3
				62000		*75700*	*Training, Workshops and conference*		2,000	2,000	2,000	2,000	2,000	*10,000*	4
			Total Responsible FECO/MEE					*1,000*	*82,000*	*137,400*	*124,200*	*37,400*	*3,000*	385,000	
		Total Output 1.1.1						*1,000*	*82,000*	*137,400*	*124,200*	*37,400*	*3,000*	385,000	
		Output 1.1.2 Technical by-laws, regulations and guidance aiming to reduce UP-POPs and BFRs release from batteries	*FECO/MEE*	*62000*	*10003*	*71200*	*International Consultants*	-		6,000	24,000	-	-	30,000	5
				62000		*71300*	*Local Consultant (NTA)*	*10,000*	20,000	20,000	30,000	20,000		100,000	6
				62000		*71800*	*Contractual Services - Individuals*		21,000	21,000	21,000	21,000	21,000	105,000	7
				62000		*72100*	*Contractual Services -*		140,000	158,000	126,000	504,000	-	928,000	8

Quantum Outcome (GEF Component)	Quantum Output (GEF Outcome)	Quantum Activity (GEF Output)	Quantum Responsible Party (UNDP, IP, or Responsible Party)	Quantum Fund ID	Quantum Donor ID	Quantum Budgetary Account Code	Quantum Budget Account Description	Amount Year 2023 (USD)	Amount Year 2024 (USD)	Amount Year 2025 (USD)	Amount Year 2026 (USD)	Amount Year 2027 (USD)	Amount Year 2028 (USD)	Total (USD)	See Budget Note:
		manufacturing, recycling and disposal practices developed, adopted and implemented.					*Companies (defghij)*								
				62000		*71600*	*Travel*	*2,000*	*2,000*	57,000	57,000	52,000	52,000	222,000	9
				62000		*74500*	*Miscellaneous Expenses*		*4,000*	4,000	5,000	1,000	1,000	15,000	10
				62000		*75700*	*Training, Workshops and conference*	*500*	2,000	2,000	2,000	2,000	1,500	10,000	11
			Total Responsible FECO/MEE					*12,500*	*189,000*	*268,000*	*265,000*	*600,000*	*75,500*	1,410,000	
		Total Output 1.1.2						*12,500*	*189,000*	*268,000*	*265,000*	*600,000*	*75,500*	1,410,000	
		Output 1.1.3 Barriers to BAT/BEP and extended producer responsibility implementation removed through e.g. the institution of economic instruments and incentives.	*FECO/MEE*	*62000*	*10003*	*72100*	*Contractual Services - Companies (kl)*			54,000	126,000		-	180,000	12
				62000		*71600*	*Travel*		2,000	3,000	2,000	2,000	1,000	10,000	13
				62000		*72500*	*Supplies*	*1,000*	2,000	2,000	2,000	2,000	1,000	10,000	14
				62000		*75700*	*Training, Workshops and conference*	-	1,000	1,000	1,000	1,000	1,000	5,000	15
			Total Responsible FECO/MEE					*1,000*	*5,000*	*60,000*	*131,000*	*5,000*	*3,000*	205,000	
		Total Output 1.1.3						*1,000*	*5,000*	*60,000*	*131,000*	*5,000*	*3,000*	205,000	
	Total Outcome 1.1							*14,500*	276,000	465,400	520,200	642,400	81,500	2,000,000	
Total Component 1								***14,500***	***276,000***	***465,400***	***520,200***	***642,400***	***81,500***	**2,000,000**	
Component 2 Reduction of UP-POPs and BFRs releases from unsound metal scrap and batteries recycling	*Outcome 2.1 Reduced releases of UP-POPs and BFRs as a result of improved raw material (recycled metal scrap and batteries) supply chains as well as the introduction of*	*Output 2.1.1 Assessment of existing collection systems completed, and appropriate collection schemes established, feasible legislative arrangements,*	*FECO/MEE*	*62000*	*10003*	*72100*	*Contractual Services - Companies (e g)*	-	60,000	90,000	90,000	60,000	-	300,000	16
			Total Responsible FECO/MEE					-	*60,000*	*90,000*	*90,000*	*60,000*	-	300,000	

Quantum Outcome	Quantum Output	Quantum Activity	Quantum Responsible Party (UNDP, IP, or Responsible Party)	Quantum Fund ID	Quantum Donor ID	Quantum Budgetary Account Code	Quantum Budget Account Description	Amount Year 2023 (USD)	Amount Year 2024 (USD)	Amount Year 2025 (USD)	Amount Year 2026 (USD)	Amount Year 2027 (USD)	Amount Year 2028 (USD)	Total (USD)	See Budget Note:
(GEF Component)	(GEF Outcome)	(GEF Output)													
	environmentally sound disposal practices and extended producers responsibility at recycling entities	*including proper acceptance and outbound material criteria.*													
		Total Output 2.1.1						-	*60,000*	*90,000*	*90,000*	*60,000*	-	300,000	
		Output 2.1.2 Supply chains for local markets further developed, recycling rates increased and maximum quantities of recyclable plastic parts diverted from inadequate disposal.	*FECO/MEE*	*62000*	*10003*	*72100*	*Contractual Services - Companies (f)*		20,000	30,000	30,000	20,000		100,000	17
				62000		*75700*	*Training, Workshops and conference*		3,000	3,000	3,000	3,000	3,000	15,000	18
			Total Responsible FECO/MEE					-	23,000	33,000	33,000	23,000	3,000	115,000	
		Total Output 2.1.2						-	23,000	33,000	33,000	23,000	3,000	115,000	
		Output 2.1.3 Two demonstration projects implemented to demonstrate BAT/BEP and life cycle recycling in the collection and conditioning of waste batteries (one in lead acid batteries and one in lithium ion batteries), applying proper management of hazardous waste generated in	*FECO/MEE*	*62000*	*10003*	*72100*	*Contractual Services - Companies (a b)*		800,000	1,200,000	1,200,000	800,000		4,000,000	19
				62000		*71600*	*Travel*	2,000	6,000	3,500	8,000	7,500	3,000	30,000	20
				62000		*71800*	*Contractual Services - Individuals*		10,500	10,500	21,000			42,000	21
				62000		*72500*	*Supplies*	1,000	2,000	2,000	2,000	2,000	1,000	10,000	22
				62000		*75700*	*Training, Workshops and conference*	1,000	1,000	1,000	1,000	1,000		5,000	23
			Total Responsible FECO/MEE					*4,000*	*819,500*	*1,217,000*	*1,232,000*	*810,500*	*4,000*	*4,087,000*	

Quantum Outcome (GEF Component)	Quantum Output (GEF Outcome)	Quantum Activity (GEF Output)	Quantum Responsible Party (UNDP, IP, or Responsible Party)	Quantum Fund ID	Quantum Donor ID	Quantum Budgetary Account Code	Quantum Budget Account Description	Amount Year 2023 (USD)	Amount Year 2024 (USD)	Amount Year 2025 (USD)	Amount Year 2026 (USD)	Amount Year 2027 (USD)	Amount Year 2028 (USD)	Total (USD)	See Budget Note:
		the whole process.													
		Total Output 2.1.3						*4,000*	*819,500*	*1,217,000*	*1,232,000*	*810,500*	*4,000*	*4,087,000*	
	Total Outcome 2.1							*4,000*	*902,500*	*1,340,000*	*1,355,000*	*893,500*	*7,000*	4,502,000	
	Outcome 2.2 Prevent and minimize the generation of UP-POPs in the secondary metallurgical processes	*Output 2.2.1 Assessment of secondary metallurgic production processes and technologies finalized.*	*FECO/MEE*	*62000*	*10003*	*72100*	*Contractual Services - Companies (h-l)*	-	-	188,600	471,500	282,900	-	943,000	24
				62000		*74500*	*Miscellaneous Expenses*	2,000	5,000	5,000	5,000	2,500	500	20,000	25
			Total Responsible FECO/MEE					*2,000*	*5,000*	*193,600*	*476,500*	*285,400*	*500*	*963,000*	
		Total Output 2.2.1						*2,000*	*5,000*	*193,600*	*476,500*	*285,400*	*500*	*963,000*	
		Output 2.2.2 Two demonstration projects implemented to demonstrate BAT/BEP in the secondary production of metals (one in aluminum and one in zinc).	*FECO/MEE*	*62000*	*10003*	*72100*	*Contractual Services - Companies (cd)*		760,000	1,140,000	1,140,000	760,000		3,800,000	26
				62000		*71600*	*Travel*	*2,000*	5,000	6,000	8,000	6,000	3,000	30,000	27
				62000		*75700*	*Training, Workshops and conference*	1,000	1,000	1,000	1,000	1,000	-	5,000	28
			Total Responsible FECO/MEE					*3,000*	*766,000*	*1,147,000*	*1,149,000*	*767,000*	*3,000*	*3,835,000*	
			UNDP	*62000*	*10003*	*72100*	*Contractual Services - Companies*		47,600	55,800	55,800	40,800		200,000	29
			Total Responsible UNDP					-	*47,600*	*55,800*	*55,800*	*40,800*	-	*200,000*	
		Total Output 2.2.2						*3,000*	*813,600*	*1,202,800*	*1,204,800*	*807,800*	*3,000*	*4,035,000*	
	Total Outcome 2.2							*5,000*	*818,600*	*1,396,400*	*1,681,300*	*1,093,200*	*3,500*	4,998,000	
Total Component 2								***9,000***	***1,721,100***	***2,736,400***	***3,036,300***	***1,986,700***	***10,500***	**9,500,000**	
Component 3 Implementation of a National Replication	*Outcome 3.1 Replication and Promotion of demonstration*	*Output 3.1.1 A national replication plan of sustainable recycling and*	*FECO/MEE*	*62000*	*10003*	*71600*	*Travel*				5,000	5,000	5,000	15,000	30
				62000		*72100*	*Contractual Services - Companies*				485,000	1,944,200	569,700	2,998,900	31

Quantum Outcome (GEF Component)	Quantum Output (GEF Outcome)	Quantum Activity (GEF Output)	Quantum Responsible Party (UNDP, IP, or Responsible Party)	Quantum Fund ID	Quantum Donor ID	Quantum Budgetary Account Code	Quantum Budget Account Description	Amount Year 2023 (USD)	Amount Year 2024 (USD)	Amount Year 2025 (USD)	Amount Year 2026 (USD)	Amount Year 2027 (USD)	Amount Year 2028 (USD)	Total (USD)	See Budget Note:
Programme (NRP)	*results and experience*	*green production developed.*		*62000*		*74500*	*Communication & Audio Visual Equip*	-	3,000	5,000	5,000	5,000	2,000	20,000	32
				62000		*75700*	*Training, Workshops and conference*					5,000	5,000	10,000	33
			Total Responsible FECO/MEE					-	*3,000*	*5,000*	*495,000*	*1,959,200*	*581,700*	3,043,900	
			UNDP	*62000*	*10003*	*72100*	*Contractual Services - Companies*				15,000	55,800	14,300	85,100	34
			Total Responsible UNDP					-	-	-	*15,000*	*55,800*	*14,300*	*85,100*	
		Total Output 3.1.1						-	3,000	5,000	510,000	2,015,000	596,000	3,129,000	
		Output 3.1.2 Results of the implemented demonstration project published and disseminated for replication.	*FECO/MEE*	*62000*	*10003*	*75700*	*Training, Workshops and conference*				2,000	3,000		5,000	35
				62000		*71800*	*Contractual Services - Individuals*				7,000	10,500	3,500	21,000	36
			Total Responsible FECO/MEE					-	-	-	*9,000*	*13,500*	*3,500*	26,000	
		Total Output 3.1.2						-	-	-	*9,000*	*13,500*	*3,500*	26,000	
	Total Outcome 3.1							-	*3,000*	*5,000*	*519,000*	*2,028,500*	*599,500*	3,155,000	
	Outcome 3.2 Promotional events for stakeholders, including awareness raising delivered	*Output 3.2.1 Technical training for stakeholders and awareness raising workshops developed and implemented.*	*FECO/MEE*	*62000*	*10003*	*75700*	*Training, Workshops and conference*			5,000	5,000			10,000	37
				62000		*71600*	*Travel*				5,000	5,000	5,000	15,000	38
			Total Responsible FECO/MEE					-	-	*5,000*	*10,000*	*5,000*	*5,000*	25,000	
		Total Output 3.2.1						-	-	*5,000*	*10,000*	*5,000*	*5,000*	25,000	
		Output 3.2.2 Awareness raising materials formulated and distributed.	*FECO/MEE*	*62000*	*10003*	*75700*	*Training, Workshops and conference*		2,000	3,000				5,000	39
			Total Responsible FECO/MEE					-	*2,000*	*3,000*	-	-	-	5,000	

Quantum Outcome (GEF Component)	Quantum Output (GEF Outcome)	Quantum Activity (GEF Output)	Quantum Responsible Party (UNDP, IP, or Responsible Party)	Quantum Fund ID	Quantum Donor ID	Quantum Budgetary Account Code	Quantum Budget Account Description	Amount Year 2023 (USD)	Amount Year 2024 (USD)	Amount Year 2025 (USD)	Amount Year 2026 (USD)	Amount Year 2027 (USD)	Amount Year 2028 (USD)	Total (USD)	See Budget Note:
		Total Output 3.2.2						-	*2,000*	*3,000*	-	-	-	5,000	
	Total Outcome 3.2							-	*2,000*	*8,000*	*10,000*	*5,000*	*5,000*	30,000	
Total Component 3								-	***5,000***	***13,000***	***529,000***	***2,033,500***	***604,500***	**3,185,000**	
Monitoring and Evaluation (M&E)	*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, mid-term review and terminal evaluation conducted and project performance evaluated.*	*FECO/MEE*	*62000*	*10003*	*71300*	*Local Consultant (Gender Safeguards)*	*13,800*	23,200	9,000	-	-	-	46,000	40
				62000		*71600*	*Travel*	*2,000*	3,000	2,000	5,000	5,000	-	17,000	41
				62000		*75700*	*Training, Workshops and conference*		12,000	4,000	4,000	4,000	4,000	28,000	42
			Total Responsible FECO/MEE					*15,800*	*38,200*	*15,000*	*9,000*	*9,000*	*4,000*	91,000	
			UNDP	*62000*	*10003*	*71200*	*International Consultants*				19,500		19,500	39,000	43
				6200		*71300*	*National Consultants*				15,000		15,000	30,000	44
				62000		*71600*	*Travel*				7,500		7,500	15,000	45
			Total Responsible UNDP					-	-	-	*42,000*	-	*42,000*	84,000	
	Outcome 4.2 Knowledge sharing and information dissemination	*Output 4.2.1 Knowledge products on best practices, experiences and lessons learned documented and shared nationally and internationally, including recycling and disposal knowledge on waste lead/lithium batteries and metal scrap*	*FECO/MEE*	*62000*	*10003*	*71800*	*Contractual Services - Individuals*	-	10,500	10,500	3,500	10,500	7,000	42,000	46
				62000		*72100*	*Contractual Services - Companies*	-	-	-	-	56,000	22,000	78,000	47
				62000		*75700*	*Training, Workshops and conference*	-	4,000	4,000	4,000	4,000	4,000	20,000	48
			Total Responsible FECO/MEE					-	*14,500*	*14,500*	*7,500*	*70,500*	*33,000*	140,000	

Quantum Outcome	Quantum Output	Quantum Activity	Quantum Responsible Party (UNDP, IP, or Responsible Party)	Quantum Fund ID	Quantum Donor ID	Quantum Budgetary Account Code	Quantum Budget Account Description	Amount Year 2023 (USD)	Amount Year 2024 (USD)	Amount Year 2025 (USD)	Amount Year 2026 (USD)	Amount Year 2027 (USD)	Amount Year 2028 (USD)	Total (USD)	See Budget Note:
(GEF Component)	(GEF Outcome)	(GEF Output)													
Total Outcome 4.1 & 4.2								***15,800***	***52,700***	***29,500***	***58,500***	***79,500***	***79,000***	**315,000**	
Project Management Cost (PMC)	*PMC*	*PMC*	*FECO/MEE*	*62000*	*10003*	*71800*	*Contractual Services-Imp Partn*	67,240	138,420	138,420	138,420	138,420	70,780	691,700	49
			Total Responsible FECO/MEE					67,240	138,420	138,420	138,420	138,420	70,780	691,700	
			UNDP	*62000*	*10003*	*74596*	*Services to projects - GOE for CO*		4,660	4,660	4,660	4,660	4,660	23,300	50
				62000		*64397*	*Services to projects - CO staff*		1,000	1,000	1,000	1,000	1,000	5,000	51
				62000		*74100*	*Audit*	-	6,000	6,000	6,000	6,000	6,000	30,000	52
			Total Responsible UNDP					-	11,660	11,660	11,660	11,660	11,660	58,300	
Total Project Management Cost								67,240	150,080	150,080	150,080	150,080	82,440	750,000	
Total Project Grant								***106,540***	***2,204,880***	***3,394,380***	***4,294,080***	***4,892,180***	***857,940***	**15,750, 000**	

** Budget for Year 1 and Year 6 is allocated for a period of 6-month only*

Summary of Funds:							
	Amount Year 1 *	**Amount Year 2**	**Amount Year 3**	**Amount Year 4**	**Amount Year 5**	**Amount Year 6 ***	**Total**
GEF grant administered by UNDP	$1,107,800	$3,237,200	$3,416,000	$3,436,000	$3,278,300	1,274,700	**$15,750,000**
Ministry of Ecology and Environment (cash and in-kind)	$50,000	$150,000	$150,000	$150,000	$150,000	$50,000	**$700,000**
Weifang Aolong Zinc Industry Co., Ltd. (cash and in-kind)	$348,900	$3,185,400	$4,543,400	$4,469,500	$1,848,100	$584,700	**$14,980,000**
Zhejiang Tianneng Energy Technology Co., Ltd. (cash and in-kind)	$456,500	$4,167,800	$5,944,600	$5,848,000	$2,418,100	$765,000	**$19,600,000**
Jiangsu New Chunxing Resource Recycling Co., Ltd. (cash and in-kind)	$276,000	$2,519,800	$3,594,000	$3,535,700	$1,462,000	$462,500	**$11,850,000**
Xinlian Environmental Protection Technology Co., Ltd. (cash and in-kind)	$348,900	$3,185,400	$4,543,300	$4,469,600	$1,848,100	$584,700	**$14,980,000**
Jiangxi Hongcheng Aluminum Co., Ltd. (cash and in-kind)	$348,900	$3,185,300	$4,543,400	$4,469,600	$1,848,100	$584,700	**$14,980,000**
Shandong Hongshun Recycling Technology Co., Ltd. (cash and in-kind)	$456,500	$4,167,800	$5,944,600	$5,848,000	$2,418,100	$765,000	**$19,600,000**
GWM Co., Ltd. (cash and in-kind)	$312,400	$2,851,400	$4,067,200	$4,001,100	$1,654,500	$523,400	**$13,410,000**
UNDP (cash and in-kind)	$25,000	$50,000	$50,000	$50,000	$50,000	$25,000	**$250,000**
TOTAL	**$3,730,900**	**$26,700,100**	**$36,796,500**	**$36,277,500**	**$16,975,300**	**$5,619,700**	**$126,100,000**

** Budget for Year 1 and Year 6 is allocated for a period of 6-month only*

Budget Notes:

Budget note number	**Atlas Budgetary Account Code**	**Project Output (Description)**
Component 1: Strengthening the national policy and regulatory framework to reduce UP-POPs and BFRs releases from secondary non-ferrous metal industry		
1	71300	Local consultants: (b) Policy Advisor to provide policy proposal for the secondary metal industry at $2,000/week for 20 weeks, **Total $40,000**;
2	72100	Subcontracts: (a) Compilation and publication of information materials related to the secondary metal smelting industry **($157,000)**; (b) Policy research and recommendations on the management of recycled zinc raw materials **($80,000)**;

