Report of the Independent Terminal Evaluation of UNDP/GEF Project

´Reduction of POPs and PTS release by environmentally sound management throughout the life cycle of electrical and electronic equipment and associated wastes in China´

January 2020

Basic Report Information

Project title:	Reduction of POPs and PTS release by environmentally sound management throughout the life cycle of electrical and electronic equipment and associated wastes in China
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UNDP Award ID:	00078105
GEF project ID#:	4862
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Management Arrangement:	National Execution
Atlas Award/Project ID:	00088552
TE time frame:	20 October 2019 to 31 May 2020
Date of TE report:	20 January 2020
Project region:	Asia-Pacific
Project country:	People's Republic of China
GEF Operational Focal Area/	
Strategic Program:	Chemicals and Waste, Persistent Organic Pollutants
Implementing Agency:	United Nations Development Programme (UNDP)
Executing Agency:	(FECO), Ministry of Ecology and Environment, PRC

Terminal Evaluation Team Members

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Acronyms and Abbreviations

APR	Annual Progress Report
BAT	Best Available Technique
BCRC	Basel Convention Regional Centre
BEP	Best Environmental Practices
BFR	Brominated Flame Retardant
CDR	Combined Delivery Report
CO	Country Office
CRT	Cathode Ray Tube
EA	Executing Agency
EEE	Electrical and Electronic Equipment
EPB	Environmental Protection Bureau
EPR	Extended Producer Responsibility
ESM	Environmentally Sound Management
FECO	Foreign Economic Cooperation Office
GEF	Global Environment Facility
IA	Implementing Agencies
IMS	Information Management System
LCA	Life-cycle Assessment
LCM	Life-cycle Management
LPMO	Local Project Management Office
M&E	Monitoring & Evaluation
MEE	Ministry of Ecology and Environment, PRC
MFA	Ministry of Foreign Affairs, PRC
MIIT	Ministry of Industry and Information Technology, PRC
MOC	Ministry of Commerce, PRC
MOF	Ministry of Finance, PRC
MOFCOM	Ministry of Commerce, PRC
MOHURD	Ministry of Housing and Urban-Rural Development, PRC
MTR	Mid-Term Review
NDRC	National Development and Reform Commission, PRC
NGO	Non-governmental organizations

NIP	National Implementation Plan
NPT	National Project Team
PBDD/PBDF	Polybrominated Dibenzodioxins/Dibenzofurans
PBDE	Polybrominated Diphenyl Ethers
PCB	Polychlorinated Biphenyl
PCDD/PCDF	Polychorinated Dibenzodioxins/Dibenzofurans
PFOS	Perfluorooctanesulfonic acid
PIM	Programme Implementation Manual
PIR	Project Implementation Review
PMO	Project Management Office
POPs	Persistent Organic Pollutants
PPG	Project Preparation Grant
PRC	People's Republic of China
PTS	Persistent Toxic Substances
QPR	Quarterly Progress Report
RMB	Renminbi, "People's currency"
RoHS	Restriction of the Use of Certain Hazardous Substances
SAC	Standardization Administration, PRC
SAICM	Strategic Approach to International Chemicals Management
ToR	Terms of Reference
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USD	United States Dollars
WEEE	Waste Electrical and Electronic Equipment
WPCB	Waste Printed Circuit Board

1 EXECUTIVE SUMMARY

1.1 Project Summary Table

The general information of the project is as following:

Table 1: General information of the project

Project Title	**Reduction of POPs and PTS release by environmentally sound management throughout the life cycle of electrical and electronic equipment and associated wastes in China**
Atlas Award/Project ID	00088552
UNDP PIMS	5044
GEF Project ID	4862
Project Duration	5.5 years (04/2014—10/2019)
Executing Agencies	Foreign Economic Cooperation Office/ Ministry of Ecology and Environment
Implementing Agencies	UNDP (China)
PAC Meeting Date	14 March 2014
Strategic Program	Chemicals and Waste, Persistent Organic Pollutants
GEF Project Grant	USD 11,650,000
Co-financing	USD 47,000,000
Total Project Budget	USD 58,650,000