		(c) Green battery ecological design path and policy research **($80,000)**; **Total: $317,000**
3	71600	Travel costs for: (c) For Policy Advisor at $2,000/mission for 4 times**, sub-total: $ 8,000**; (e) Domestic travel costs for technical consultations and policy consultations at $1,000/person/mission for 2 persons and 5 times (1 time per year x 5 years), inclusive of transportation costs, **sub-total: $10,000**; **Total: $18,000**
4	75700	Costs for workshop and seminar for: (b) Technical workshops to develop and consult on national legislative and policy revisions (10 meetings @ $1,000), **Total: $10,000**;
5	71200	International Technical Advisor to support international technical knowledge sharing and project capacity building at $3,000/week for 10 weeks, **Total: $30,000**
6	71300	Local consultant: (a) National Technical Advisor (NTA) to provide technical support for the project at $2,000/week for 50 weeks **Total $100,000**;
7	71800	Technical Coordinator to provide technical support for industrial research and policy development in secondary metal sectors under the project. 60 months at $3,500/month, with 50% (30 months) time allocation to Component 1, **Total $105,000**
8	72100	Subcontracts: (d) Guidelines on BAT/BEP for the pollution prevention and control of secondary metals (Al, Zn, Pb, Li) smelting **($320,000)**; (e) Technical specifications for pollution control by utilization and disposal of aluminum-containing waste and zinc-containing waste **($160,000)**; (f) Evaluation Index System for Cleaner Production of Secondary Zinc and Lithium **($ 150,000)**; (g) Research on Environmental Management Policies and Standards of Hazardous Waste in Waste Lithium-ion Battery Recycling Industry **($80,000)**; (h) Research on Accounting Methods and Reporting of Greenhouse Gas Emissions from Recycling Metals (Al, Pb, Zn, Li) Smelting Industry **($60,000)**; (i) Evaluation standards for low-carbon enterprises in the smelting industry of recycled metals (Al, Pb, Zn, Li) **($60,000)**; (j) Research on low-carbon technology in the smelting industry of secondary metals (Al, Pb, Zn, Li) **($98,000)**; **Total: $928,000**
9	71600	(a) International travel for International Technical Advisor at $5,000/mission for 2 missions**, sub-total: $10,000**; (b) Domestic travel for National Technical Advisor at $2,000/mission for 5 times, **sub-total: $10,000**; (c) Domestic travel costs for technical consultations and policy consultations at $1,000/person/mission for 2 persons and 5 times (1 time per year x 5 years), inclusive of transportation costs, **sub-total: $10,000**; (d) International technical knowledge sharing study tour for 8 advisors of 4 missions at average costs of $6,000/person for each mission, **sub-total $192,000**; **Total: $222,000**
10	74500	Miscellaneous costs for conducting research in the field, expenses on coordination activities required to support conducting researches and investigations, liaison and interaction with subcontractors, over the 5-year project duration. **Total: $15,000**
11	75700	Costs for meetings for: (a) Series of meetings of the task force and national stakeholders to develop and consult on national legislative and policy revisions (5 meetings @ $1,000); (b) Series of meetings to analyze, develop and promote legislative and policy changes with related stakeholders (5 meetings @ $1,000)

		Total: $10,000;
12	72100	Subcontracts: (k) Evaluation of recycling mode of recycled metals (Al, Pb, Zn, Li) and research on fiscal and taxation policies **($100,000)**; (l) Study on the management requirements for the collection and transportation of waste lead storage batteries **($80,000)**; **Total: $180,000**
13	71600	Domestic travel costs for technical consultations at $1,000/person/mission for 2 persons and 5 times (1 time per year x 5 years), inclusive of transportation costs, **Total: $10,000**;
14	72500	Standard costs of materials and supplies for workshop and meetings, **Total: $ 10,000** for 5 years
15	75700	Costs for workshop and seminar for: (a) Review and revision on policy frameworks, 2 one-day workshops per year (total 10 workshops) with 10 participants at $50/day per participant, **Total: $ 5,000**
Component 2: Reduction of UP-POPs and BFRs release from unsound metal scrap and batteries recycling		
16	72100	Subcontracts for the reduction of UP-POPs and BFRs releases from unsound metal scrap and batteries recycling: (e) Research and design of current situation assessment of waste battery recycling mode in demonstration areas **($100,000)**; (g) Performance evaluation of battery recovery demonstration **($200,000)**; **Total: $300,000**
17	72100	Subcontract: (f) Research and assessment on environmental management for hazardous waste and BFR-containing waste in the supply chain of scrap metals and manage BFR-containing plastics and other polymers in the recycling process **($100,000);**
18	75700	(c) Consultation meetings for the development of project training plan and materials, 5 times at $3,000 each, **sub-total $15,000**;
19	72100	Subcontracts for the reduction of UP-POPs and BFRs releases from unsound metal scrap and batteries recycling: (a) Demonstration of Waste Lead-acid Battery **($3,000,000)**; (b) Demonstration of Waste LIB **($1,000,000)**; **Total:$4,000,000**
20	71600	Travel costs for consultations and consultant inputs including air and ground transportation costs for the demonstration selection and monitoring, USD1,000/person/mission for 6 persons and 5 times, **Total $30,000**
21	71800	Technical Coordinator to provide technical support to the demonstration activities of the project. 60 months at $3,500/month, with 20% (12 months) time allocation to component 2, **Total: $42,000**
22	72500	Standard costs of materials and supplies for workshop and meetings. **Total: $10,000**
23	75700	(a) Special stakeholder consultation meetings to address specific technical issues at each of demonstration sites, 5 time at $1,000 each, **Total: $5,000**;
24	72100	Subcontracts for the reduction of UP-POPs and BFRs releases from unsound metal scrap and batteries recycling: (h) Evaluation of dioxin emission reduction technology in the secondary aluminum and secondary zinc industry **($103,000)**; (i) Recycled zinc and recycled aluminum recycling supervision capacity building **($500,000)**; (j) Baseline assessment of UP-POPs in secondary aluminum and secondary zinc demonstration enterprises **($170,000)**;

		(k) Performance evaluation of secondary aluminum and secondary zinc demonstration enterprises **($120,000)**; (l) Social and Environmental assessment and management (**$50,000**) **Total: $943,000**
25	74500	Miscellaneous costs related to the organization, collaboration and coordination among the demonstration enterprises and demonstration provinces/cities to share lessons and researches, investigations activities. Total: **$20,000** for 5 years
26	72100	(c) Demonstration of Secondary Aluminum ($2,000,000); (d) Demonstration of Secondary Zinc ($1,800,000); **Total: $3,800,000**
27	71600	Travel costs for consultations and consultant inputs including air and ground transportation costs for the demonstration selection and monitoring, USD1,000/person/mission for 6 persons and 5 times, **Total $30,000**
28	75700	(b) Technical workshops involving international and national partners, project demonstration sites, technical experts team, 5 times at $1,000 each. **Total: $ 5,000**
29	72100	Subcontract for Independent Verification and Supervision. **Total: $200,000**
Component 3. Implementation of a National Replication Programme (NRP)		
30	71600	Standard domestic travel costs to support the identification, selection and evaluation for National Replication Plan, 3 persons at average transportation of $1,000/mission/person, and 5 times in total **Total: $15,000**
31	72100	Subcontracts for 10-12 secondary metal plants to implement NRP **Total $2,998,900**
32	74500	Standard miscellaneous expenses to for the bureaucratic endorsement actions and start up of implementation of the National Replication Plan. **$20,000** for 5 years **Total: $20,000**
33	75700	(a) Consultation and review meetings on NRP plan launch and promotion, at $100 /person for 20 people, 5 times **Total: $10,000**;
34	72100	Subcontract for Independent Verification and Supervision. **Total: $85,100**
35	75700	(b) Meeting /training for promotion of BAT/BEP for 4 sectors, $100/person for 50 people **Total: $5,000**;
36	71800	Technical Coordinator to provide technical support to the NRP activities of the project. 60 months at $3,500/month, with 10% (6 months) time allocation to Component 3, **Total $21,000**
37	75700	Technical workshop and trainings, $330/person for 30 people. Rounded up to **Total: $10,000.**
38	71600	Standard domestic travel costs to support the identification, selection and evaluation for National Replication Plan, 3 persons at average transportation of $1,000/mission/person, and 5 times in total, **Total: $15,000**
39	75700	Technical workshop and trainings, $100/person for 50 people **Total: $5,000**
Component 4. Project Monitoring, Evaluation and Knowledge Management		
40	71300	(a) Project Gender Specialist at $2,000/week for 15 weeks, **sub-total $30,000**;

		(b) Project Safeguards Specialist, at $2,000/week for 8 weeks, **sub-total $ 16,000**, including monitoring progress in development/implementation of the project ESMF/ESMP and undertake scoped ESIA/ESMP if needed; **Total: $46,000**
41	71600	Travel costs for: (a) Training, public awareness, technical knowledge sharing, monitoring and evaluation for 5 participants for an average of 5-day duration at $400/participant/day, **sub-total $10,000**; (b) Annual monitoring of safeguards management framework, environmental and social risks and coordination management for 5 years, **sub-total $7,000**; **Total: $17,000**
42	75700	Standard costs for meetings, workshops for M&E, including: (a) Inception workshop, **$8,000**; (b) Project Board meeting for 4 times, **$20,000**; **Total: $28,000**
43	71200	International consultants to conduct MTR and TE at daily rate of $650, 30 workdays each for MTR and TE, **Total $39,000**
44	71300	National consultants to conduct MTR and TE at daily rate of $500, 30 workdays each for MTR and TE, **Total $30,000**
45	71600	Travel costs for: (a) International evaluator for MTR and TE at $5,000 each, **sub-total $10,000**, (b) National evaluator for MTR and TE at $2,500 each, **sub-total $5,000;** **Total: $15,000**
46	71800	Technical Coordinator to provide technical support on knowledge sharing, lessons learned and experiences under the project. 60 months at $3,500/month, with 20% (12 months) time allocation to Component 4, **Total $42,000**
47	72100	Subcontract to conduct performance and effectiveness evaluation, **$78,000**
48	75700	Standard costs for meetings, workshops and seminars for knowledge management, including: (a) International knowledge sharing workshop with participation of international and domestic experts for South-South cooperation platform, covering costs meeting facilities, fees of 10 invited experts, 2 interpreters, and printed materials **($10,000)**; (b) Training workshops on technical tools and guidelines, awareness, knowledge and experience sharing, two 1-day workshops per year for 5 years, with 50 participants for each workshop **($10,000)**; **Total: $20,000**
Project Management		
49	71800	Project management personnel to include: (a) Project Manager at $54,340/year for 5 years, **sub-total: $271,700**; (b) Project Assistant at $42,000/year for 5 years, **sub-total: $210,000**; (c) Project Financial Assistant at $42,000/year for 5 years, **sub-total: $210,000**; **Total: $691,700**
50	74596	UNDP technical support to NIM costs based on UPL, **$23,300**
51	64397	UNDP admin support to NIM costs, **$5,000**
52	74100	Annual audit costs, **total $30,000**

Note: Monitoring and Evaluation activities are highlighted

XI. LEGAL CONTEXT

This project document shall be the instrument referred to as such in Article 1 of the Standard Basic Assistance Agreement between the Government of the People's Republic of China and UNDP, signed on 29 June 1979. All references in the SBAA to "Executing Agency" shall be deemed to refer to "Implementing Partner."

This project will be implemented by the Foreign Environmental Cooperation Center (FECO) of the Ministry of Ecology and Environment (MEE) ("Implementing Partner") in accordance with its financial regulations, rules, practices and procedures only to the extent that they do not contravene the principles of the Financial Regulations and Rules of UNDP. Where the financial governance of an Implementing Partner does not provide the required guidance to ensure best value for money, fairness, integrity, transparency, and effective international competition, the financial governance of UNDP shall apply.

XII. RISK MANAGEMENT

Implementing Partner is a Government Entity (Assisted NIM with support by UNDP)

1. Consistent with the Article III of the SBAA *[or the Supplemental Provisions to the Project Document]*, the responsibility for the safety and security of the Implementing Partner and its personnel and property, and of UNDP's property in the Implementing Partner's custody, rests with the Implementing Partner. To this end, the Implementing Partner shall:

   a) put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;

   b) assume all risks and liabilities related to the Implementing Partner's security, and the full implementation of the security plan.

2. UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of the Implementing Partner's obligations under this Project Document.

3. The Implementing Partner agrees to undertake all reasonable efforts to ensure that no UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the United Nations Security Council Consolidated Sanctions List, and that no UNDP funds received pursuant to the Project Document are used for money laundering activities. The United Nations Security Council Consolidated Sanctions List can be accessed via https://www.un.org/securitycouncil/content/un-sc-consolidated-list.

4. The Implementing Partner acknowledges and agrees that UNDP will not tolerate sexual harassment and sexual exploitation and abuse of anyone by the Implementing Partner, and each of its responsible parties, their respective sub-recipients and other entities involved in Project implementation, either as contractors or subcontractors and their personnel, and any individuals performing services for them under the Project Document.

   (a) In the implementation of the activities under this Project Document, the Implementing Partner, and each of its sub-parties referred to above, shall comply with the standards of conduct set forth in the Secretary General's Bulletin ST/SGB/2003/13 of 9 October 2003, concerning "Special measures for protection from sexual exploitation and sexual abuse" ("SEA").

   (b) Moreover, and without limitation to the application of other regulations, rules, policies and procedures bearing upon the performance of the activities under this Project Document, in the implementation of activities, the Implementing Partner, and each of its sub-parties referred to above, shall not engage in any form of sexual harassment ("SH"). SH is defined as any unwelcome conduct of a sexual nature that might reasonably be expected or be perceived to cause offense or humiliation, when such conduct interferes with work, is made a condition of employment or creates an intimidating, hostile or offensive work environment. SH may occur in the workplace or in connection with work. While typically involving a pattern of conduct, SH may take the form of a single incident. In assessing the reasonableness of expectations or perceptions, the perspective of the person who is the target of the conduct shall be considered.

5. a) In the performance of the activities under this Project Document, the Implementing Partner shall (with respect to its own activities), and shall require from its sub-parties referred to in paragraph 4 (with respect to their activities) that they, have minimum standards and procedures in place, or a plan to develop and/or improve such standards and procedures in order to be able to take effective preventive and investigative action. These should include: policies on sexual harassment and sexual exploitation and abuse; policies on whistleblowing/protection against retaliation; and complaints, disciplinary and investigative mechanisms. In line with this, the Implementing Partner will and will require that such sub-parties will take all appropriate measures to:

    i. Prevent its employees, agents or any other persons engaged to perform any services under this Project Document, from engaging in SH or SEA;

    ii. Offer employees and associated personnel training on prevention and response to SH and SEA, where the Implementing Partner and its sub-parties referred to in paragraph 4 have not put in place its own training regarding the prevention of SH and SEA, the Implementing Partner and its sub-parties may use the training material available at UNDP;

    iii. Report and monitor allegations of SH and SEA of which the Implementing Partner and its sub-parties referred to in paragraph 4 have been informed or have otherwise become aware, and status thereof;

    iv. Refer victims/survivors of SH and SEA to safe and confidential victim assistance; and

    v. Promptly and confidentially record and investigate any allegations credible enough to warrant an investigation of SH or SEA. The Implementing Partner shall advise UNDP of any such allegations received and investigations being conducted by itself or any of its sub-parties referred to in paragraph 4 with respect to their activities under the Project Document, and shall keep UNDP informed during the investigation by it or any of such sub-parties, to the extent that such notification (i) does not jeopardize the conduct of the investigation, including but not limited to the safety or security of persons, and/or (ii) is not in contravention of any laws applicable to it. Following the investigation, the Implementing Partner shall advise UNDP of any actions taken by it or any of the other entities further to the investigation.

    b) The Implementing Partner shall establish that it has complied with the foregoing, to the satisfaction of UNDP, when requested by UNDP or any party acting on its behalf to provide such confirmation. Failure of the Implementing Partner, and each of its sub-parties referred to in paragraph 4, to comply of the foregoing, as determined by UNDP, shall be considered grounds for suspension or termination of the Project.

6. Social and environmental sustainability will be enhanced through application of the UNDP Social and Environmental Standards (http://www.undp.org/ses) and related Accountability Mechanism (http://www.undp.org/secu-srm).

7. The Implementing Partner shall: (a) conduct project and programme-related activities in a manner consistent with the UNDP Social and Environmental Standards, (b) implement any management or mitigation plan prepared for the project or programme to comply with such standards, and (c) engage in a constructive and timely manner to address any concerns and complaints raised through the Accountability Mechanism. UNDP will seek to ensure that communities and other project stakeholders are informed of and have access to the Accountability Mechanism.

8. All signatories to the Project Document shall cooperate in good faith with any exercise to evaluate any programme or project-related commitments or compliance with the UNDP Social and Environmental Standards. This includes providing access to project sites, relevant personnel, information, and documentation.

9. The Implementing Partner will take appropriate steps to prevent misuse of funds, fraud or corruption, by its officials, consultants, responsible parties, subcontractors and sub-recipients in implementing the project or using UNDP funds.

10. In the implementation of the activities under this Project Document, UNDP places reasonable reliance upon the Implementing Partner for it to apply its laws, regulations and processes, and applicable international laws regarding anti money laundering and countering the financing of terrorism, to ensure consistency with the principles of then in force the UNDP Anti-Money Laundering and Countering the Financing of Terrorism Policy.

11. The Implementing Partner will ensure that its financial management, anti-corruption, anti-fraud and anti-money laundering and countering the financing of terrorism policies are in place and enforced for all funding received from or through UNDP.

12. The requirements of the following documents, then in force at the time of signature of the Project Document, apply to the Implementing Partner: (a) UNDP Policy on Fraud and other Corrupt Practices and (b) UNDP Office of Audit and Investigations Investigation Guidelines. The Implementing Partner agrees to the requirements of the above documents, which are an integral part of this Project Document and are available online at www.undp.org.

13. In the event that an investigation is required, UNDP has the obligation to conduct investigations relating to any aspect of UNDP projects and programmes in accordance with UNDP's regulations, rules, policies and procedures. The Implementing Partner shall provide its full cooperation, including making available personnel, relevant documentation, and granting access to the Implementing Partner's (and its consultants', responsible parties', subcontractors' and sub-recipients') premises, for such purposes at reasonable times and on reasonable conditions as may be required for the purpose of an investigation. Should there be a limitation in meeting this obligation, UNDP shall consult with the Implementing Partner to find a solution.

14. The signatories to this Project Document will promptly inform one another in case of any incidence of inappropriate use of funds, or credible allegation of fraud or corruption with due confidentiality.

15. UNDP shall be entitled to a refund from the Implementing Partner of any funds provided that have been used inappropriately, including through fraud, corruption or other financial irregularity, or otherwise paid other than in accordance with the terms and conditions of the Project Document. Such amount may be deducted by UNDP from any payment due to the Implementing Partner under this or any other agreement. Recovery of such amount by UNDP shall not diminish or curtail the Implementing Partner's obligations under this Project Document..

    Where such funds have not been refunded to UNDP, the Implementing Partner agrees that donors to UNDP (including the Government) whose funding is the source, in whole or in part, of the funds for the activities under this Project Document, may seek recourse to the Implementing Partner for the recovery of any funds determined by UNDP to have been used inappropriately, including through fraud, corruption or other financial irregularity, or otherwise paid other than in accordance with the terms and conditions of the Project Document.

    Note: The term "Project Document" as used in this clause shall be deemed to include any relevant subsidiary agreement further to the Project Document, including those with responsible parties, subcontractors and sub-recipients.

16. Each contract issued by the Implementing Partner in connection with this Project Document shall include a provision representing that no fees, gratuities, rebates, gifts, commissions or other payments, other than those shown in the proposal, have been given, received, or promised in connection with the selection process or in contract execution, and that the recipient of funds from the Implementing Partner shall cooperate with any and all investigations and post-payment audits.

17. Should UNDP refer to the relevant national authorities for appropriate legal action any alleged wrongdoing relating to the project, the Government will ensure that the relevant national authorities shall actively investigate the same and take appropriate legal action against all individuals found to have participated in the wrongdoing, recover and return any recovered funds to UNDP.

18. The Implementing Partner shall ensure that all of its obligations set forth under this section entitled "Risk Management" are passed on to each responsible party, subcontractor and sub-recipient and that all the clauses under this section entitled "Risk Management Standard Clauses" are included, mutatis mutandis, in all sub-contracts or sub-agreements entered into further to this Project Document.

XIII. MANDATORY ANNEXES

1. GEF Budget
2. Project Map and geospatial coordinates of the project area
3. Multiyear Workplan
4. Monitoring Plan
5. Social and Environmental Screening Procedure (SESP)
6. UNDP Atlas Risk Register
7. Overview of technical consultancies/subcontracts
8. Stakeholder Engagement Plan
9. Environmental Social Management Framework (ESMF)
10. Gender Analysis and Gender Action Plan
11. Procurement Plan
12. Proposed Selection Process and Criteria for Demonstration and NRP Activities
13. Letter of financial commitments
14. Signed LOA between UNDP and IP requesting UNDP Support Services
15. GEF Core indicators
16. GEF Taxonomy
17. Partners Capacity Assessment Tool and HACT assessment
18. UNDP Project Quality Assurance Report

Annex 1: GEF Budget Template

Project budget is attached as a separate Excel file.