1.2 Project Description

Project background: The goal of the Stockholm Convention related to avoiding the environment pollutions by POPs is to protect the environment and human health. As one of the first panel of contracting parties，Chinese government signed the Convention on May 23, 2001. The Convention became effective on November 11, 2004 in China. The Stockholm Convention National Implementation Plan on POPs (NIP), completed and submitted in 2007, is the principle national plan directly pertinent to this project. It's Action Plan that places a high priority on reduction of unintentionally produced POPs releases. During the period up to 2015, the planned actions focus on sectoral or source category initiatives involving first-stage interventions to initiate control of PCDD/F sources by means of technical evaluation, environmental impact assessment, revised release standards, monitoring capacity building, and BAT/BEP demonstration. GEF -5 projects are approved in two such priority source categories, municipal waste and pulp and paper. This project, with its primary focus on unintentional POPs releases represents the third such sectoral initiative proposed for GEF support and is consistent with the NIP Action Plan it focused on these first stage interventions. The secondary processing of non-ferrous metals generally was also identified in the NIP as a primary source category and priority for action. The informal processing e-waste is now recognized under the UNEP Tool Kit Source Category 2 (Ferrous and Non-Ferrous Metal Production/Group l (Thermal wire reclamation and e-waste recycling). In China, this is a major and rapidly growing sub-sector in this source category, as well as also being a source of unintended new POPs emissions in the form of PBDD/F as a consequence of open-burning of cables and circuit boards.

China is generally considered the world's largest processer of e-waste derived from WEEE recycling. China's domestic generation of such wastes is rapidly increasing and will sustain the high volume of processing. Some of WEEE recycling, specifically e-waste sensitive POPs and PTS release is triggered by an informal sector typically utilizing primary processes. This has resulted in the sector being associated with a range of serious environmental and health impacts including significant air U-POPs releases of PCDD/F and PBDD/F. Direct POPs release from random land disposal of PCB, PBDE and potentially PFOS containing components also result in eventual POPs release. Additionally, these processes also result in release of a variety of toxic heavy metals classed as PTS, notably mercury, lead, and cadmium, which further contribute to air, land and water contamination.

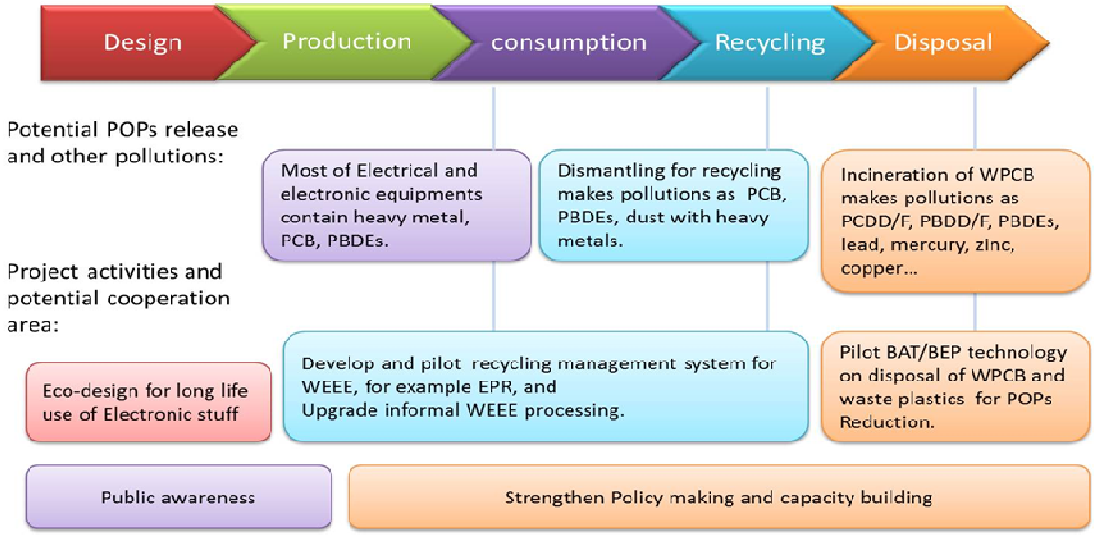


Figure 1: Project framework

In order to fulfill the obligations under the Stockholm Convention and reduce the release of POPs and PTS during the process of WEEE treatment, the Ministry of Environmental Protection China, with the assistance of UNDP, has initiated the project "Reduction of POPs and PTS Release by Environmentally Sound Management throughout the Life Cycle of Electrical and Electronic Equipment and Associated Wastes in China". The project also is a key part of a current national policy initiative under the Regulation on the Administration of the Recovery and Disposal of Waste Electrical and Electronic Products that came into effect in 2011. This has the overall objective of establishing a national Extended Producer Responsibility (EPR) system by 2015, inclusive of an EPR Treatment Fund that provides environmentally sound processing of such wastes, including those currently associated with unintentional POPs releases. This system assumes and relies on substantial private sector involvement as noted elsewhere herein. More generally, this flows from the Circular Economy Promotion Law of the PRC (2008), and earlier Law of People's Republic of China on Prevention of Environmental Pollution caused by Solid Waste (2004 revision) and Promotion of Clean Production (2002). It is also consistent with a number of broader national environmental and economic development programs including the current (12th) National 5-years Plan which specifically includes a specific sub-plan to address POPs.

As a main achievement of the project, the four-year project will help China to fulfil the requirements of the Stockholm Convention. Consistent with this objective, the project will address the POPs/PTS

release sensitive e-waste stream in the recycling, dismantling, treatment and final disposal processes of Waste Electrical and Electronic Equipment as illustrated in Figure 1.

The implementation plan for the EPR based WEEE management system is based on several critical assumptions as follows:

- the current informal sector will be replaced by or absorbed into the new formal sector, something that will depend on the effectiveness and competitiveness of the EPR system relative to the informal sector that should be achieved by the financial incentives a well-funded EPR system can preferentially provide to the formal sector and the private sector investing in it as a consequence;
- the current large volumes of imported e-waste which might otherwise sustain a competing informal sector will be eliminated;
- there is a broader coverage of WEEE than currently provided for;
- International experience related to implementing EPR systems and introducing processing technology based on international BAT/BEP is available and applicable to the Chinese context.

Project Objectives: The proposed four-year (extended 1.5 year) project will help China to fulfill the requirement of the Stockholm Convention. Consistent with this objective and taking into account of achievements of the Project Preparation Grant (PPG) activities, the project will address the POPs/PTS release sensitive e-waste stream in eco-design, recycling, dismantling, treatment and final disposal processes of Waste Electrical and Electronic Equipment (WEEE). The main objectives are: at least 250 management persons to be trained for EPR concept and EPR management system; at least 25,000 technical workers to be trained on BAT/BEP; 3 kinds of WEEE recycling/collection system to be demonstrated, and will cover at least 3 provinces shown in Table 2; over 2,000,000 units WEEE in the demon area to be collected into formal sector at the first year, 50% increased at the end of the project; setup an environmental sound management system for WEEE control; finalize 5 item EEE guidelines about eco-design and at least develop 1 kind of EEE up to eco-design standard and at least 1 national policy proposal about EPR system.

Table 2: Technical Demonstrations

Demo area and enterprise		Re-collection	Pre-treatment			Disposal			
			Dismantling	Waste Printed circuit boards					CRT
				Physical crush	Remove Com-ponent	Resin Reuse	Hydro-metallurgy	Incinerator	
Tianjin	TCL-AOBO Environmental Protection and Development CO., Ltd	√	√		√		√		
Jiang-su	Changzhou Xiangyu Resource Recycling Technology Co., Ltd.	√	√		√	√			
	Jiangsu New Chunxing Resource Recycling Co., Ltd.								√
Hubei	Bo Wang Xing Yuan Environmental Protection Technology Co., Ltd.		√	√					
	Jingmen GEM New Material Co. Ltd.	√	√	√					