Annex 2: Project map and Geospatial Coordinates of project sites

At the PPG stage, the identification and selection of the demonstration enterprises and the demonstration provinces could not be finalized due to the significant impacts of limited movements caused by the COVID-19 situation during the PPG stage, as it was necessary to further clarify the current status and demand of the industries and to fully evaluate and summarize the policies, current and alternative technologies, market situations and supervision mechanism. The in-depth review and analysis is required to ensure that the potential candidate enterprises to be selected to undertake demonstration activities are good representatives, can effectively promote dioxin and other pollutants emission reduction and improve the comprehensive capabilities of the industry.

However, substantive contributions of the secondary metal industry associations and the solid waste management organizations to the PPG work, and through information and data gathered through investigations, stakeholders consultations, interactions with the private sector manufacturing enterprises, interviews and on-site surveys to more than 10 secondary metal enterprises in Shanghai, Jiangsu, Shandong, Yunnan and other provinces during the PPG stage despite the limited allowed movements and the short timeframe, the enterprises have provided good information and suggestions for the promotion of recycling system demonstrations in the secondary lead and lithium industries, and good data basis for BAT/BEP demonstration in secondary aluminum and zinc production enterprises. There is now a comprehensive understanding on the basic information about industry policies, technologies, markets situations and supervision mechanisms, and knowing these enterprises' key aspects in implementing energy conservation and emission reduction, have provided a very good foundation for advancing the setting up of an effective regional secondary metal recycling system and demonstration of dioxins emission reduction, which is conducive to promoting the implementation of the demonstration projects immediately upon initiation of project implementation. It is expected that, as a result of the pre-selection of the demonstration enterprises at the PPG stage, the selection of the demonstration provinces and enterprises, and the contractual arrangements for their formal engagement will be completed within six months after project initiation, and the demonstration activities can start implementation immediately, to be completed within 3 years of implementation.

Therefore, based on information and data gathered through investigations, stakeholders consultations, interactions with the private sector manufacturing enterprises, interviews and on-site surveys, a general overview of the four sectors, of the manufacturing enterprises in the sectors, as well as a general overview of the geographical distribution of the enterprises have been generated and are presented below. In addition, general situation of the producing and recycling enterprise are also described to present a general understanding of the sectors.

GEOGRAPHICAL DISTRIBUTION OF ENTERPRISES IN SECONDARY METAL SECTORS

Secondary aluminum sector

According to the China Nonferrous Metals Association Recycling Metals Branch (CMRA), as of 2020, there are about 200 plants for secondary aluminum metallurgy in China, producing 7,400,000 tons in 2020. Among the 200 secondary aluminum plants, there are about 100 plants that produce over 10,000 tons per year. When the secondary aluminum industry started, scrap aluminum raw materials mainly relied on imports. Therefore, enterprises were concentrated in coastal port areas. The Pearl River Delta, Yangtze River Delta, and Bohai Rim regions formed by industrial clusters are still the main sources and raw materials of domestic secondary aluminum distribution center.



Figure 3: Secondary aluminum plants in China

Source of all maps in Annex 2: http://bzdt.ch.mnr.gov.cn/

Secondary zinc sector

Up to now, there are about 150-200 plants for secondary zinc metallurgy in China, producing 1,450,000 tons in 2020, with 58% recycling rate and 25% are medium-sized enterprises. China's secondary zinc companies are mostly distributed around hot-dip galvanizing plants, steel companies and large scrap markets, with Hebei, Yunnan, and Shandong being the main producing areas.



Figure 4: Large scale secondary zinc plants in China

Secondary lead sector

Up to now, there is more than 70 plants for secondary lead metallurgy in China, producing 2,400,000 tons, in 2020, accounting for 32.5% of the world's total production (CMRA). The five provinces of Henan, Jiangxi, Anhui, Inner Mongolia, and Guizhou have the largest number of enterprises, accounting for 53% of the total number of enterprises in the country. At the same time, the production scale of Anhui, Henan, Jiangxi, Jiangsu, and Guizhou provinces exceeds 60% of the nationally approved total.



Figure 5: Secondary lead plants in China

Secondary lithium ion battery sector

Up to now, there are about 14 plants for waste LIB recycling in China, recycling 600,000 tons waste LIBs in 2020 (CMRA). Waste LIB recycling companies are mainly concentrated in provinces with developed economy, large number of new energy vehicles, and production bases for cathode materials and cathode precursors, such as Zhejiang and Guangdong.



Figure 6: Secondary lithium plants in China

In the PPG stage of this project, more than 10 companies in the industry and alternative areas for demonstration were selected for investigation to gather a general overview and the current status of potential demonstration enterprises. The map below (Fig.8) shows a sample of five companies visited and their geographic locations. The specific information of these five companies is introduced below.

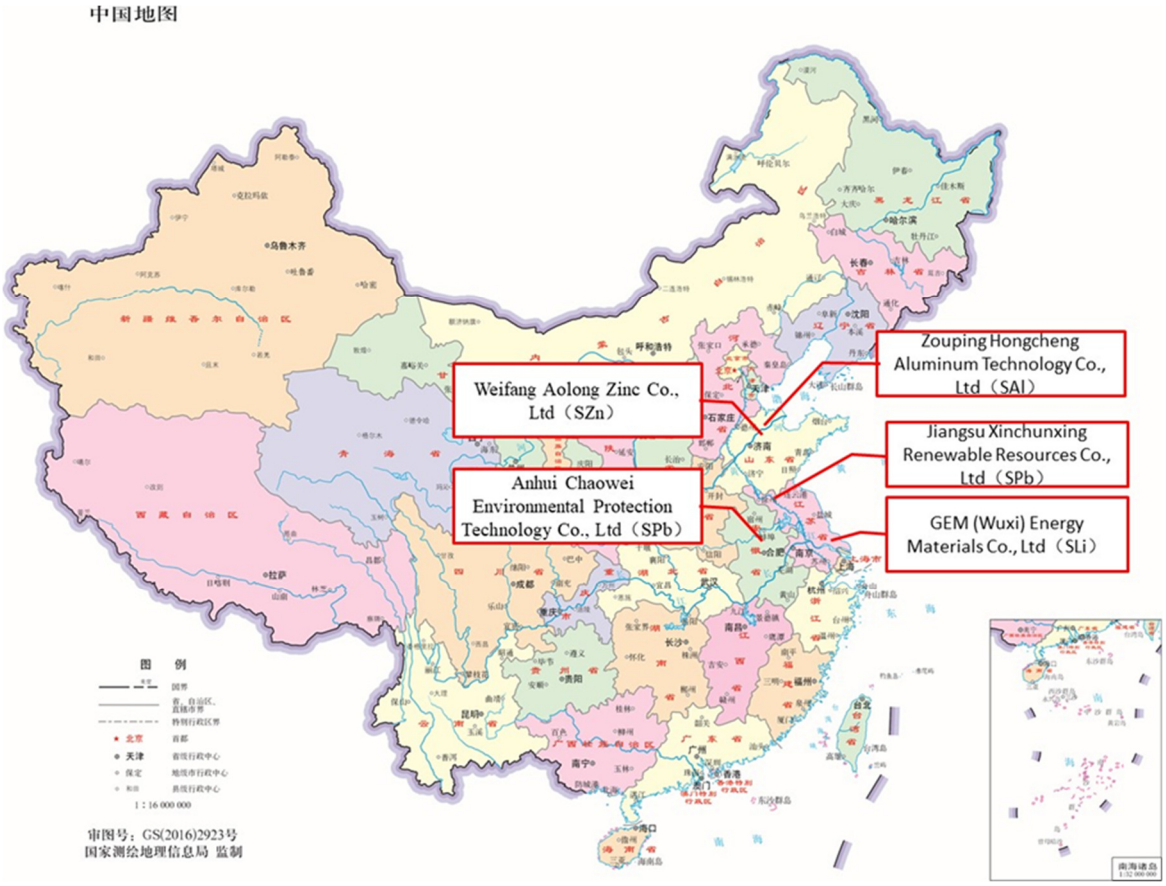


Figure 7: Second metal industry survey enterprises in China

Annex 3: Multi Year Work Plan

	Outcomes	Outputs	Year 1				Year 2				Year 3				Year 4				Year 5			
			Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
Component 1. Strengthening the national policy and regulatory framework to reduce UP-POPs and BFRs releases from secondary non-ferrous metal industry	**Outcome 1.1** Reduced UP-POPs and BFRs releases resulting from unsound metal scrap and batteries recycling management practices through the adoption and implementation of standards/measures, policies, plans, laws, regulations and guidance.	**Output 1.1.1** Policy and regulatory framework for metal scrap management developed, revised and improved and relevant components integrated into the existing policy and regulatory framework.																				
		Output 1.1.2 Technical by-laws, regulations and guidance aiming to reduce UP-POPs and BFRs release from batteries manufacturing, recycling and disposal practices developed, adopted and implemented.																				
		Output 1.1.3 Barriers to BAT/BEP and Extended Producer Responsibility (EPR) implementation removed through e.g. the institution of economic instruments and incentives.																				
Component 2 Reduction of UP-POPs and BFRs releases from unsound metal scrap and batteries recycling	**Outcome 2.1** Reduced releases of UP-POPs and BFRs as a result of improved raw material (recycled metal scrap and batteries) supply chains as well as the introduction of environmenta	**Output 2.1.1** Assessment of existing collection systems completed, and appropriate collection schemes established, feasible legislative arrangements, including proper																				

	lly sound disposal practices and extended producers responsibility at recycling entities.	acceptance and outbound material criteria.																				
		Output 2.1.2 Supply chains for local markets further developed, recycling rates increased and maximum quantities of recyclable plastic parts diverted from inadequate disposal.																				
		Output 2.1.3 Two demonstration projects implemented to demonstrate BAT/BEP and life cycle recycling in the collection and conditioning of waste batteries (one in lead acid batteries and one in lithium ion batteries), applying proper management of hazardous waste generated in the whole process.																				
	Outcome 2.2 Prevent and minimize the generation of UP-POPs in the secondary metallurgical processes.	**Output 2.2.1** Assessment of secondary metallurgic production processes and technologies finalized.																				
		Output 2.2.2 Two demonstration projects implemented to demonstrate BAT/BEP in the secondary production of metals (one in aluminum and one in zinc).																				
Component 3. Implementation of a National Replication	**Outcome 3.1** Replication and Promotion of demonstratio	**Output 3.1.1** A national replication plan of sustainable																				

Programme (NRP)	n results and experience.	recycling and green production developed and assessed																				
		Output 3.1.2 Results of the implemented demonstration project published and disseminated for replication																				
	Outcome 3.2 Promotional events for stakeholders, including awareness raising delivered.	**Output 3.2.1** Technical training for stakeholders and awareness raising workshops developed and implemented.																				
		Output 3.2.2 Awareness raising materials formulated and distributed.																				
Component 4. Project Monitoring, Evaluation and Knowledge Management	**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, mid-term review and terminal evaluation conducted and project performance evaluated.																				
	Outcome 4.2 Knowledge sharing and information dissemination	**Output 4.2.1** Knowledge products on best practices, experiences and lessons learned documented and shared nationally and internationally , including recycling and disposal knowledge on waste lead/lithium batteries and metal scrap.																				

Annex 4: Monitoring Plan

This Monitoring Plan and the M&E Plan and Budget in Section VI of this project document will both guide monitoring and evaluation at the project level for the duration of project implementation.

Monitoring	Indicators	Targets	Description of indicators and targets	Data source/ Collection Methods[60]	Frequency	Responsible for data collection	Means of verification	Risks / Assumptions
Project Objectives: Reduce and eliminate UP-POPs (PCDD/Fs, HCB and PCNs) and Brominated flame retardants (BFRs) releases through the introduction of BAT/BEP in the Secondary Aluminum and Zinc production, and implementation of life cycle management in Lead acid battery and Lithium ion battery recycling in China	**Indicator 1** # direct project beneficiaries disaggregated by gender (individual people)	*By MTR:* 50,000 direct project beneficiaries (25,000 female, 25,000 male); 100,000 indirect project beneficiaries (50,000 female, 50,000 male) *By end of project:* 100,000 direct project beneficiaries (50,000 female, 50,000 male); 300,000 indirect project beneficiaries (150,000 female, 150,000 male) ,	# direct project beneficiaries disaggregated by gender (individual people)	Baseline data from PIF and PPG reports, collected through desk studies, investigation, studies, interviews and on-site visits. For verification, data to be collected from training reports and progress reports	Annually Repotted in DO tab of the GEF PIR	Project Manager Project Management Officer	Consultant reports, Training reports and progress reports	Risks: Lack of interest for enterprises to participate; Alternative technologies (BAT/BEP) selected not addressing UP-POPs sensitive release Assumptions: Key stakeholders, especially the manufacturing enterprises in the four sectors have been properly consulted and their interest and commitments to participate secured. Careful analysis of BAT/BEP to be ensure that alternatives selected are appropriate for Chinese enterprises. Concerned parties and enterprises committed to gender equality
	Indicator 2 Quantity of UP-POPs reduction at the demonstration locations	*By MTR:* 7.5 g TEQ dioxin in two demonstration enterprises reduced through BAT/BEP demonstration in project period *By end of project:* 32.25 g TEQ dioxin in two demonstration enterprises reduced through BAT/BEP demonstration and 322.5 g ,	Through promotion of advanced technology and management experience of the demonstration projects, the dioxin pollution prevention technology and equipment upgrade of the recycled metal enterprise can be promoted. Based on the current scale and average emission	Baseline data from PIF and PPG reports, collected through desk studies, investigation, studies, interviews and on-site visits. The emission reduction data to be achieved will be calculated from the dioxin test data obtained during the implementation process and	Annually. Reported in DO tab of the GEF PIR	FECO (Project Manager, Project Management Offices) and Demonstration enterprises	Consultant reports, Enterprises progress reports, MTR and Terminal Evaluation reports	Risks: Technologies adopted not directly targeting UP-POPs sensitive release Assumptions: Appropriate BAT/BEP are selected for application to Chinese processing enterprises, and technologies effectively deployed to reduce UP-POPs and BFRs release

[60] Data collection methods should outline specific tools used to collect data and additional information as necessary to support monitoring. The PIR cannot be used as a source of verification.

Monitoring	Indicators	Targets	Description of indicators and targets	Data source/ Collection Methods[60]	Frequency	Responsible for data collection	Means of verification	Risks / Assumptions
		TEQ dioxin reduction through the NRP for the total amount of 354.75 g TEQ fir a two-year operation period	levels of the secondary non-ferrous metal industry, the potential emission reduction of dioxins per year at the two demonstration enterprises are estimated	the UNEP toolkit				
	Indicator 6.2 **(GEF Core Indicator 6)** Quantity of CO_2 emission reduction by the demonstration enterprises and National Replication Programme (NRP)	Through BAT/BEP demonstration and NRP, comprehensive energy consumption will be reduced from 1,200 kgce/t to 1,122 kgce/t, reducing CO_2 emission by 52,278.6 t/a	Through demonstration activities at the production enterprises and NRP, CO_2 emission reduced with reduction of comprehensive energy consumption	Baseline data from PIF and PPG reports collected through desk studies, investigations, studies, interviews and on-site visits. After the demonstration and NRP activities, Data on CO2 emission data will be collected from enterprise reports and progress reports	Annually. Reported in DO tab of the GEF PIR	FECO (Project Manager, Project Management Offices) and Demonstration enterprises	Consultant reports, Enterprises progress reports, MTR and Terminal Evaluation reports	Risk: Technologies adopted not directly contributed to reduced energy consumption. Assumption: Appropriate BAT/BEP are evaluated and selected to promote energy efficiency
	Indicator 3 Number of new technologies demonstrated	At least 1 Bat/BEP key technologies demonstrated by MTR and at least 2 BAT/BEP demonstrated by end of project to meet pollution control standard	Two demonstration projects (one secondary aluminum and one secondary zinc) implemented to demonstrate the best available techniques/ best environmental practices for reducing UP-POPs and BFRs in the production of secondary metals (aluminum, zinc).	Baseline data from PIF and PPG reports collected through desk studies, investigations, studies, interviews and on-site visits. After the demonstration enterprise adopts BAT/BEP, dioxin emission data and indicators will be obtained after testing meet the industry pollutant emission standards.	Annually Reported in DO tab of the GEF PIR	FECO (Project Manager, Project Management Offices) and Demonstration enterprises	Consultant reports, Enterprises progress reports, MTR and Terminal Evaluation reports	Risks: Technologies adopted not directly targeting UP-POPs sensitive release Assumptions: Appropriate BAT/BEP are selected for application to Chinese processing enterprises, and technologies effectively deployed to reduce UP-POPs and BFRs release
	Indicator 4	At least 1 battery recycling	A four-dimensional waste lead	Baseline data from PIF and PPG reports	Annually	FECO (Project Manager,	Consultant reports,	Risks: Battery recycling mode not

Monitoring	Indicators	Targets	Description of indicators and targets	Data source/ Collection Methods[60]	Frequency	Responsible for data collection	Means of verification	Risks / Assumptions
	Number of battery recycling mode	mode demonstrated by MTR, and at least 2 battery recycling modes demonstrated by end of project	storage battery recycling model established: point (enterprise), line (industry), area (region), and body (cross-region); A model of recycling management (including enterprise point-to-point recycling, Internet recycling, B2B recycling and other recycling models) built for the full life cycle value chain of storage and transportation points, transportation transfer institutions, regional processing centers, and recycling	collected through desk studies, investigations, studies, interviews and on-site visits. Data to be collected and verified in at least one area or one company in the normal operation of recycling mode	Reported in DO tab of the GEF PIR	Project Management Offices) and Demonstration enterprises	Enterprises progress reports, MTR and Terminal Evaluation reports	suitable for all kinds of enterprises Assumptions: Battery recycling mode is highly promoted in China, especially given that the demonstration solution is quite suitable for the recycling area
Project Outcome 1.1 Reduced UP-POPs and BFRs releases resulting from unsound metal scrap and batteries recycling management practices through the adoption and implementation of standards/measures, policies, plans, laws, regulations and guidance.	**Indicator 5** Number of technical standards finalized	At least 2 technical standard documents finalized by MTR and at least 4 technical standard documents finalized by end of project	The formulation, adoption and implementation of pollution prevention and control technology policies, guidelines for feasible technologies for pollution prevention and control, technical specifications for pollution prevention and control, cleaner production evaluation index systems, technical specifications for the application and issuance	Baseline data from PIF and PPG reports collected through desk studies, investigations, studies, interviews and on-site visits. Data to be collected and verified through relevant reports submitted to authorities or officially release	Annually Reported in DO tab of the GEF PIR	FECO (Project Manager, Project Management Offices)	Consultant reports, Enterprises progress reports, MTR and Terminal Evaluation reports	Risks: Resistance in compliance and inadequate enforcement effort Assumptions: Standards established or revised to guide proper secondary metal production to reduce UP-POPs and BFRs release

Monitoring	Indicators	Targets	Description of indicators and targets	Data source/ Collection Methods[60]	Frequency	Responsible for data collection	Means of verification	Risks / Assumptions
			of pollutant discharge permits, and pollutant discharge standards are designed to reduce battery manufacturing , recycling and implementatio n. Technical rules, regulations and guidelines for the release of UP-POPs and BFRs generated during the disposal process.					
	Indicator 6 Effectiveness of policy implementation	At least one evaluation report on effectiveness of existing policy implementatio n and suggestions for improvement by MTR, and at least two evaluation reports and at least five policy drafts on secondary metal management by end of project	Policies and regulatory frameworks developed, revised and improved for metal scrap management from the perspectives of product design standards, domestic and imported raw materials standards, and industry norms, etc., and incorporating relevant content into existing policies and regulatory frameworks, such as green battery product standards, aluminum Technical specifications for pollution prevention and control of ash and secondary aluminum ash, etc.	Baseline data from PIF and PPG reports collected through desk studies, investigations, studies, interviews and on-site visits. Data to be collected and verified through relevant research reports submitted to relevant management department	Prior to MTR and TE Reported in DO tab of the GEF PIR	FECO (Project Manager, Project Management Offices)	Consultant reports, MTR and Terminal Evaluation reports	Risks: Resistance in compliance and inadequate enforcement effort Assumptions: Timely and effective enforcement efforts by Ecology and Environment Bureaus (EEB) on pollution prevention and control by secondary metal production enterprises to reduce UP-POPs and BFRs release
Project Outcome 2.1 Reduced releases of UP-POPs and	**Indicator 7** Battery recycling demonstration	By MTR, at least one waste LAB recycling pilot	Design of pilot plan and activities	Baseline data at PIF and PPG reports	Annually Reported in DO tab of	FECO (Project Manager, Project	Consultant reports,	Risks: Battery recycling mode not suitable for all kinds of enterprises

Monitoring	Indicators	Targets	Description of indicators and targets	Data source/ Collection Methods[60]	Frequency	Responsible for data collection	Means of verification	Risks / Assumptions
BFRs as a result of improved raw material (recycled metal scrap and batteries) supply chains as well as the introduction of environmentally sound disposal practices and extended producers responsibility at recycling entities	models in waste lead-acid battery	programme initiated, By end of project, at least one feasible waste LAB recycling model established		Data to be collected and verified with meeting, workshop and progress reports	the GEF PIR	Management Offices) and Demonstration enterprises	Enterprises progress reports, MTR and Terminal Evaluation reports	Assumptions: Battery recycling mode is highly promoted in China, especially given that the demonstration solution is quite suitable for the recycling area.
	Indicator 8 Battery recycling demonstration models in waste lithium ion battery	At least one waste LIB recycling pilot programme initiated by MTR, By end of project, at least one feasible waste LIB recycling model established	Design of pilot plan and activities	Baseline data at PIF and PPG reports Data to be collected and verified with meeting, workshop and progress reports	Annually Reported in DO tab of the GEF PIR	FECO (Project Manager, Project Management Offices) and Demonstration enterprises	Consultant reports, Enterprises progress reports, MTR and Terminal Evaluation reports	Risks: Battery recycling mode not suitable for all kinds of enterprises Assumptions: Battery recycling mode is highly promoted in China, especially given that the demonstration solution is quite suitable for the recycling area.
Project Outcome 2.2 Prevent and minimize the generation of UP-POPs in the secondary metallurgical processes.	**Indicator 9 (GEF Core Indicator 10)** BAT/BEP demonstration in SAl sectors	At least two BAT/BEP technical routes established by MTR, By end of project, at least tone to wo BAT/BEP demonstration plants implemented	Demonstration projects in secondary aluminum implemented to demonstrate BAT/BEP for reducing UP-POPs and BFRs in the production of secondary aluminum.	Baseline data from PIF and PPG reports collected through desk studies, investigations, studies, interviews and on-site visits. After the demonstration enterprise adopts BAT/BEP, data on dioxin emission indicators obtained after testing meet the industry pollutant emission standards will be collected and verified	Annually Reported in DO tab of the GEF PIR	FECO (Project Manager, Project Management Offices) and Demonstration enterprises	Consultant reports, Enterprises progress reports, MTR and Terminal Evaluation reports	Risks: Technologies adopted not directly targeting UP-POPs sensitive release Assumptions: Appropriate BAT/BEP suitable for application to Chinese processing enterprises are selected to reduce UP-POPs and BFRs release
	Indicator 10 (GEF Core Indicator 10) BAT/BEP demonstration in SZn sectors	By MTR, at least two BAT/BEP technical routes established, By end of project, at least one to two BAT/BEP demonstration	Demonstration projects in secondary aluminum implemented to demonstrate BAT/BEP for reducing UP-POPs and BFRs in the production of secondary zinc	Baseline data from PIF and PPG reports collected through desk studies, investigations, studies, interviews and on-site visits. After the demonstration	Annually Reported in DO tab of the GEF PIR	FECO (Project Manager, Project Management Offices) and Demonstration enterprises	Consultant reports, Enterprises progress reports, MTR and Terminal Evaluation reports	Risks: Technologies adopted not directly targeting UP-POPs sensitive release Assumptions: Appropriate BAT/BEP suitable for application to Chinese processing enterprises are selected to reduce UP-POPs and BFRs release

Monitoring	Indicators	Targets	Description of indicators and targets	Data source/ Collection Methods[60]	Frequency	Responsible for data collection	Means of verification	Risks / Assumptions
		plants implemented		enterprise adopts BAT/BEP, data on dioxin emission indicators obtained after testing meet the industry pollutant emission standards will be collected and verified				
Project Outcome 3.1 Replication and Promotion of demonstration results and experience.	**Indicator 11** National Replication Plan	National Replication Plan incorporating experience gained developed and implemented resulting in 322.5 g TEQ dioxin reduction through the NRP	The design and implementation of a National Replication Programme to replicate demonstration results to generate additional reduction of dioxins emission	Baseline data from PIF and PPG reports. Data to be verified with training, meeting and progress reports	Annually Reported in DO tab of the GEF PIR	FECO (Project Manager, Project Management Offices) and Demonstration enterprises	Consultant reports, Progress reports Meeting and workshop reports	Risks：The promotion plan not directly targeting POPs sensitive release Assumptions: Through careful selection of participants and quality training programme, promotion replication can reach expected target successfully.
	Indicator 12 Promotion plan design and implementation	BAT/BEP integrated into development plan of secondary metal project and implemented at dismantling and smelting enterprises	Transfer of alternative technology	Baseline data from PIF and PPG reports. Data to be collected and verified with training, meeting and progress reports	Annually upon initiation of NRP Reported on DO tab of the GEF PIR	FECO (Project Manager, Project Management Offices) and Demonstration enterprises	Consultant reports, Progress reports Meeting and workshop reports	Risks：The promotion plan not directly targeting POPs sensitive release Assumptions: Through proper preparation of the promotion plan and effective implementation, replication can reach expected targets successfully
Project Outcome 3.2 Promotional events for stakeholders, including awareness raising delivered.	**Indicator 13** Knowledge products and promotion materials	3 Knowledge products based on lessons learned developed and disseminated to promote demonstration results	Knowledge products and promotion materials documenting knowledge, implementation experience and demonstration results	Baseline data from PIF and PPG reports Data to be collected and verified with workshops, meeting and progress reports	Annually after results of demonstration projects, and upon initiation of NRP Reported on DO tab of the GEF PIR	FECO (Project Manager, Project Management Offices) and Demonstration enterprises	Consultant reports, Progress reports Meeting and workshop reports	Risks: Lack of interest of enterprise and general public on sound management, and prevention and control of chemicals and wastes Assumptions: Careful design of knowledge products, promotional and training activities, professional organization and promotion of events
	Indicator 14	10 Training sessions, promotion and public	Knowledge and experience shared to promote	Baseline data from PIF and PPG reports	Annually upon completion of	FECO (Project Manager, Project	Consultant reports,	Risks: Low participation rate on training and

Monitoring	Indicators	Targets	Description of indicators and targets	Data source/ Collection Methods[60]	Frequency	Responsible for data collection	Means of verification	Risks / Assumptions
	Training and promotional activities	awareness activities conducted by end of the project	emission reduction and raise awareness for sound management of chemicals	Data to be collected and verified with training, workshops, public awareness activities, and progress report	demonstration projects and initiation of NRP Reported on DO tab of the GEF PIR	Management Offices)	Progress reports Meeting, training and workshop reports	public awareness activates Assumptions: Careful design of knowledge products, promotional and training activities, professional organization and promotion of events.
Project Outcome 4.1 Project monitoring and evaluation	**Indicator 15** Timing and quality of annual (APRs, PIRs etc.) and M&E reports	M&E activities implemented as scheduled and on budget, project implementation monitor to achieve project objectives	Project implementation, supervision and monitoring activities undertaken during implementation of project activities	Baseline data from PIF and PPG reports Data to be collected and verified with training, workshops, and progress report	Annually Reported on DO tab of the GEF PIR	FECO (Project Manager, Project Management Offices) and UNDP	Progress report, Training and workshop reports, APR, PIR	Risks: Failure to exercise timely and effective M&E activities due to capacity issue Assumptions: Efficient M&E implemented to facilitate achievement of outcomes and project objectives
	Indicator 16 Quality appraisal in Mid-Term Review and Terminal Evaluation	Adaptive management undertaken and evaluation of project effectiveness and achievements conducted	Monitoring and evaluation of project implementation and achievements of project objectives, outcomes and outputs at mid-term and end of project	Baseline data at PIF and PPG reports Data to be collected and verified with MTR and TE reports	At mid-point of project implementa-tion and 6 months prior to project completion Reported in DO tab of the GEF PIR	FECO (Project Manager, Project Management Offices) and UNDP	MTR and TE reports, Management Response, progress report, APR, PIR	Risks: Failure to exercise timely and effective M&E activities due to capacity issue Assumptions: Efficient M&E and timely planning of MTR and TE to evaluate achievement of project outcomes and objectives and implement adaptive management
Project Outcome 4.2 Knowledge sharing and information dissemination	**Indicator 17** Lessons learnt and experience documented and disseminated; post-project action plan formulated	Lessons and experience documented and disseminated through 30 workshops conducted to benefit 2,000 direct and 1,000,000 indirect beneficiaries	Knowledge, implementation experience and demonstration results documents, and shared	Baseline data from PIF and PPG reports Data to be collected and verified with workshop, meeting and progress reports	Annually after mid-term of project implementation. Reported in DO tab of the GEF PIR	FECO (Project Manager, Project Management Offices) and UNDP	Meeting, training, workshop reports, progress report	Risks: Results of demonstration activities and technology transfer not properly documented or shared Assumptions: Careful monitoring and documentation of achievements and efficient organization and dissemination of results
	Indicator 18 International knowledge and experience gained	4 International exchanges conducted to share knowledge and promote BAT/BEP	Number of workshop, technical or managerial exchange	Baseline data from PIF and PPG reports Data to be collected and verified from progress report or workshop	Last two years of project implementation Reported in DO tab of the GEF PIR	FECO (Project Manager, Project Management Offices) and UNDP	Progress reports, Training and workshop reports	Risks: Difficult in coordination and collaboration, and continuous impacts of COVID-19 pandemic Assumptions: Multi- and inter-ministerial interactions will

Monitoring	Indicators	Targets	Description of indicators and targets	Data source/ Collection Methods[60]	Frequency	Responsible for data collection	Means of verification	Risks / Assumptions
								facilitate consensus in legislative and technology improvement.

Social and Environmental Screening Template

The completed template, which constitutes the Social and Environmental Screening Report, must be included as an annex to the Project Document at the design stage. Note: this template will be converted into an online tool. The online version will guide users through the process and will embed relevant guidance.

Project Information

Project Information	
1. Project Title	Green Production and Sustainable Development in Secondary Aluminum, Lead, Zinc and Lithium Sectors in China
2. Project Number (i.e. Atlas project ID, PIMS+)	Atlas Project ID: 111692, UNDP-GEF PIMS ID number: 6492
3. Location (Global/Region/Country)	China
4. Project stage (Design or Implementation)	Design (PPG Stage)
5. Date	11/08/2021

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

QUESTION 1: How Does the Project Integrate the Programming Principles in Order to Strengthen Social and Environmental Sustainability?
Briefly describe in the space below how the project mainstreams the human rights-based approach
Based on Article 25, of the UN Human Right Declaration "*Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family"*. A healthy environment should be considered as a pre-condition for the full enjoyment of human right. The project aims at reducing the risk for the environment and human health through the prevention of the use and release of very toxic substances (persistent organic pollutants). This project is designed to work with enterprises, small to large in the secondary metal sectors, such as the secondary aluminum, lead, zinc and lithium sectors, by demonstrating BAT/BEP (one in aluminum and one in zinc) and implementation of a life cycle management in Lead acid battery and Lithium ion battery recycling to reduce and eliminate UP-POPs (PCDD/Fs, HCB and PCNs) and BFRs. The project is to directly reduce 354.75g TEQ PCDD/Fs released from the demonstration facilities and national replication programme in about 10 enterprises. Furthermore, the emphasis will also be placed on policies, capacity building for management and public awareness, with great potentials to further reduction of UP-POPs and BFRs release. Though China, in the past years, has issued some laws, regulations, and technical guidance and norms for the POPs control in the non-ferrous industry, including secondary copper, aluminum, lead and zinc sector, due to lack of mandatory ones and financial mechanism; there are still problems for implementation and enforcement of those laws, regulations, technical standards, etc. The project will develop some specific law, regulations, and technical standards, for guiding and regulating secondary non-ferrous metal sectors, especially in the secondary aluminum, lead, zinc and lithium sector, covering the recycling process, to reduce the risks of people's exposure to UP-POPs and BFRs in daily life and production. The raising of awareness, capacity building and guidance will be incorporated into the sectoral plan within China's long term National Strategy and Action Plan for the Implementation of the Stockholm Convention, ensuring that risks to health of workers and communities will be managed in the long-term.
Briefly describe in the space below how the project is likely to improve gender equality and women's empowerment
A Gender Analysis and Gender Mainstreaming Action Plan (GMAP) has been prepared for the project to ensure that the principles of gender equality are firmly embedded in activities which will be undertaken by the project in line with applicable GEF and UNDP gender policies, and to ensure female and male will equally and equitably involve in the project, make

contribution to, and receive benefits from the project. The gender analysis showed that in the manufacturing sector in China, there are less women in the management positions, and more women are engaged in the frontline work. Women continue to face challenges in equal and equitable accessing to training, participation, and decision making due to traditions, cultural norms, etc.

The following strategies will be adopted to promote gender equality during the project implementation and monitoring and evaluation:
(i) adequate inclusion of women in the project decision making, and pay proper attention to impact of the policies and decisions on gender;
(ii) inclusion of more women in the technology transformation selection processes to improve industrial practices;
(iii) ensure all the women and men who may potentially lose their jobs due to technology transformation will be appropriately relocated;
(iv) training and supporting more women for management positions in the project related enterprises;
(v) the project stakeholder engagement and the project publicity activities target proportionally at females;
(vi) dissemination materials of the project results with gender-sensitive language and materials,
(vii) collection of sex-disaggregated data wherever possible.

Briefly describe in the space below how the project mainstreams sustainability and resilience

The project is designed to respond to the requirements of the Stockholm Convention and reduce the risks of UP-POPs and BFRs on human health and the environment by demonstrating the phase-out of UP-POPs in the sector of the secondary aluminum and zinc sectors, and implementing of a life cycle management in lead and lithium battery recycling. The project also aims to ensure the implementation of Best Available Techniques and Best Environmental Practices (BAT/BEP) in demonstration enterprises. The project will complement and enhance implementation of China's National Strategy and Action plan for the implementation of the Stockholm Convention. Specifically, it seeks to:

1. Strengthen the national policy and regulatory framework to reduce UP-POPs and BFRs releases from secondary non-ferrous metal industry, including guidance for the reduction of UP-POPs and BFRs releases resulting from unsound metal scrap and batteries recycling management practices;
2. Reduce UP-POPs and BFRs releases from unsound metal scrap and batteries recycling, through improvement of the supply chains as well as the introduction of environmentally sound disposal practices at recycling entities, including development of appropriate collection schemes, diversion of recyclable toward appropriate disposals procedures;
3. Demonstrate BAT/BEP and life cycle management in the collection and conditioning of waste batteries (one in lead acid batteries and one in lithium ion batteries), and in the secondary production of metals (one in aluminum and one in zinc);
4. Implement a National Replication Programme (NRP) including promotional events, technical training, awareness raising.

These outputs can be used to inform national sectoral planning, and upscale action nationwide in support of China's National Strategy and Action plan for the Implementation of the Stockholm Convention.

This proposed GEF Project will contribute to United Nations Sustainable Development Cooperation Framework (2021-2025): Outcome 3: People in China and the region benefit from a healthier and more resilient environment as well as the UNDP Country Programme Document for China (2021-2025), Pillar 2 (A healthier planet and resilient environment, Output 2.1: Adaptive policies developed at target level (subnational), financed and applied for nature-based systems to align with multilateral agreements and transboundary platforms.

Briefly describe in the space below how the project strengthens accountability to stakeholders

The project's Stakeholder Engagement Plan (SEP) has been designed to ensure inclusive, effective, and efficient engagement of key stakeholders throughout its lifecycle. The stakeholder engagement process includes disclosure of the project information to, consultation with the stakeholders, and the stakeholders' participation in the project development, implementation, monitoring, evaluation and learning throughout the project cycle, addressing grievances, and on-going reporting to the stakeholders. Project affected people cover those who will be directly affected, positively or negatively, by the project, including those who live in or on the edge of a project site, or live in the areas of the project influence/impacts. In line with the SEP, A grievance redress mechanism will be established for the project. In addition, UNDP's Accountability Mechanism, which includes the Social and Environmental Compliance Review (SECU) and Stakeholder Response Mechanism (SRM) will also serve as an additional layer of grievance redress and empower stakeholders and increase accountability.

Part B. Identifying and Managing Social and Environmental Risks

QUESTION 2: What are the Potential Social and Environmental Risks? *Note: Complete SESP Attachment 1 before responding to Question 2.*	**QUESTION 3: What is the level of significance of the potential social and environmental risks?** *Note: Respond to Questions 4 and 5below before proceeding to Question 5*			**QUESTION 6: Describe the assessment and management measures for each risk rated Moderate, Substantial or High**
Risk Description (broken down by event, cause, impact)	***Impact and Likelihood (1-5)***	***Significance (Low, Moderate Substantial, High)***	***Comments (optional)***	***Description of assessment and management measures for risks rated as Moderate, Substantial or High***
Risk 1: Government Officials responsible for enforcing legislation may fall short of capacities to meet their obligations in the Project upon the development of the new coordination and regulatory mechanisms. Related to: • Human Rights; P.2 • Accountability; P.14	I=2 L=2	**Low**	This project is placed as part of the implementation of the Stockholm Convention in China and will develop and/or propose complementary and streamlined set of regulatory instruments in Component 1. **The activities are integrally funded by the GEF**. Government Officials, who are responsible for enforcing legislation, will thus require further training and capacity building in order to internalize the changes promoted by the Project, as well as to enforce these to support the project effectiveness.	This risk is being managed by Project Design (Components 1 and 4) The project, through Components 1 and 4, is expected to manage this risk by providing adequate capacity building related to the instruments developed by the Project. The project will conduct the training needs assessment and develop a targeted training plan (guided by the SES) to ensure that the relevant officials receive adequate training to understand their new extended responsibilities arising from the improved institutional frameworks being developed by the project in terms of legislation, guidelines and mandatory standards. In addition, upon project commencement, a grievance redress mechanism will be established for the project, and its details disseminated to relevant stakeholders to ensure that all concerns and complaints are documented and addressed.
Risk 2: Small or Medium sized enterprises - which are expected to benefit from project outputs and are also expected to internalize and scale up project results after its completion - may not be involved in decision-making process during the Project implementation in relation to the development of policy and regulatory frameworks that will support the project's replication and sustainability goals. Related to: • Accountability; P.13, P.14, • Human Rights; P.3	I = 3 L = 3	**Moderate**	Project Output 1.1.3 will support the "unlocking" of the Extended Producer Responsibility (EPR) and the institution of economic instruments and incentives for companies that operate in the metals recycling sector can internalize and replicate the project´s pilots (the pilots will demonstrate the technical viability of BAT/BEP). **These activities are integrally funded by the GEF**.	This risk is being managed by: - Stakeholders Engagement Plan - SEP - Project Design (Components 1 and 4) - Governance and Management Arrangements Stakeholder Engagement Plan (SEP) was developed during the Project Preparation Phase (PPG) and will be implemented to ensure fair representation of small and medium sized enterprises for secondary non-ferrous metal industry who may otherwise be marginalized from participating in any incentive schemes planned for the implementation of BAT/BEP (Output 1.1.3). The Components 1 and 4 of the project incorporate activities that facilitate the participation in policy development as well

			If not aware and fully engaged (e.g. in Project structure, workshops and/or monitoring activities) these SMEs may not have access to the incentives mechanisms, nor to the project pilots results, and won´t be able to improve their processes in line with best available technologies/best environmental practices (BAT/BEP). These stakeholders may be at risk of not complying with the future requisites of EPR schemes and may thus become marginalized and not benefit from outputs of the project.	as awareness and capacity building activities that will also support the stakeholders' management, with particular focus on SMEs. Finally, the Project´s Governance and Management Structure envisages the participation of the Industrial Associations as Responsible Parties which will be instrumental in promoting the National Replication Programme: through this arrangement these entities will facilitate the application of new alternative technologies, and will assist the project so information and capacities are transmitted down the chain for the SMEs in regards to the promotion and awareness raising activities, assuring their representation in the project.
Risk 3: Potential risk to workers' employment, particularly women, in the course of the transition to implementation of BAT/BEP Related to: • Gender Equality and Women Empowerment; P.9 • Accountability; P.13, P.14 • Standard 5: Displacement and Resettlement: 5.2 • Standard 7: Labour and Working Conditions; 7.1, 7.5	I = 3 L = 4	**Moderate**	As noted above, the project will undertake four (4) pilot/demonstration activities (sub-projects) in the recycling sectors of lead/lithium ion batteries and aluminum/zinc metals. These pilots/demonstrations will deploy alternative BAT that can reduce the emissions of chemicals controlled by the Stockholm Convention, and are expected to provide also improve energy efficiency in these industries. **These demonstrations are partially funded by GEF resources, partially by Industries co-finance.** It is expected that certain BAT may result in phasing-in automation techniques to improve recycling processes. Best Environmental Practices can also substantially change the management of work profiling and skills sets. Both interventions can lead to cutting of certain jobs posts	This risk is being managed by: - Project Design (Components 2 and 3) - Environmental and Social Management Framework (ESMF) - Environmental and Social Management Plan (ESMP) - Gender Action Plan (GAP) - Labour Management Procedures In line with the Environmental and Social Management Framework (ESMF) prepared for the project (ProDoc Annex 9), scoped Environmental and Social Impact Assessment (ESIA) will be undertaken for all project demonstrations. The ESIA(s) will include an analysis of this risk and propose measures to avoid or reduce redundancies, the method of selection and mitigating the effects, integrating outcomes into a restructuring plan (if needed). The Environmental and Social Management Plan (ESMP) will also be developed, following the ESIA(s), and is expected to include potential training for qualified existing staff on other roles or skills that may be needed at the industry (re-qualification). Where no viable alternatives are identified, a Restructuring Plan will be developed to reduce and mitigate adverse impacts of retrenchment on workers. In addition, Labour Management Procedures will be prepared for all enterprises to assess and align with national legislation and ensure compliance with SES Principle 7.

			while creating new, specialized, jobs opportunities. This can lead to unemployment of unskilled/marginalized people in the industry.	The Gender Action Plan will also support to address potential risks related to the (lack of) inclusion of women employees in the project implementation and the BAT/BEP selection processes;
Risk 4: Inadequate participation of women in consultations, policy decision making and design of modalities for capacity building in uptake of BAT/BEP in the metals recycling industry Related to: • Gender Equality and Women's Empowerment; P.10	I= 3 L= 2	**Moderate**	As noted above, the project will sponsor pilots/demonstrations and will deploy alternative BAT that can reduce the emissions of chemicals controlled by the Stockholm Convention, and are expected to provide also improve energy efficiency in these industries. **These demonstrations are partially funded by GEF resources, partially by Industries co-finance.** The metals recycling industry require high level of physical work, which by sex-driven perception is seen as a "work for men". In addition, women are mainly engaged in dismantling phase of the products that carry metals and are directly exposed to some harmful substances that are released in this process.	This risk is being managed by: - Project Design (Components 2 and 3) - Environmental and Social Management Framework (ESMF) - Gender Action Plan (GAP) The Gender Action Plan has addressed potential risks and included measures to mainstream gender in all project components, with specific focus on encouraging women representation in the following: • Adequate inclusion of women employees in the project decision making process and the BAT/BEP selection processes; • Training and supporting more women employees to management positions including being middle and senior managers; • Supporting all the women and men who may lose their jobs to be appropriately relocated; • Making sure the project results dissemination materials be gender sensitive; • The project publicity targets proportionally toward relevant women and girls; and • Collection of sex-disaggregated data wherever relevant.
Risk 5: Risk of release and emissions during decommissioning, transport, storage and disposal of hazardous waste during the demonstration pilots Related to: • Standard 1: Biodiversity Conservation and Sustainable Natural Resource Management; 1.1, 1.7, 1.11 and 1.14 • Standard 3: Community Health, Safety and Security; 3.2, 3.4, 3.5, 3.6 and 3.8 • Standard 4: Cultural Heritage; 4.1, 4.3 • Standard 7: Labor and Working Conditions; 7.6 • Standard 8: Pollution Prevention and Resource Efficiency; 8.1, 8.2 and 8.3	I = 4 L =2	**Moderate**	Transport, storage and disposal operations for any hazardous substance may pose potential human and ecosystem health risks, whether to workers or the wider community, to local environment, or transboundary ecosystems. The **baseline project** involves the recycling and storage of used lithium batteries and lead batteries. If not managed properly, especially if some pollution prevention measures are not in place, causing leakage, it will pollute the soil and water	This risk is being managed by: - Project Design (Components 1, 2 and 3) - Environmental and Social Management Plan (ESMP) - Spill Prevention and Management Plan - Strategic Environmental and Social Assessment (SESA) For the Industries that will participate in BAT/BEP Demonstration Activities: The project will provide technical assistance and oversee the deployment of technologies. The Industries/Companies will implement such technologies through using their co-finance (not part of Project's GEF Budget). (a) The PPG Phase has undertaken a preliminary assessment of companies and short listed the

			bodies and affect the health of local people and workers. **The GEF resources under this project will be used to improve BAT/BEP of the selected (pilot/demonstration) industries in order to reduce/avoid such risk.** These BAT/BEP are expected to deploy actions to reduce the quantity of contaminated waste generated of the moment. It is expected that the project will still generate waste, but in a controlled manner, such as the contaminated filters of new filtering systems under BAT, or properly managed lithium/lead batteries waste. These are to be properly disposed as per BEP to be implemented by the project	companies that could engage into the Demonstration Activities. (b) During pre-selection of the demonstration enterprises, priority was given to those located within industrial settings, and industries located near natural habitats, cultural heritage sites and residential areas are, thus avoided. (c) During the first year of implementation, ESIA will be undertaken for the short listed companies to further assess all relevant risks, including the potential release and emissions of hazardous material. (d) As part of the ESMP to be developed in the first year of project implementation, a Spill Prevention and Management Plan will be developed and implemented for all demonstration activities for safe handling and disposal of hazardous waste. (e) In addition, the project will ensure that enterprises that formally engage with the Project/IP in the demonstration activities (Output 2.1.3 and Output 2.2.2) must meet the following condition: "Environmental management: waste, flue gas and water shall be discharged after meeting relevant standards. UP-POPs-containing wastes shall be managed according to relevant requirements on hazardous waste management". For the Project Contractors/Service providers: the project will engage a number of service providers/contractors to support the operationalization of several activities. These will be engaged using procurement (tendering) processes against clear Terms of Reference and Technical Specifications as approved in the Procurement Plan. (a) Under Components 2 and 3, the project will ensure that qualified waste management companies will be recruited through public tendering process. Clear criteria will be set to ensure strong track records and compliance with relevant National and International regulations and standards for handling, treatment and disposal of hazardous waste, including certification provided through Environmental Operational License and Workers certification and training. (b) A Targeted Spill Prevention and Management Plan will be developed and implemented at sites for safe handling and disposal of hazardous waste, including procedures for safely cleanup of accidental wastes releases.

				For the upstream activities related to improvement policy and regulatory framework (Outputs 1.1.1, 1.1.2 and 1.1.3): Strategic Environmental and Social Assessment (SESA) will be carried out during development of the policies and regulations to assess and reduce this risk.
Risk 6: Risk of flooding of demonstration facilities and other disaster risks Related to: • Standard 2: Climate Change Mitigation and Adaptation; 2.1, 2.2 • Standard 3: Community Health, Safety and Security; 3.3	I = 3 L = 2	**Moderate**	Increased weather events due to climate change may pose a risk on facilities where demonstration pilots will be undertaken and hazardous material and waste are stored. Those facilities are not yet selected. **The GEF resources under this project will be used to improve BAT/BEP of the selected (pilot/demonstration) industries in order to reduce/avoid such risk.**	This risk is being managed by: - Project Design (Components 2 and 3) - Environmental and Social Management Plan (ESMP) - Spill Prevention and Management Plan The PPG Phase has undertaken a preliminary assessment of companies and short listed the companies that could engage into the Demonstration Activities. During pre-selection of the demonstration enterprises, priority was given to those located within industrial settings, industries located near natural habitats, cultural heritage sites and residential areas are, thus avoided. During the first year of implementation, ESIA will be undertaken for the short-listed companies to further assess all relevant risks, including the potential release and emissions of hazardous material. The project will take into consideration flood risks and risks related to other natural disasters in the ESIA and before engaging with the demonstration enterprises (locations prone to these types of disasters will be avoided) As additional precautionary measure, and part of the ESMP to be developed in the first year of project implementation, a Spill Prevention and Management Plan will be developed and implemented to place procedures for clean up and re-habilitation.
Risk 7: Increased GHG emissions and energy consumption from alternative processes to reduce the releases of hazardous chemicals Related to: • Standard 2: Climate Change Mitigation and Adaptation; 2.4 • Standard 8: Pollution Prevention and Resource Efficiency; 8.6	I = 3 L = 3	**Moderate**	The metals recycling industry consumes substantial quantities of energy in the production process, resulting in high level of greenhouse gases emitted. In this regard, the project aims to support the industries to use BAT/BEP that can reduce the releases of hazardous chemicals. **The GEF resources under this project will be used to improve BAT/BEP of the selected (pilot/demonstration)**	This risk is being managed by Project Design (Components 1 and 2) When selecting the BAT/BEP for the demonstration activities (Output 2.1.3 and Output 2.2.2), the energy consumption and level of GHG emissions of the considered alternatives will be one of the criteria to be evaluated for best environmental practice and SES requirements will be followed where applicable. The GHG technology landscape and impacts will be consistent with a assessed during ESIA(s) for the selected demonstration sites/enterprises.

			industries in order to reduce/avoid such risk. It is expected that some technologies can also bring co-benefit of improved energy efficiency of the recycling/smelting processes.	The ESMP (under Risks 5 and 6) will also incorporate the relative aspects of Standards 8 triggered and incorporate SES requirements where applicable.
Risk 8: Working conditions that do not meet national labor laws and international commitments and exposure to health and safety risk within the demonstration enterprises and hazardous waste disposal enterprises Related to: • Standard 7: Labor and Working Conditions; 7.1, 7.2, 7.5, 7.6	I = 4 L = 2	**Moderate**	This risk is related to the potential practices and behaviours of workers that do not abide by a safety protocol and use the essential personal protective equipment (PPE) appropriate for the work they perform. It is noted that regulations on health and working environment are strictly implemented by the Government of China and that Forced Labour is illegal in China through articles in the Penal Law of 2011 and Labour Contract Law of 2007. If the project fails, the workers employed by recycling industries who participate in the project may continue to be at risk of exposure to POPs.	This risk is being managed by: - Project Design (Components 2 and 3) - Environmental and Social Management Plan (ESMP) - Occupational Health and Safety Plan The PPG Phase has undertaken a preliminary assessment of companies and short listed the companies that could engage into the Demonstration Activities. During the first year of implementation, ESIA will be undertaken for the short-listed companies to further assess all relevant risks, including adherence to national laws on Labor Practices. ESIA will also incorporate the proper assessment on occupational health and safety measures are applied (through an Occupational Risk Assessment). A scoped ESMP will be developed for the demonstration pilots and will include an Occupational Health and Safety Plan that determines the measures to be adopted to further avoid or mitigate this risk (such as ventilation and wearing personal protective equipment). In addition, the demonstration enterprises will confirm that they have ensured the hazardous waste disposal enterprises they engaged/will engage are duly registered and authorized to conduct such business.
Risk 9: Informal recyclers, who may include marginalized and traditional communities, find their access to resources and thus income reduced as a result of new policy and regulatory framework for metal scrap management and to reduce UP-POPs and BFRs release from recycling practices Related to: • Human Rights: P.5, P.6 • Standard 5: Resettlement and Economic Displacement; 5.2	I = 3 L = 3	**Moderate**	The project will develop, revise and improve policies and regulatory frameworks in secondary aluminum and zinc sectors for sound management from the prospective of raw materials standards, industry norms and for green battery production and waste battery full life circle management (collection, dismantling, storage, transportation, and recycling).	This risk is being managed by: - Project Design (Component 1) - Strategic Environmental and Social Assessment Development of the policies and regulations in Outputs 1.1.1 and 1.1.2 will be underpinned by a SESA, which will assess the potential for economic displacement. If such a risk is identified to become an issue, a Livelihoods Restoration Framework will be developed to be implemented during roll out of the policies and legislation. Should any of the SESAs find that this risk is relevant to traditional communities, the Project will take steps to ensure

• Standard 6: Indigenous Peoples; 6.1, 6.6			It is important to note that the target waste stream is considered "hazardous waste", and by that, individual informal waste pickers and recyclers should not be involved in this highly specialized and regulated collection system, as uncontrolled practices may adversely impact the environment and health of the community. **The activities are integrally funded by the GEF**. These policies and regulations, once implemented or enforced, may affect access to resources for workers in the informal recycling sector, limiting their income.	relevant requirements of Standard 6 are applied, including obtaining Free Prior Informed Consent (FPIC) and developing a Traditional Communities Framework as part of the relevant policy/legislation.
Risk 10: Inappropriate behavior by security personnel who may be recruited by the industries Related to: • Standard 3: Community Health, Safety and Security; 3.8	I = 4 L = 2	**Moderate**	Security guards may be required to secure the industries during operation. These staff may not be properly trained on how to properly deal with the local community, which may lead to grievances by other workers or nearby residents. **The demonstrations are partially funded by GEF resources, partially by Industries co-finance.**	Prior to hiring of any security staff to guard selected demonstration industries (Output 2.1.3 and Output 2.2.2), a Code of Conduct reflecting SES requirements will be prepared so that industry operators ensure their security staff abide by them. Training will be offered to participating individuals to ensure they are aware of their responsibilities. In addition, the Grievance Redress Mechanism for the project will allow the local community to share any concerns or grievances they may have or report any incidents related to this risk.
	QUESTION 4: What is the overall project risk categorization?			
			Low Risk	☐
			Moderate Risk	☐
			Substantial Risk	**X**
				The screening has identified 10 risks related to this project, being one (1) categorized as Low (Risks 1) and nine (9) categorized as Moderate. **Conditions during the PPG were not conducive to conduct the selection and engagement with the short listed demonstration enterprises.** In addition, it is noted that the Project include activities with potential adverse social and environmental risks

			and impacts that are more varied or complex than those of Moderate Risk projects, but is important to note that those remain limited in scale and are expected of having lesser magnitude than those typical of High Risk projects (the potential adverse effects identified are reversible, predictable and have a smaller footprint). Thus, as a precautionary measure, the overall risk categorization for **this project is determined to be Substantial.** Therefore, an ESMF (ProDoc Annex 9) has been prepared for the project. SESA will be carried out for the upstream Policy/Regulatory related activities and ESIA will be developed for the demonstration pilots (enterprise level) during implementation for Risks 3, 5, 6, 7 and 8, resulting in the development of a scoped ESMP during the first year of project implementation. Some of the risks are also being addressed through additional Targeted Management Plans: including a Stakeholder Engagement Plan (ProDoc Annex 8) as well as a Gender Action Plan (ProDoc Annex 10) which have already been prepared. Enterprises that will be selected by the Project to implement the demonstration activities based on strict criteria that ensure meeting national legislation and UNDP SES. In addition, during project implementation as part of the site-specific ESMPs, a Spill Prevention and Management Plan and an Occupational Health and Safety Plan will be prepared and implemented. If retrenchment is found to be unavoidable for certain industries, a Restructuring Plan will be developed and implemented. A Grievance Redress Mechanism will be set up for the project (per the Stakeholder Engagement Plan).	
	High Risk	☐			
	QUESTION 5: Based on the identified risks and risk categorization, what requirements of the SES are triggered? (check all that apply)				
	Question only required for Moderate, Substantial and High Risk projects				
	Is assessment required? (check if "yes")	**X**			***Status? (completed, planned)***
	if yes, indicate overall type and status		**X**	Targeted assessment(s) Gender analysis Stakeholder analysis	 Completed Completed
			X	ESIA (Environmental and Social Impact Assessment)	Planned

			X	SESA (Strategic Environmental and Social Assessment)	Planned
	Are management plans required? (check if "yes)	**X**			
	If yes, indicate overall type		**X**	Targeted management plans Gender Action Plan Stakeholder Engagement Plan Occupational Health and Safety Plan Spill Prevention and Management Plan Labour Management Procedures Livelihoods Restoration Framework Code of Conduct for Security Personnel	 Completed Completed Planned Planned If needed If needed Planned
			X	ESMP (Environmental and Social Management Plan which may include range of targeted plans)	Planned
			X	ESMF (Environmental and Social Management Framework)	Completed
	Based on identified <u>risks</u>, which Principles/Project-level Standards triggered?		**Comments (not required)**		
	Overarching Principle: Leave No One Behind				
	Human Rights	X			
	Gender Equality and Women's Empowerment	**X**			
	Accountability	**X**			
	1. Biodiversity Conservation and Sustainable Natural Resource Management	**X**			
	2. Climate Change and Disaster Risks	**X**			
	3. Community Health, Safety and Security	**X**			
	4. Cultural Heritage	X			
	5. Displacement and Resettlement	X			
	6. Indigenous Peoples	X			
	7. Labour and Working Conditions	**X**			
	8. Pollution Prevention and Resource Efficiency	**X**			

Final Sign Off

Final Screening at the design-stage is not complete until the following signatures are included

Signature	***Date***	***Description***
QA Assessor		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		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		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		
INSTRUCTIONS: The risk screening checklist will assist in answering Questions 2-6 of the Screening Template. Answers to the checklist questions help to (1) identify potential risks, (2) determine the overall risk categorization of the project, and (3) determine required level of assessment and management measures. Refer to the SES toolkit for further guidance on addressing screening questions.		
Overarching Principle: Leave No One Behind **Human Rights**		**Answer (Yes/No)**
P.1	Have local communities or individuals raised human rights concerns regarding the project (e.g. during the stakeholder engagement process, grievance processes, public statements)?	No
P.2	Is there a risk that duty-bearers (e.g. government agencies) do not have the capacity to meet their obligations in the project?	Yes
P.3	Is there a risk that rights-holders (e.g. project-affected persons) do not have the capacity to claim their rights?	Yes
Would the project potentially involve or lead to:		
P.4	adverse impacts on enjoyment of the human rights (civil, political, economic, social or cultural) of the affected population and particularly of marginalized groups?	No
P.5	inequitable or discriminatory impacts on affected populations, particularly people living in poverty or marginalized or excluded individuals or groups, including persons with disabilities? [61]	Yes
P.6	restrictions in availability, quality of and/or access to resources or basic services, in particular to marginalized individuals or groups, including persons with disabilities?	Yes
P.7	exacerbation of conflicts among and/or the risk of violence to project-affected communities and individuals?	No
Gender Equality and Women's Empowerment		
P.8	Have women's groups/leaders raised gender equality concerns regarding the project, (e.g. during the stakeholder engagement process, grievance processes, public statements)?	No
Would the project potentially involve or lead to:		
P.9	adverse impacts on gender equality and/or the situation of women and girls?	Yes
P.10	reproducing discriminations against women based on gender, especially regarding participation in design and implementation or access to opportunities and benefits?	Yes
P.11	limitations on 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
P.12	exacerbation of risks of gender-based violence? *For example, through the influx of workers to a community, changes in community and household power dynamics, increased exposure to unsafe public places and/or transport, etc.*	No

[61] Prohibited grounds of discrimination include race, ethnicity, sex, age, language, disability, sexual orientation, gender identity, 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 and transsexual people.

Sustainability and Resilience: Screening questions regarding risks associated with sustainability and resilience are encompassed by the Standard-specific questions below		
Accountability		
Would the project potentially involve or lead to:		
P.13	exclusion of any potentially affected stakeholders, in particular marginalized groups and excluded individuals (including persons with disabilities), from fully participating in decisions that may affect them?	Yes
P.14	grievances or objections from potentially affected stakeholders?	Yes
P.15	risks of retaliation or reprisals against stakeholders who express concerns or grievances, or who seek to participate in or to obtain information on the project?	No
Project-Level Standards		
Standard 1: Biodiversity Conservation and Sustainable Natural Resource Management		
Would the project potentially involve or lead to:		
1.1	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*	Yes
1.2	activities within or adjacent to critical habitats and/or environmentally sensitive areas, including (but not limited to) 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	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 to Standard 5)	No
1.4	risks to endangered species (e.g. reduction, encroachment on habitat)?	No
1.5	exacerbation of illegal wildlife trade?	No
1.6	introduction of invasive alien species?	No
1.7	adverse impacts on soils?	Yes
1.8	harvesting of natural forests, plantation development, or reforestation?	No
1. 9	significant agricultural production?	No
1. 10	animal husbandry or harvesting of fish populations or other aquatic species?	No
1.11	significant extraction, diversion or containment of surface or ground water? *For example, construction of dams, reservoirs, river basin developments, groundwater extraction*	Yes
1.12	handling or utilization of genetically modified organisms/living modified organisms?[62]	No
1.13	utilization of genetic resources? (e.g. collection and/or harvesting, commercial development)[63]	No
1.14	adverse transboundary or global environmental concerns?	Yes
Standard 2: Climate Change and Disaster Risks		
Would the potentially involve or lead to:		
2.1	areas subject to hazards such as earthquakes, floods, landslides, severe winds, storm surges, tsunami or volcanic eruptions?	Yes
2.2	outputs and outcomes sensitive or vulnerable to potential impacts of climate change? *For example, through increased precipitation, drought, temperature, salinity, extreme events*	Yes

[62] See the Convention on Biological Diversity and its Cartagena Protocol on Biosafety.
[63] See the Convention on Biological Diversity and its Nagoya Protocol on access and benefit sharing from use of genetic resources.

2.3	direct or indirect increases in vulnerability to climate change impacts or disasters 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
2.4	increases of greenhouse gas emissions, black carbon emissions or other drivers of climate change?	Yes
Standard 3: Community Health, Safety and Security		
Would the potentially involve or lead to:		
3.1	construction and/or infrastructure development (e.g. roads, buildings, dams)? (Note: the GEF does not finance projects that would involve the construction or rehabilitation of large or complex dams)	No
3.2	air pollution, noise, vibration, traffic, injuries, physical hazards, poor surface water quality due to runoff, erosion, sanitation?	Yes
3.3	harm or losses due to failure of structural elements of the project (e.g. collapse of buildings or infrastructure)?	Yes
3.4	risks of water-borne or other vector-borne diseases (e.g. temporary breeding habitats), communicable and noncommunicable diseases, nutritional disorders, mental health?	Yes
3.5	transport, storage, and use and/or disposal of hazardous or dangerous materials (e.g. explosives, fuel and other chemicals during construction and operation)?	Yes
3.6	adverse impacts on ecosystems and ecosystem services relevant to communities' health (e.g. food, surface water purification, natural buffers from flooding)?	Yes
3.7	influx of project workers to project areas?	No
3.8	engagement of security personnel to protect facilities and property or to support project activities?	Yes
Standard 4: Cultural Heritage		
Would the project potentially involve or lead to:		
4.1	activities adjacent to or within a Cultural Heritage site?	Yes
4.2	significant excavations, demolitions, movement of earth, flooding or other environmental changes?	No
4.3	adverse impacts to 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)	Yes
4.4	alterations to landscapes and natural features with cultural significance?	No
4.5	utilization of tangible and/or intangible forms (e.g. practices, traditional knowledge) of Cultural Heritage for commercial or other purposes?	No
Standard 5: Displacement and Resettlement		
Would the project potentially involve or lead to:		
5.1	temporary or permanent and full or partial physical displacement (including people without legally recognizable claims to land)?	No
5.2	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)?	Yes
5.3	risk of forced evictions?[64]	No
5.4	impacts on or changes to land tenure arrangements and/or community based property rights/customary rights to land, territories and/or resources?	No

[64] Forced eviction is defined here as the permanent or temporary removal against their will of individuals, families or communities from the homes and/or land which they occupy, without the provision of, and access to, appropriate forms of legal or other protection. Forced evictions constitute gross violations of a range of internationally recognized human rights.

Standard 6: Indigenous Peoples[65]		
Would the project potentially involve or lead to:		
6.1	areas where indigenous peoples are present (including project area of influence)?	Yes
6.2	activities located on lands and territories claimed by indigenous peoples?	No
6.3	impacts (positive or negative) to 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 ethnic minorities/indigenous peoples by the country in question)? *If the answer to screening question 6.3 is "yes", then the potential risk impacts are considered significant and the project would be categorized as either Substantial Risk or High Risk*	No
6.4	the 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	the utilization and/or commercial development of natural resources on lands and territories claimed by indigenous peoples?	No
6.6	forced eviction or the whole or partial physical or economic displacement of indigenous peoples, including through access restrictions to lands, territories, and resources? *Consider, and where appropriate ensure, consistency with the answers under Standard 5 above*	Yes
6.7	adverse impacts on the development priorities of indigenous peoples as defined by them?	No
6.8	risks to the physical and cultural survival of indigenous peoples?	No
6.9	impacts on the Cultural Heritage of indigenous peoples, including through the commercialization or use of their traditional knowledge and practices? *Consider, and where appropriate ensure, consistency with the answers under Standard 4 above.*	No
Standard 7: Labour and Working Conditions		
Would the project potentially involve or lead to: (note: applies to project and contractor workers)		
7.1	working conditions that do not meet national labour laws and international commitments?	Yes
7.2	working conditions that may deny freedom of association and collective bargaining?	Yes
7.3	use of child labour?	No
7.4	use of forced labour?	No
7.5	discriminatory working conditions and/or lack of equal opportunity?	Yes
7.6	occupational health and safety risks due to physical, chemical, biological and psychosocial hazards (including violence and harassment) throughout the project life-cycle?	Yes
Standard 8: Pollution Prevention and Resource Efficiency		
Would the project potentially involve or lead to:		
8.1	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
8.2	the generation of waste (both hazardous and non-hazardous)?	Yes
8.3	the manufacture, trade, **release,** and/or use of hazardous materials and/or chemicals?	Yes

8.4	the 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* Montreal Protocol, Minamata Convention, Basel Convention, Rotterdam Convention, Stockholm Convention	No
8.5	the application of pesticides that may have a negative effect on the environment or human health?	No
8.6	significant consumption of raw materials, energy, and/or water?	Yes

Annex 6: UNDP Risk Register

Risks identified in this project and associated mitigation measures are presented in the table below.

#	Description	Risk Category	Impact & Likelihood	Risk Treatment / Management Measures	Risk Owner
1	Government Officials responsible for enforcing legislation may fall short of capacities to meet their obligations in the Project upon the development of the new coordination and regulatory mechanisms	Operational Organizational Regulatory Strategic	I=2 L= 2 Low	This risk is being managed by Project Design (Components 1 and 4) The project, through Components 1 and 4, is expected to manage this risk by providing adequate capacity building related to the instruments developed by the Project. The project will conduct the training needs assessment and develop a targeted training plan (guided by the SES) to ensure that the relevant officials receive adequate training to understand their new extended responsibilities arising from the improved institutional frameworks being developed by the project in terms of legislation, guidelines and mandatory standards. In addition, upon project commencement, a grievance redress mechanism will be established for the project, and its details disseminated to relevant stakeholders to ensure that all concerns and complaints are documented and addressed.	Implementing Partner, Demonstration Provinces
2	Small or Medium sized enterprises - which are expected to benefit from project outputs and are also expected to internalize and scale up project results after its completion - may not be involved in decision-making process during the Project implementation in relation to the development of policy and regulatory frameworks that will support the project's replication and sustainability goals	Social and Environmental Financial Operational Organizational Regulatory Strategic	I=3 L= 3 Moderate	This risk is being managed by: - Stakeholders Engagement Plan - SEP - Project Design (Components 1 and 4) - Project Governance and Management Arrangements Stakeholder Engagement Plan (SEP) was developed during the Project Preparation Phase (PPG) and will be implemented to ensure fair representation of small and medium sized enterprises for secondary non-ferrous metal industry who may otherwise be marginalized from participating in any incentive schemes planned for the implementation of BAT/BEP (Output 1.1.3). The Components 1 and 4 of the project incorporate activities that facilitate the participation in policy development as well as awareness and capacity building activities that will also support the stakeholders' management, with particular focus on SMEs. Finally, the Project´s Governance and Management Structure envisages the participation of the Industrial Associations as Responsible Parties which will be instrumental in promoting the National Replication Programme: through this arrangement these entities will facilitate the application of new alternative technologies, and will assist the project so information and capacities are transmitted down the chain for the SMEs in regards to the promotion and awareness raising activities, assuring their representation in the project.	Implementing Partner, Demonstration provinces and enterprises

3	Potential risk to workers' employment, particularly women, in the course of the transition to implementation of BAT/BEP	Social and Environmental Financial Operational Organizational Regulatory	I=3 L= 4 Moderate	This risk is being managed by: - Project Design (Components 2 and 3) - Environmental and Social Management Framework (ESMF) - Environmental and Social Management Plan (ESMP) - Gender Action Plan (GAP) - Labour Management Procedures In line with the Environmental and Social Management Framework (ESMF) prepared for the project (ProDoc Annex 9), scoped Environmental and Social Impact Assessment (ESIA) will be undertaken for all project demonstrations. The ESIA(s) will include an analysis of this risk and propose measures to avoid or reduce redundancies, the method of selection and mitigating the effects, integrating outcomes into a restructuring plan (if needed). The Environmental and Social Management Plan (ESMP) will also be developed, following the ESIA(s), and is expected to include potential training for qualified existing staff on other roles or skills that may be needed at the industry (re-qualification). Where no viable alternatives are identified, a Restructuring Plan will be developed to reduce and mitigate adverse impacts of retrenchment on workers. In addition, Labour Management Procedures will be prepared for all enterprises to assess and align with national legislation and ensure compliance with SES Principle 7. The Gender Action Plan will also support to address potential risks related to the (lack of) inclusion of women employees in the project implementation and the BAT/BEP selection processes.	Implementing Partner, Demonstration provinces and enterprises
4	Inadequate participation of women in consultations, policy decision making and design of modalities for capacity building in uptake of BAT/BEP in the metals recycling industry	Social and Environmental Operational Organizational Regulatory Strategic	I=3 L= 2 Moderate	This risk is being managed by: - Project Design (Components 2 and 3) - Environmental and Social Management Framework (ESMF) - Gender Action Plan (GAP) The Gender Action Plan has addressed potential risks and included measures to mainstream gender in all project components, with specific focus on encouraging women representation in the following: • Adequate inclusion of women employees in the project decision making process and the BAT/BEP selection processes; • Training and supporting more women employees to management positions including being middle and senior managers; • Supporting all the women and men who may lose their jobs to be appropriately relocated;	Implementing Partner, Demonstration provinces and enterprises

				• Making sure the project results dissemination materials be gender sensitive; • The project publicity targets proportionally toward relevant women and girls; and • Collection of sex-disaggregated data wherever relevant.	
5	Risk of release and emissions during decommissioning, transport, storage and disposal of hazardous waste during the demonstration pilots	Environmental Operational Regulatory Health	I=4 L= 2 Moderate	This risk is being managed by: - Project Design (Components 1, 2 and 3) - Environmental and Social Management Plan (ESMP) - Spill Prevention and Management Plan - Strategic Environmental and Social Assessment (SESA) For the Industries that will participate in BAT/BEP Demonstration Activities: The project will provide technical assistance and oversee the deployment of technologies. The Industries/Companies will implement such technologies through using their co-finance (not part of Project's GEF Budget). (a) The PPG Phase has undertaken a preliminary assessment of companies and short listed the companies that could engage into the Demonstration Activities. (b) During pre-selection of the demonstration enterprises, priority was given to those located within industrial settings and industries located near natural habitats, cultural heritage sites and residential areas are, this avoided. (c) During the first year of implementation, ESIA will be undertaken for the short listed companies to further assess all relevant risks, including the potential release and emissions of hazardous material. (d) As part of the ESMP to be developed in the first year of project implementation, a Spill Prevention and Management Plan will be developed and implemented for all demonstration activities for safe handling and disposal of hazardous waste. (e) In addition, the project will ensure that enterprises that formally engage with the Project/IP in the demonstration activities (Output 2.1.3 and Output 2.2.2) must meet the following condition: "Environmental management: waste, flue gas and water shall be discharged after meeting relevant standards. UP-POPs-containing wastes shall be managed according to relevant requirements on hazardous waste management". For the Project Contractors/Service providers: the project will engage a number of service	Demonstration provinces and enterprises

				providers/contractors to support the operationalization of several activities. These will be engaged using procurement (tendering) processes against clear Terms of Reference and Technical Specifications as approved in the Procurement Plan. (a) Under Components 2 and 3, the project will ensure that qualified waste management companies will be recruited through public tendering process. Clear criteria will be set to ensure strong track records and compliance with relevant National and International regulations and standards for handling, treatment and disposal of hazardous waste, including certification provided through Environmental Operational License and Workers certification and training. (b) A Targeted Spill Prevention and Management Plan will be developed and implemented at sites for safe handling and disposal of hazardous waste, including procedures for safely cleanup of accidental wastes releases. For the upstream activities related to improvement policy and regulatory framework (Outputs 1.1.1, 1.1.2 and 1.1.3): Strategic Environmental and Social Assessment (SESA) will be carried out during development of the policies and regulations to assess and reduce this risk.	
6	Risk of flooding of demonstration facilities and other disaster risks	Environmental Operational	I=3 L= 2 Moderate	This risk is being managed by: - Project Design (Components 2 and 3) - Environmental and Social Management Plan (ESMP) - Spill Prevention and Management Plan The PPG Phase has undertaken a preliminary assessment of companies and short listed the companies that could engage into the Demonstration Activities. During pre-selection of the demonstration enterprises, priority was given to those located within industrial settings, industries located near natural habitats, cultural heritage sites and residential areas are, thus avoided. During the first year of implementation, ESIA will be undertaken for the short-listed companies to further assess all relevant risks, including the potential release and emissions of hazardous material. The project will take into consideration flood risks and risks related to other natural disasters in the ESIA and before engaging with the demonstration enterprises (locations prone to these types of disasters will be avoided) As additional precautionary measure, and part of the ESMP to be developed in the first year of project implementation, a Spill Prevention and Management Plan will be developed and	Implementing Partner, Demonstration provinces and enterprises

				implemented to place procedures for clean up and re-habilitation.	
7	Increased GHG emissions and energy consumption from alternative processes to reduce the releases of hazardous chemicals	Social and Environmental Operational Regulatory	I=3 L= 3 Moderate	This risk is being managed by Project Design (Components 1 and 2) When selecting the BAT/BEP for the demonstration activities (Output 2.1.3 and Output 2.2.2), the energy consumption and level of GHG emissions of the considered alternatives will be one of the criteria to be evaluated for best environmental practice and SES requirements will be followed where applicable. The GHG technology landscape and impacts will be consistent with a assessed during ESIA(s) for the selected demonstration sites/enterprises. The ESMP (under Risks 5 and 6) will also incorporate the relative aspects of Standards 8 triggered and incorporate SES requirements where applicable.	Implementing Partner, Demonstration provinces and enterprises
8	Working conditions that do not meet national labor laws and international commitments and exposure to health and safety risk within the demonstration enterprises and hazardous waste disposal enterprises	Social and Environmental Organizational Regulatory Health	I=4 L= 2 Moderate	This risk is being managed by: - Project Design (Components 2 and 3) - Environmental and Social Management Plan (ESMP) - Occupational Health and Safety Plan The PPG Phase has undertaken a preliminary assessment of companies and short listed the companies that could engage into the Demonstration Activities. During the first year of implementation, ESIA will be undertaken for the short-listed companies to further assess all relevant risks, including adherence to national laws on Labor Practices. ESIA will also incorporate the proper assessment on occupational health and safety measures are applied (through an Occupational Risk Assessment). A scoped ESMP will be developed for the demonstration pilots and will include an Occupational Health and Safety Plan that determines the measures to be adopted to further avoid or mitigate this risk (such as ventilation and wearing personal protective equipment). In addition, the demonstration enterprises will confirm that they have ensured the hazardous waste disposal enterprises they engaged/will engage are duly registered and authorized to conduct such business.	Demonstration provinces and enterprises
9	Informal recyclers, who may include marginalized and traditional communities, find their access to resources and thus income reduced as a result of new policy and regulatory	Social and Environmental Operational Regulatory Health	I=3 L= 3 Moderate	This risk is being managed by: - Project Design (Component 1) - Strategic Environmental and Social Assessment Development of the policies and regulations in Outputs 1.1.1 and 1.1.2 will be underpinned by a SESA, which will assess the potential for economic displacement.	Implementing partner Demonstration provinces and enterprises

	framework for metal scrap management and to reduce UP-POPs and BFRs release from recycling practices			If such a risk is identified to become an issue, a Livelihoods Restoration Framework will be developed to be implemented during roll out of the policies and legislation. Should the SESAs find that this risk is relevant to traditional communities, the Project will take steps to ensure relevant requirements of Standard 6 are applied, including obtaining Free Prior Informed Consent (FPIC) and developing a Traditional Communities Framework as part of the relevant policy/legislation.	
10	Inappropriate behavior by security personnel who may be recruited by the industries	Social and Environmental Operational Regulatory Health	I=4 L= 2 Moderate	Prior to hiring of any security staff to guard selected demonstration industries (Output 2.1.3 and Output 2.2.2), a Code of Conduct reflecting SES requirements will be prepared so that industry operators ensure their security staff abide by them. Training will be offered to participating individuals to ensure they are aware of their responsibilities. In addition, the Grievance Redress Mechanism for the project will allow the local community to share any concerns or grievances they may have or report any incidents related to this risk.	Demonstration provinces and enterprises
11	Failure to promote the project affected by COVID-19	Social and Environmental Health	I=3 L=3 Moderate	The project will always pay attention to the impact of the COVID-19 on the implementation of the project. When necessary, the project will carry out the socio-economic impact assessment of the impact of COVID-19 on the progress of the project, and promote the implementation of the project according to the plan through various means, such as online meeting, telephone, etc.	Implementing Partner; UNDP

Annex 7: Overview of Project Staff and Technical Consultancies

Consultant	Time Input	Tasks, Inputs and Outputs
For Project Management		
Local / National contracting		
Project Manager Rate: $4,528/month	60 months / over 5 years	The Project Manager (PM), together with the National Technical Advisor will be responsible for the overall management of the project, including the mobilization of all project inputs, supervision over project staff, consultants and sub-contractors. PM has the authority to implement the project on a day-to-day basis on behalf of the Project Board within the constraints laid down by the Board. The PM is responsible for the day-to-day management and decision-making for the project. The PM's prime responsibility is 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. Duties and Responsibilities • Provide direction and guidance to project team(s)/responsible party(ies); • Liaise with the Project Board to assure the overall direction and integrity of the project; • Identify and obtain any support and advice required for the management, planning and control of the project; • Responsible for project administration; • Plan the activities of the project and monitor progress against the project results framework and the approved annual work plan; • Mobilize personnel, goods and services, training and micro-capital grants to initiative activities, including drafting terms of reference and work specifications, and overseeing all contractors' work; • Monitor events as determined in the project monitoring schedule plan/timetable, and update the plan as required; • Manage requests for the provision of financial resources by UNDP through advance of funds, direct payments or reimbursement using the fund authorization and certificate of expenditures; • Monitor financial resources and accounting to ensure the accuracy and reliability of financial reports; • Be responsible for preparing and submitting financial reports to UNDP on a quarterly basis; • Manage and monitor the project risks initially identified and submit new risks to the Project Board for consideration and decision on possible actions if required; update the status of these risks by maintaining the project risks log; • Capture lessons learned during project implementation; • Prepare annual work plan for the following year; and update the Atlas Project Management module if external access is made available. • Prepare the inception report no later than one month after the inception workshop. • Ensure that the indicators included in the project results framework are monitored annually in advance of the GEF PIR submission deadline so that progress can be reported in the GEF PIR. • Prepare the GEF PIR and submit the final report to the Project Board; • Based on the GEF PIR and the Project Board review, prepare the AWP for the following year; • Monitor implementation plans including the gender action plan, stakeholder engagement plan, and any environmental and social management plans; • Monitor and track progress against the GEF Core indicators;

Consultant	Time Input	Tasks, Inputs and Outputs
		• Ensure the mid-term review process is undertaken as per the UNDP guidance, and submit the final MTR report to the Project Board; • Identify follow-on actions and submit them for consideration to the Project Board; • Ensure the terminal evaluation process is undertaken as per the UNDP guidance, and submit the final TE report to the Project Board.
Project Assistant Rate: $3,500/month	60 months / over 5 years	Duties and Responsibilities Under the guidance and supervision of the Project Manager, the Project Assistant will carry out the following tasks: • Assist the Project Manager in day-to-day management and oversight of project activities; • Assist the M&E officer in matters related to M&E and knowledge resources management; • Assist in the preparation of progress reports; • Ensure all project documentation (progress reports, consulting and other technical reports, minutes of meetings, etc.) are properly maintained in hard and electronic copies in an efficient and readily accessible filing system, for when required by PB, TAC, UNDP, project consultants and other PMU staff; • Provide PMU-related administrative and logistical assistance.
Project Finance Assistant Rate: $3,500/month	60 months / over 5 years	Duties and Responsibilities • Keep records of project funds and expenditures, and ensure all project-related financial documentation are well maintained and readily available when required by the Project Manager; • Review project expenditures and ensure that project funds are used in compliance with the Project Document and Government of China financial rules and procedures; • Validate and certify FACE forms before submission to UNDP; • Provide necessary financial information as and when required for project management decisions; • Provide necessary financial information during project audit(s); • Review annual budgets and project expenditure reports, and notify the Project Manager if there are any discrepancies or issues; • Consolidate financial progress reports submitted by the responsible parties for implementation of project activities; • Liaise and follow up with the responsible parties for implementation of project activities in matters related to project funds and financial progress reports.
For Technical Assistance		
Component 1-4		
Local / National contracting		
National Technical Advisor Rate: $2,000/week (Total cost: 100,000 USD)	50 weeks / over 5 years	Under close supervision of the Project Manager (PM) the National Technical Advisor (NTA) will play an important role and be responsible for stakeholder engagement through implementation of the plan, and to validate resource requirements and associated budget. The NTA will be a specialist in UP-POPs and BFRs reduction related works, with knowledge in the field of policy and planning, technical transfer and investment, UP-POPs and BFRs monitoring, green procurement and current UP-POPs and BFRs status. The NTA will work closely with the Policy Advisor, the Technical Coordinator, the Project Gender Specialist, Project Safeguards Specialist and other specialists to conduct capacity building related to the project and also support a working group for improved capacity building and work with that group to: • Provide technical guidance for the overall project execution;

Consultant	Time Input	Tasks, Inputs and Outputs
		• Contribute to the development of a capacity development strategy and action plan for increasing management effectiveness. • Conduct training need assessment and develop training plan covering also governmental officials such as inspection officers. • Work closely with other project specialists to conduct relevant work and support technical suggestions; • Coordinate the development and institution of knowledge management system enabling learning from, and upscaling of, pilot/individual project activities; • Monitor project progress and responsible for the production of progress reports ensuring that they meet the necessary reporting requirements and standards; • Advise the Technical Coordinator to support mid-term and terminal evaluations of the project; including management responses; • Visit project sites as and when required advise on investigation the status of project-related industry on the ground and validate written progress reports.
Policy Advisor Rate: $2,000/week (Total cost: 40,000 USD)	20 weeks / over 5 years	Policy Advisor (PA) will provide advice on Policy baseline, policy gap analysis and the demonstration plan in secondary non-ferrous metal industry in China. The consultant will be a specialist in secondary non-ferrous metal industry related works, with comprehensive understanding of technology transfer and application in secondary non-ferrous metal industry and its quality standards in China and its related policies. <u>Duties and Responsibilities</u> • Provide advice on industrial baseline, policy gap analysis and demonstration plan in UP-POPs and BFRs reduction in secondary non-ferrous industry in China; • Contribute to demonstration plan and selection criteria on enterprises for technology transfer and investment of UP-POPs and BFRs reduction in secondary non-ferrous industry; • Conduct promotion and scale up plans after demonstration in dedicated enterprises; • Support the Technical Coordinator on the mid-term and terminal evaluations of the project; including the management responses; • Visit project sites as and when required to assist the investigation of the status of project-related industry on the ground and validate written progress reports.
Technical Coordinators Rate: $3,500/month (Total cost: 210,000 USD)	60 months / over 5 years	The Technical Coordinator (TC) will coordinate the efforts of the NTA and PA and work closely under the PM to provide specific technical oversight and sector-wise guidance for the policy making process and the implementation of technical activities, (i.e., very specific technical areas that impact/are impacted by the policies, technology transfer potential issues, technology implementation/conversion). The TC will also lead the evaluation of performance in respect to the effectiveness of the demonstration and NRP activities, as well as facilitate the effective knowledge transfer by assisting in collection and dissemination of lessons learned. <u>Duties and Responsibilities for Component 1 (30 months)</u> • Work closely with PM and NTA to conduct relevant work and address specific technical issues/suggestions; • Responsible for coordinating the efforts of NTA and PA on the industrial research and provide technical inputs required to substantiate the policy development in secondary metal sectors. <u>Duties and Responsibilities for Component 2 (12 months)</u>

Consultant	Time Input	Tasks, Inputs and Outputs
		• Work closely with PM and NTA to conduct relevant work and address specific technical issues/suggestions • Responsible for coordinating technology transfer, technology implementation, and evaluation of performance in respect to the demonstrations in secondary metal sectors at component level; • Visit project sites of project related industry and coordinate the actions for the industry-level investigation and assessments. <u>Duties and Responsibilities for Component 3 (6 months)</u> • Work closely with PM and NTA to conduct relevant work and address specific technical issues/suggestions • Responsible for preparing technical requirements of the declaration guide and evaluation of performance for NRP. <u>Duties and Responsibilities for Component 4 (12 months)</u> • Work closely with PM and NTA to conduct relevant work and address specific technical issues/suggestions • Coordinate the gathering of data and experiences and support the information sharing of knowledge, lessons learned and experiences from the execution of the project; • Assist the Safeguards Specialist in collecting information on environmental and social risks, at components level, throughout project execution cycle.
Project Gender Specialist Rate: $2,000/week (Total cost: 30,000 USD)	15 weeks / over 5 years	<u>Duties and Responsibilities</u> • Oversee/develop/coordinate implementation of all gender-related work; • Monitor progress in implementation of the project Gender Action Plan ensuring that targets are fully met and the reporting requirements are fulfilled; • Review the Gender Action Plan annually, and update and revise corresponding management plans as necessary; • Work with the Technical Coordinator and the Project Safeguards Specialist to ensure reporting, monitoring and evaluation fully address the gender and stakeholder issues of the project
Project Safeguards Specialist $2,000/week (Total cost: 16,000 USD)	8 weeks /over 5 years	<u>Duties and Responsibilities</u> • Monitor progress in development/implementation of the project ESMP/ESMF ensuring that UNDPs SES policy is fully met and the reporting requirements are fulfilled; • Undertake scoped ESIA/ESMP if needed; • Oversee/develop/coordinate implementation of all safeguards related plans; • Ensure social and environmental grievances are managed effectively and transparently; • Review the SESP annually, and update and revise corresponding risk log; mitigation/management plans as necessary; • Ensure full disclosure with concerned stakeholders; • Ensure environmental and social risks are identified, avoided, mitigated and managed throughout project implementation; • Contribute to the development of official guidelines for risk management strategy and environmental sound management technical guidance
International / Regional and global contracting		
International Technical Advisor	10 weeks / over 3 years	In close coordination with the Project Manager (PM), will provide international perspective, strategic guidance, BAT/BEP experience and technical inputs on the

Consultant	Time Input	Tasks, Inputs and Outputs
Rate: $ 3,000/week (Total cost: 30,000 USD)		reduction and elimination of UP-POPs (PCDD/Fs, HCB and PCNs) and Brominated flame retardants (BFRs) releases. The Advisor will be a specialist in reducing and eliminating UP-POPs (PCDD/Fs, HCB and PCNs) and Brominated flame retardants (BFRs) releases in secondary metal smelting sectors, in close collaboration and in conjunction with UNDP and associated international agencies, and will support the implementation of activities under the following outputs, including: <u>Duties and Responsibilities</u> • For Outputs 1.1.1, 1.1.2 and 1.1.3, the Advisor will provide international BAT/BEP and experience in reducing and eliminating UP-POPs and BFRs releases, including policy and regulatory frameworks, pollution prevention and control technology policies, BAT guidelines, management and financing systems of Extended Producer Responsibility (EPR), etc. The Advisor will also conduct a gap analysis in this area and make suggestions for improvement of policy and regulatory measures; • For Output 2.1.3, the Advisor will provide international experience, practice and technical guidance to build capacity at demonstration areas on the application of EPR in battery collection, and on sound management of battery recycling; contribute to raise local environmental supervision capability on battery recycling, including how to make sure the supply chains for local markets are further developed, recycling rates increased and maximum quantities of recyclable plastic parts are diverted from inadequate disposal, etc.; • For Output 2.2.2, the Advisor will provide international BAT/BEP, experience and technical guidance to demonstration enterprises and the industry in the secondary aluminum and secondary zinc sectors to achieve reduction of 32.25 g TEQ of UP-POPs (for a two-year operation period) by project completion.

Annex 8: Stakeholder Engagement Plan

EXECUTIVE SUMMARY

This stakeholder engagement plan provides strategic guidance on stakeholder engagement during project implementation, which may be further elaborated at the project inception workshop. The Stakeholder Engagement Plan is designed to ensure inclusive, effective, and efficient engagement of the key stakeholders throughout the lifecycle of the GEF-supported, UNDP-administered project of *Green Production and Sustainable Development in Secondary Aluminum, Lead, Zinc and Lithium Sectors in China* (the project).

During the Project Preparation Grant (PPG) process, based on the Project Identification Form (PIF), a consultant conducted a stakeholder analysis, identified key stakeholders, assessed their interests in the project and defined their roles and responsibilities in the project implementation and monitoring and evaluation. Then the consultant further identified and assessed the project key stakeholders through consulting and discussing with UNDP, the Foreign Environmental Cooperation Center (FECO) of the Ministry of Ecology and Environment (MEE) of the Peoples' Republic of China (PRC), the other members of the project preparation team. Based on the above information, the consultant together with the other PPG members, UNDP, and FECO conducted field survey of some secondary metallurgic enterprises in Zhejiang, Shandong, Jiangsu and Yunnan provinces, in order to fully understand stakeholders involved in the life cycle recycling including the collection and conditioning of waste Lead-acid and Li-ion batteries, and the secondary production of the four nonferrous metals.

Based on the above analysis, the Stakeholder Engagement Plan for the project implementation, monitoring, and evaluation has been developed. The key points are:

- Timely and publicly (e.g., online) dissemination of the project information such as the project objective, expected outcome, tender documents on selection of the demonstration enterprises and enterprises for the national replication plan (NRP).
- Equal involvement of relevant male and female employees of the project related enterprises in selection of the enterprises' BAT/BEP, and in the project training development including trainees, training contents, time, location, etc.
- Male and female employees equally participation in development of the project training plans and will be equally trained.
- Using appropriate methods to distribute the project objective, outcomes, etc. to male and female, Han and ethnic minority residents in the communities surrounding the project enterprises and/or surrounding the project collection sites of waste batteries.
- Setting up grievance redress mechanisms.
- Setting up project information request procedure for the broader public.
- Integration of implementation situation of the stakeholders' engagement plan into the project annual report, and
- Consultation with the key stakeholders for the project mid-term review and terminal evaluation, and making the evaluation reports accessible to the project stakeholders.

The Project Manager will be responsible for facilitating and monitoring implementation of this Stakeholder Engagement Plan, with cooperation of the demonstration enterprises and enterprises involved in the National Replication Plan. The monitoring results will be included in the annual Project Implementation Report.

ABBREVIATIONS AND ACRONYMS

APR	Annual Project Report
AWP	Annual Work Plan
CNY	Chinese yuan
EA	Executing Agency
EIA	Environmental Impact Assessment
GEF	Global Environment Facility
IA	Implementing Agency
IMC	Inter-ministerial Committee
M&E	Monitoring and evaluation
MEE	Ministry of Ecology and Environment
MOF	Ministry of Finance
MTR	Midterm Review
NDRC	National Development and Reform Committee
NPD	National Project Director
PIF	Project Identification Form
PIMS	Project Information Management System
PIR	Project Implementation Review
PIU	Project Implementation Unit
PPG	Project Preparation Grant (for GEF)
PSC	Project Steering Committee
RTA	Regional Technical Advisor
TBD	To Be Determined
UNDP	United Nations Development Programme
UNDP CO	UNDP Country Office
USD	United States Dollar

1. INTRODUCTION

1. The GEF financed project of "Green Production and Sustainable Development in Secondary Aluminum, Lead, Zinc and Lithium Sectors in China" (the project) is in its preparation stage. A Project Preparation Grant (PPG) has been secured to formulate the full-sized project.

2. The project aims to reduce and eliminate UP-POPs[66] (PCDD/Fs, HCB and PCNs) and Brominated flame retardants (BFRs) releases through introduction of BAT/BEP in the Secondary Aluminum and Zinc production, and implementation of a life cycle management in Lead-acid battery and Li-ion battery recycling in China.

3. The project has four components: Component 1: Strengthening the national policy and regulatory framework to reduce UP-POPs and BFRs releases from secondary non-ferrous metal industry; Component 2: Reduction of UP-POPs and BFRs releases from unsound metal scrap and batteries recycling; Component 3: Implementation of a National Replication Programme (NRP); and Component 4: Project Monitoring, Evaluation and Knowledge Management.

4. The Foreign Environmental Cooperation Center (FECO) of the Ministry of Ecology and Environment (MEE) of the People's Republic of China (the PRC) is the project implementing partner (GEF Executing Entity).

5. Effective stakeholder engagement is critical to the success of GEF-financed projects. Stakeholder engagement improves project performance and impact by enhancing recipient country ownership of, and accountability for, project outcomes and objective; addressing the social and economic needs of affected people; building partnerships among project executing agencies (IA) and stakeholders; and making use of skills, experiences and knowledge particularly from enterprises especially the private sector, communities and local groups, ethnic minority peoples, male and female residents, as well as the project design team, in the design, implementation, monitoring and evaluation of project activities.

2. THE STAKEHOLDER ENGAGEMENT PLAN

2.1 Objectives of the Stakeholder Engagement Plan

6. This Stakeholder Engagement Plan (SEP) is designed to ensure inclusive, effective, and efficient engagement of key stakeholders throughout the lifecycle of the GEF-supported project of Green Production and Sustainable Development in Secondary Aluminum, Lead, Zinc and Lithium Sectors in China (the project).

2.2 Scope of the plan

7. Stakeholder means any individual or group that has an interest in the project or is likely to be affected by the project. **Key stakeholders** are those who have strong interest in, and/or influence over the project design, implementation, and the monitoring and evaluation, and will be directly affected by the project. **Stakeholder Engagement** means a process of disclosure of the project information to, consultation with the stakeholders, and the stakeholders' participation in the project development, implementation, monitoring, evaluation and learning throughout the project cycle, addressing grievances, and on-going reporting to the stakeholders. **The Project directly affected people** cover those who will be directly affected, positively or negatively, by the project. The affected people may live in or on the edge of a project site, or live in the areas of the project influence/impacts.

2.3 Methodology and methods

8. During the project preparation stage, based on the GEF Project Information Form (PIF), the consultant tentatively identified the key stakeholders first; then discussed with the UNDP, FECO who are the project implementing agencies (IA), and the other project preparation grant (PPG) team members for further identifying the key stakeholders; followed by field survey of seven metallurgic enterprises in Zhejiang, Shandong, Jiangsu and Yunnan provinces to understand current collection and recycling situation of Lead-acid and Li-ion batteries and secondary production of the four nonferrous metals and the stakeholders involved, and to discuss life-cycle recycling of the batteries and the key stakeholders, in order to ensure that all key stakeholders will be equally engaged in the project design, implementation, and monitoring and evaluation.

9. Identification of stakeholders will be an on-going and adaptation management process throughout the project cycle of life. More key stakeholders will be included whenever identified during the project implementation, monitoring and evaluation. The stakeholder engagement plan developed should be adjusted and improved whenever and wherever necessary.

[66] UP-POPs: Unintentionally produced persistent organic pollutants.

2.4 Alignment with relevant policies

10. This plan was developed in accordance with the GEF 2020 Strategy, the GEF policy on stakeholder engagement (2017), GEF Guideline on the Implementation of the Policy on Stakeholder Engagement (2018), GEF principles and guidelines on engagement with indigenous peoples (2012), GEF Policy on Gender Equality (2017), and UNDP Social and Environmental Standards (2021).

3. STAKEHOLDER ANALYSIS

11. The stakeholder analysis aims to identify the key stakeholders related to the project and assess their roles, responsibilities for, interests in life cycle recycling of lead-acid and li-ion batteries, and secondary production of the four nonferrous metals in China. Major barriers for female staff and female residents to engagement in the project are also assessed. The key stakeholders and their roles are summarized in Table 16.

Table 16: Summary of Key Stakeholder Analysis

Key Stakeholders	Mandate Relevant to the project	Roles in the project
National level administrative authorities		
Ministry of Finance (MOF)	MOF manages loans (grants) from multi- and bi-lateral development organizations and foreign governments.	a) Overall responsibility for national GEF programme; b) Review, endorse and supervise preparation and implementation of this proposal as the Country GEF Official Focal Point. The MOF was briefed on project development and will endorse the final Project Document.
National Development and Reform Commission (NDRC)	NRRC is responsible for promotion of the strategy of sustainable development through its lead role in the five-year planning process. NDRC makes proposal on strategy, plan, and relevant policies on using foreign funds.	NRDC will be a key partner in project mainstreaming efforts related to its lead role in the five-year planning process, and will support mainstreaming of life-cycle recycling into five-year planning process for relevant sectors.
Ministry of Ecology and Environment (MEE)	Supervise and administer to ensure the attainment of national emission reduction targets; Supervise efforts to prevent environment pollution; Formulate and implement regulations for pollution of the air, water, sea, soil, noise, light, odor, solid waste, chemicals, and vehicles; Guide and coordinate educational campaigns over ecological environmental protection; Formulate and implement educational campaign outlines for ecological environmental protection; Promote societal and public participation in environmental protection efforts;	a) Ongoing management of implementation of the project and management of the project; b) Issue national policy and standards to regulate environmental performance of China's secondary lead production sector; c) Supervise enforcement of environmental policies.
Foreign Environmental Cooperation Centre (FECO), Ministry of Ecology and Environment, China	Responsible for performing the Stockholm Convention in China	As the Executing Agency of the project, FECO is responsible for the project design, advise and supervise the project implementation.
Ministry of Industry and Information Technology (MIIT)	Overall planning and promotion of national information technology development Planning of manufacture industry development	Provide technical and policy support to MOF, MOC and MEE on development and implementation of the secondary metal (lead, aluminum and zinc) and li-ion batteries production industry management system including identification of technology requirements.

Key Stakeholders	Mandate Relevant to the project	Roles in the project
United Nations Development Programme (UNDP)	UNDP works in about 170 countries and territories, helping to achieve the eradication of poverty, and the reduction of inequalities and exclusion. UNDP helps countries to develop policies, leadership skills, partnering abilities, institutional capabilities and build resilience in order to sustain development results.	UNDP is GEF Implementing Agency for the project and is therefore responsible for oversight and monitoring project implementation and ensuring adherence to UNDP and GEF policies and procedures.
Local government and local level administrative authorities		
Local Government and Ecology and Environment Bureaus (EEB)	Within their jurisdictions: Supervise and administer to ensure the attainment of national and local emission reduction targets; Supervise efforts to prevent environment pollution; Formulate and implement regulations for pollution of the air, water, sea, soil, noise, light, odor, solid waste, chemicals, and vehicles; Guide and coordinate educational campaigns over ecological environmental protection; Formulate and implement educational campaign outlines for ecological environmental protection; Promote societal and public participation in environmental protection efforts.	Within their own jurisdictions: a) Planning and development approvals; b) Support public information dissemination and local social impact mitigation; c) Monitor environmental performance; d) Enforce environmental policies and requirements applicable to secondary lead management.
Industry Association		
Non-Ferrous Metal Association of China, Chinese Non-ferrous Metal Association Recycling Metal Branch, China Industry Technology Innovation Strategies Alliance, China Power battery forcible recovery of industrial technology innovation strategic alliance, Electric Vehicle Power Battery Recycling Strategic Alliance)	Within their own areas: Coordinate and support compliance actions within the sector; Facilitate information exchanges among members; Facilitate formulation of sector development strategies; Industrial strategy development of secondary metals.	a) Coordinate and support compliance actions within the sector; b) Facilitate information exchanges among members; c) Facilitate formulation of sector development strategies; d) Industrial strategy development of secondary metals; e) Enterprises management support.
The project demonstration and national replication enterprises		
Private Sectors	Investing and making profits from production of secondary metallurgy of nonferrous metals, and collection of waste lead-acid and/or waster Li-ion batteries	a) Participate in project activities; b) Carry out investment on UP-POPs, BSRs, and heavy metal reduction; c) Comply with national and local environmental policies and standards
Local communities and general public		
Local communities	Living in the influential area of the project enterprises including life cycle recycling, and those surrounding the project related waste battery collection	Participate in the project training planning and training activities, such as training on BAT/BEP and collection of life cycle recycling of waste lead-acid and/or li-ion batteries.
Ethnic minorities	In the above communities, some ethnic minorities might be live there	Ditto
General Public	Consumers of products which might have heavy metal issues	a) Improve consumers' awareness on UP-POPs, BFRs, and heavy metal issues related

Key Stakeholders	Mandate Relevant to the project	Roles in the project
	Residents whose surrounding air and soil might be impacted by UP-POPs with related exposure chicken/egg	to the secondary nonferrous metal production; b) Exercise consumers' rights to influence environmental performance of the sector.
Universities, research institutions and CSOs		
Academic institutes, colleges, universities, and/or relevant individuals	Universities and research organizations focus on teaching, research and conservation knowledge development and policy recommendations	Conduct field surveys, monitoring, data collection and database development for the project Provide technical expertise on life cycle recycling of waste lead-acid and/or li-ion batteries Provide technical expertise on secondary production of the four nonferrous metals
CSOs	Have their focuses and special interests on recycling of waste lead-acid and/or li-ion batteries, and/or secondary production of the four nonferrous metals.	Potential to provide technical expertise and bring in international experience, networking and platform for communication. Possible co-implementers for some activities such as training, communication and public awareness under projects.

Sources: PIF, consultations with the EA and other PPG team members, field visits of seven relevant enterprises, etc.

12. Due to the traditional values that men are responsible for affairs outside of home while women do household duties, there might be a few barriers to female workers and female residents' engagement in the project, especially technical trainings. The barriers and the measure are stated in Table 1717.

Table 17: Barriers to Women's Engagement and the Countermeasures

Female group	Barrier types	Barriers to Engagement	Countermeasures
Women workers displaced due to project	Equal participation in technical training and training on impacts of UP-POPs, BFRs and countermeasures	It is often that women have less participation opportunities than men in training. This tradition may constrain the displaced women's participation in the project trainings, including training for reemployment	It is proposed in the project Gender Mainstreaming Action Plan that the project enterprises ensure equal training of the displaced women workers on production of secondary metallurgy of the four nonferrous metals, train them on impacts of UP-POPs and BFRs, and the countermeasures with training time and location suitable to women.
Females involved and those will be involved in collection of waste lead-acid and/or li-ion batteries	Equal participation in the project training on scientific collection of waste lead-acid and li-ion batteries, and equal participation in training on impacts of UP-POPs, BFRs, and countermeasures.	It is often that women actually less participate than men in training. This tradition may constrain the females who are involved and those will be involved in collection of waste lead-acid and/or li-ion batteries	It is proposed in the project Gender Mainstreaming Action Plan that the project enterprises equally train females for them to scientifically collect waste lead-acid and li-ion batteries, train them on impacts of UP-POPs and BFRs, and the countering measures.

Sources: consultations with the EAs, other PPG team members, field visits of seven enterprise and their employees in 2021.

4. STAKEHOLDER ENGAGEMENT PLAN

13. Based on the stakeholder analysis, stakeholders were consulted and surveyed during the project preparation, which were shown in Table 18. Stakeholder engagement plan for the project implementation, monitoring and evaluation has also been developed based on the analysis and survey which is presented in Table 19.

4.1 Stakeholder engagement during the project preparation

14. Since the PPG team started working on the project, several meetings and field survey on identifying key stakeholders, their roles, interests, and responsibilities, were conducted led by FECO and UNDP; and seven relevant enterprises were visited and consulted for designing and implementation of the project.

Table 18: Stakeholder Engagement promoted in the Project Preparation Grant (PPG) Phase

Means of Engagement	Stakeholders engaged	Objectives	Time	Major results
Inception workshop	PPG team, UNDP, FECO, MEE, Associations, etc.	- Make familiar with the PIF emphasized gender - Achieve common and deep understanding of the project, the outcomes, objectives, the institutional arrangement, etc. - Further identify key stakeholders	April 16, 2021	Clear understanding of the project identification of the key stakeholders
Field visits and survey of relevant enterprises	Tianneng Company in Changxing County of Zhejiang Province: 12 managers etc. (6 male, 6 female) Chaowei Company in Changxing County of Zhejiang Province: 18 employees including 10 managers (6 male, 4 female) and 8 frontline workers (4 male, 4 female) Shandong Aolong Company in Weifang City of Shandong Province: GEM Company in Wuxi City of Jiangsu Province: 11 managers etc. (6 male, 5 female) Xinlianhuanbao Company in Gejiu City of Yunnan Province: 9 managers etc. (5 male, 4 female) Xiangyunfeilong Company in Xiangyun County of Yunnan	(v) understanding collection and recycling situation of waste lead-acid and li-ion batteries, and secondary Zine and Aluminum production, including working situation of the male and female employees; and release risks and impact of UP-POPs and BFRs; (vi) understanding participation willingness of the enterprises including the male and female employees (vii) make the enterprises including the male and female employees clearly understand the project such as the project objective, the expected outcomes, outputs, main activities, counterpart funds; and (viii) discuss with	19 May -1 June 2021	The PPG team and the project IAs (UNDP and FECO) known the current situation of the collection and recycling of waste batteries and the secondary Zinc and Aluminum production, existing problems, potential measures, etc. The enterprises understood the project objective, the outcomes, the proposed outputs, activities, and required counterpart funds All visited seven enterprises have willingness to participate in the projects

Means of Engagement	Stakeholders engaged	Objectives	Time	Major results
	Province: 9 managers etc. SWCMC[67] of MEE China Nonferrous Metals Industry Association（CNMIA China Battery Industry Association（CBIA PPG team UNDP, FECO	the stakeholders on the project design, implementation etc.		
Workshops for development of the project documents	UNDP, FECO, CNMIA, CBIA, PPG team	Provide more information for the PPG team to complete the draft project document	23 June 2021	Got more relevant information
Validation workshop	PPG team, UNDP, FECO, MEE, Industry Associations, etc.	Consultation, coordination and validation of project design and activities by key stakeholders	October 2021	Suggestions for improvement of project design and buy-in of the project

4.2 Stakeholder engagement during the project implementation

15. Based on the above-mentioned consultations, and GEF policy on stakeholder engagement, the following stakeholder engagement plan for the project implementation phase has been developed (20).

[67] Solid Waste and Chemicals Management Center of MEE

Table 19: Stakeholder Engagement during Project Implementation

Engagement methods	Objectives	Key Stakeholders being engaged	Main responsible agencies	Location for engagement or for info disclosure	Time	Resources
Engagement before the project implementation						
Dissemination of the project document on websites	Public access to the project information Outreach of the project	Any interested individual and organization, male and female, Han and Ethnic minorities	UNDP, FECO, PMU,	Disclosed on websites of the UNDP, and FECO	Before the project implementation	The project budget
Validation workshop for the project PPG document	Finalize the project document	Project relevant governmental agencies, enterprises, etc.	UNDP, FECO, PPG team etc.	PMU	Before the project document finalization	The project PPG budget
Engagement in project implementation						
Inception workshop Bi-annual work plan making and/or update	Reach an agreement on the project detailed arrangement	All the key stakeholders	UNDP, the PMU	TBD	Project implementation period	The project budget
Consultation, workshop etc.	Develop criteria for selection of the demonstration enterprises	The project steering committee Relevant enterprises	UNDP, the PMU	Bidding information disclosed online	In the beginning of the project implementation	The project budget
Consultation, workshop etc.	Develop criteria for selection of enterprises to be involved in the national replication plan	The project steering committee The project demonstration enterprises Other relevant enterprises	UNDP, the PMU	Bidding information disclosed online	During the project implementation	The project budget
Component 1: Strengthening the national policy and regulatory framework to reduce UP-POPs and BFRs releases from secondary non-ferrous metal industry						
Outcome 1.1 Reduced UP-POPs and BFRs releases resulting from unsound metal scrap and batteries recycling management practices through the adoption and implementation of standards/measures, policies, plans, laws, regulations and guidance. Output 1.1.1 Policy and regulatory framework for metal scrap management developed, revised and improved and relevant components integrated into the existing policy and regulatory framework. Output 1.1.2 Technical by-laws, regulations and guidance aiming to reduce UP-POPs and BFRs release from batteries manufacturing, recycling and disposal practices developed, adopted and implemented. Output 1.1.3 Barriers to BAT/BEP and Extended Producer Responsibility (EPR) implementation removed through e.g. the institution of economic instruments and incentives.						

Engagement methods	Objectives	Key Stakeholders being engaged	Main responsible agencies	Location for engagement or for info disclosure	Time	Resources
Consultation, workshop, interview, survey, etc.	Develop and/or improve environment policies and technical standards for reduction of UP-POPs and BFRs released from secondary nonferrous metal production, and life cycle recycling of waste lead-acid and waste li-ion batteries	The project steering committee MEE Relevant enterprises Relevant associations Relevant research and universities	UNDP, FECO, the PMU	TBD	During the project implementation	The project budget
Component 2: Reduction of UP-POPs and BFRs releases from unsound metal scrap and batteries recycling						
Outcome 2.1 Reduced releases of UP-POPs and BFRs as a result of improved raw material (recycled metal scrap and batteries) supply chains as well as the introduction of environmentally sound disposal practices and extended producers responsibility at recycling entities. Output 2.1.1 Assessment of existing collection systems completed, and appropriate collection schemes established, feasible logistical arrangements, including proper acceptance and outbound material criteria. Output 2.1.2 Supply chains for local markets further developed, recycling rates increased and maximum quantities of recyclable plastic parts diverted from inadequate disposal. Output 2.1.3 Two demonstration projects implemented to demonstrate BAT/BEP and life cycle recycling in the collection and conditioning of waste batteries (one in lead acid batteries and one in li-ion batteries), applying proper management of hazardous waste generated in the whole process. Outcome 2.2 Prevent and minimize the generation of UP-POPs in the secondary metallurgical processes. Output 2.2.1 Assessment of secondary metallurgic production processes and technologies finalized. Output 2.2.2 Two demonstration projects implemented to demonstrate BAT/BEP in the secondary production of metals (one in aluminum and one in zinc)						
Competitive bidding for the project demonstration enterprises	Selection of the best suitable enterprises as the project demonstration enterprises	All enterprises with participation willingness	The PMU	The RFP will be disclosed on website of FECO and UNDP	In the beginning of the project implementation	The project budget
Consultation, workshop, survey, etc.	Select BAT/BEP to be implemented in the demonstration enterprises	The project BAT/BEP including male and female technicians and other relevant employees	The demonstration enterprises	The demonstration enterprises	During the project implementation	The project budget
Participation in the project training planning	Effectively develop the training	Relevant male and female, Han and ethnic minority employees	The demonstration enterprises	TBD	During the project implementation	

Engagement methods	Objectives	Key Stakeholders being engaged	Main responsible agencies	Location for engagement or for info disclosure	Time	Resources
Publicize objective and results of the BAT/BEP implementation	Make the participants understanding benefits of the project, the BAT/BEP, which will facilitate the general public's support of the enterprises	residents living within 500m from the demonstration enterprises to students in local schools, and to local government officials	The demonstration enterprises	The demonstration enterprises, and/or the surrounding area	During the project implementation	The project budget
Consultation, workshop, etc.	Discussion and finalization of life cycle recycling of waste lead-acid and waste li-ion battery	Male and female technicians and other relevant employees of the demonstration enterprises; Relevant associations; Relevant research institutions, and universities; Male and female residents of the related waste battery collection sites	The demonstration enterprises	The demonstration enterprises; The related waste battery collection sites and/or the surrounding communities	During the project implementation	The project budget
Publicize the pilot life cycle recycling to general public on website, etc.	Raise general public' awareness on people's behaviour of carelessly discard of waste batteries lead to release of UP-POPs and BFRs, and the negative impact of UP-POPs and BFRs on human health and environment	All people with willingness to understand recycling of waste batteries.	The demonstration enterprises The collection departments of the demonstration enterprises	Websites, blackboards, etc. of the demonstration enterprises and the collection departments	During the project implementation	The project budget
Face-to-face promotion	Enhance knowledge and awareness of residents surrounding the waste battery collection sites	Male and female residents (Han and other ethnicities) living surrounding the waste battery collection sites (usually within 500m)	Collection departments of the demonstration enterprises'	The collection sites and/or the surrounding communities	During the project implementation	The project budget
People sell or give waste lead-acid and waste li-ion batteries to the collection sites	Increase collection rates of the waste batteries	People producing or having the waste batteries	The collection departments	The collection sites	During the project implementation	Cost of the collection department

Engagement methods	Objectives	Key Stakeholders being engaged	Main responsible agencies	Location for engagement or for info disclosure	Time	Resources
Component 3: Implementation of a National Replication Programme (NRP)						
Outcome 3.1 Replication and Promotion of demonstration results and experience. Output 3.1.1 A national replication plan of sustainable recycling and green production developed. Output 3.1.2 Results of the implemented demonstration project published and disseminated for replication. Outcome 3.2 Promotional events for stakeholders, including awareness raising delivered. Output 3.2.1 Technical training for stakeholders and awareness raising workshops developed and implemented. Output 3.2.2 Awareness raising materials formulated and distributed						
Competitively bidding for the NRP enterprises	Selection of the best suitable enterprises	All enterprises with willingness to participate	The PMU	RFP disclosed on FECO website	During the project implementation	The project budget
Consultation, workshops, etc.	Determine and finalize BAT/BEP for the NRP enterprises	Relevant male and female technicians and other employees of the NRP enterprises; Relevant associations; Relevant research institutes and/or universities	The NRP enterprises	The NRP enterprises or other suitable places	During the project implementation	The project budget
Train male and female employees of the NRP enterprises on the BATs/BEPs	Implement the BAT/BEP effectively and efficiently	All relevant male and female employees of the NRP enterprises	The NRP enterprises	TBD	During the project implementation	The project budget
Participation in development of training plans	Effectively develop training plans	Relevant male and female, Han and ethnic minority employees of the NRP enterprises	The NRP enterprises	TBD	During the project implementation	
Publicize the BAT/BEP to communities surrounding the NRP enterprises, to local schools and local government departments	Make the participants understand the BAT/BEP and the objective of reduction of UP-POPs and BFRs	Male and female residents living surrounding the NRP enterprises, boy and girl students of the local schools, male and female officials of the local government agencies	The NRP enterprises	The NRP enterprises	During the project implementation	The project budget
Consultation, workshop, etc.	Discuss and finalize management models of life cycle recycling of	Male and female technicians and other employees of the NRP enterprises;	The NRP enterprises	The NRP enterprises	During the project implementation	The project budget

Engagement methods	Objectives	Key Stakeholders being engaged	Main responsible agencies	Location for engagement or for info disclosure	Time	Resources
	waste lead-acid and waste li-ion batteries	Relevant associations; Relevant research institutions and/or universities				
Consultation, workshop, etc.	Discussion and finalization of life cycle recycling of waste lead-acid and waste li-ion battery	Male and female technicians and other relevant employees of the NRP enterprises; Relevant associations; Relevant research institutions, and universities; Male and female residents of the related waste battery collection sites	The NRP enterprises	The NRP enterprises; The related waste battery collection sites and/or the surrounding communities	During the project implementation	The project budget
Publicize the pilot life cycle recycling to general public on website, etc.	Raise general public awareness on people's behaviour of carelessly discard of waste batteries lead to release of UP-POPs and BFRs, and the negative impact of UP-POPs and BFRs on human health and environment	All people with willingness to understand recycling of waste batteries.	The NRP enterprises The collection departments of the NRP enterprises	Websites, blackboards, etc. of the NRP enterprises and the collection departments	During the project implementation	The project budget
Face-to-face propaganda	Enhance knowledge and awareness of residents surrounding the waste battery collection sites	Male and female residents (Han and other ethnicities) living surrounding the waste battery collection sites (usually within 500m)	Collection departments of the NRP enterprises'	The collection sites and/or the surrounding communities	During the project implementation	The project budget
People sell or give waste lead-acid and waste li-ion batteries to the collection sites	Increase collection rates of the waste batteries	People producing or having the waste batteries	The collection departments	The collection sites	During the project implementation	Cost of the collection department
Component 4: Project Monitoring, Evaluation and Knowledge Management						
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.						

Engagement methods	Objectives	Key Stakeholders being engaged	Main responsible agencies	Location for engagement or for info disclosure	Time	Resources
Outcome 4.2 Knowledge sharing and information dissemination Output 4.2.1 Knowledge products on best practices, experiences and lessons learned documented and shared nationally and internationally, including recycling and disposal knowledge on waste lead/lithium batteries and metal scrap.						
d) Participation in project monitoring						
Consultation with male and female employees of the demonstration and NRP enterprises	The male and female employees equally involved in the project progress monitoring	The project implementers in the demonstration and NRP enterprises	The project monitoring officer The demonstration and NRP enterprises	Internet, phone, WeChat, face-to-face interview, etc.	During the project implementation	The project budget
Consultation with male and female employees in the project related waste battery collection departments	The male and female employees equally involved in the project progress monitoring	Male and female employees in the project related battery collection department	The project monitoring officer The project related battery collection department	Internet, phone, WeChat, face-to-face interview, etc.	During the project implementation	The project budget
e) Mid-term review and terminal evaluation						
Consultation with relevant stakeholders	Evaluation done effectively	Key project stakeholders	The independent evaluation consultants	Suitable places and/or channels identified during the evaluation	During the evaluations	Project budget for M&E
Dissemination of the approved review/evaluation reports to broad public	Make the information accessible to broad public	Any interested individual and organization	GEF, UNDP, FECO	Disclosed on websites of the GEF, UNDP, the FECO	4 weeks after the evaluation reports finalized	Project budget for M&E
f) Information request procedure for broad public						
Publicizing contact details for information requests from public	Project non-confidential information accessible to public.	Any individual and organization interested in the project	PMU, relevant project agencies	Disclosed on websites of the project and/or FECO	Immediately after inception workshop	Project budget for communications
Public request information to the contacts by email or by written document	Project knowledge accessible to institutions or individuals	individual or organization requested project information	PMU, relevant project agencies	Emails or written documents to relevant project office / PAs	Any time during the project implementation	Project budget for communications
The Project's reply to the information requests	The requests were replied	individual and organization requested project information, relevant project	PMU, relevant project agencies	same way replying to the request	Within 2 weeks after received the request	Project budget for communications

Engagement methods	Objectives	Key Stakeholders being engaged	Main responsible agencies	Location for engagement or for info disclosure	Time	Resources
		agencies				
For all project activities: Grievance redress mechanism						
Step 1: affected people submit grievance if any to the contacts of demonstration enterprises or medical facilities	express grievance	People or organizations submitted grievance	Relevant demonstration agency	Written grievance	Any time during the project implementation	Project budget for M&E
Step 2: demonstration agencies address the grievance	Address grievance	People or organizations submitted grievance	PMU, relevant demonstration agency	Suitable ways	Two weeks after received the complaint	Project budget for M&E
Step 3: if dissatisfied, the affected people submit his/her grievance to the project PMU	Address grievance	People submitted grievance	PMU	Suitable ways	Two weeks after received the complaint	Project budget for M&E
Step 4: if still dissatisfied, the affected people can appeal to relevant administrative authorities	Address grievance	People submitted grievance	PMU, The administrative authorities	Suitable ways	Appliance with policies of the authorities	Appliance with policies of the authorities

5. ARRANGEMENT OF IMPLEMENTATION OF THE STAKEHOLDER ENGAGEMENT PLAN

16. The Project Manager will be responsible for facilitating and monitoring implementation of this stakeholder engagement plan, with demonstration enterprises and demonstration medical facilities' coordination of the project implementation at site level. The monitoring results will be included in the annual Project Implementation Reports.

17. The project midterm review and terminal evaluation will also evaluate the implementation of this stakeholder engagement plan. Experiences and learning points will be included in the evaluation reports, which will be shared with other GEF projects in the future.

ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (ESMF)

Project Management

[DATE]

MICROSOFT

[Company address]