	Daye Nonferroue Metals Group Holdings Co., Ltd							√	
	Hubei Jinyang Metallurgical Incorporated Co., Ltd								√
Henan	Anyang Minshan Non Ferrous Metals Co., Ltd.								√

Project Strategies: The project as outlined is structured with five components: Component 1 covers national WEEE management system development and implementation in terms of scope, administration, business arrangements and promotion with the GEF support being focused on introduction of international experience and lessons learned; Component 2 covers the development of the required infrastructure and the demonstration of BAT/BEP technologies with the GEF support focused on introduction of international technology and capability; Component 3 addresses the integration of the informal sector into the formal EPR system with GEF support focused on information exchange, training and international cooperation related to illegal imports, Component 4 supports the monitoring and evaluation of the project and dissemination of experience, something that is seen as useful for other developing countries dealing with the issue globally; and Component 5 strengthens project management capacity to achieve implementation effectiveness and efficiency.

1.3 Evaluation Rating Table

Table 3: Evaluation Ratings[1]

1. Monitoring and Evaluation	**Rating**	**2. IA & EA Execution**	**Rating**
M&E design at entry	HS	Quality of UNDP Implementation	S
M&E Plan Implementation	S	Quality of Execution - Executing Agency	S
Overall quality of M&E	HS	Overall quality of Implementation / Execution	S
3. Assessment of Outcomes	Rating	4. Sustainability	Rating
Relevance	R	Financial resources:	ML
Effectiveness	S	Socio-political:	S
Efficiency	S	Institutional framework and governance:	S
Overall Project Outcome Rating	HS	Environmental:	S
		Overall likelihood of sustainability:	S

Ratings are as follows:

Ratings for Outcomes, Effectiveness, Efficiency, M&E, I&E Execution	**Sustainability ratings**
6. Highly Satisfactory (HS): The project had no shortcomings in the achievement of its objectives in terms of relevance, effectiveness, or efficiency **5. Satisfactory (S):** There were only minor shortcomings **4. Moderately Satisfactory (MS)**: There were moderate shortcomings	**4. Likely (L)**: Negligible risks to sustainability **3. Moderately Likely (ML):** Moderate risks **2. Moderately Unlikely (MU):** Significant risks **1. Unlikely (U):** Severe risks
	Relevance ratings:
	2. Relevant (R) **1. Not relevant (NR)**

[1] The definition of rate could be refer to the following table 6

3. Moderately Unsatisfactory (MU): The project had significant shortcomings **2. Unsatisfactory (U):** There were major shortcomings in the achievement of project objectives in terms of relevance, effectiveness, or efficiency **1. Highly Unsatisfactory (HU):** The project had severe shortcomings	**Impact ratings:** **3. Significant (S)** **2. Minimal (M)** **1. Negligible (N)** *Additional ratings where relevant:* Not Applicable (N/A) Unable to Assess (U/A)

1.4 Summary of conclusions, recommendations and lessons

Conclusions

On project objective: The project has greatly contributed to upgrading the EPR system and the formal sector and at identifying technologies and eco-design to reduce POPs/PTS releases in WEEE management. A good level of innovation was demonstrated in project activities.

On project design: The project is highly relevant and enjoys a comprehensive and coherent structure, covering policy, BAT/BEP, guidance and capacity building, as well as awareness raising.

On project implementation: Project management was highly effective and financially efficient, exceeding targets with the funds available and good corrective actions, although more time than originally anticipated was required.

On component 1: The EPR system has been upgraded and eco-design has been promoted, thanks to thorough research, successful demonstrations and an effective information management system.

On component 2: Demonstrations have been successfully completed, with 6 BAT/BEP demonstrated (3 for pre-treatment and 3 for disposal), impressive amounts of POPs/PTS sensitive material treated (i.e. CRT and plastics) and technologies for end gas discharge of PCDD/PCDF up to standard. Yet, the plastics being recycled and treated might not be the PBDE-containing ones.

On component 3: The formal sector in WEEE management has significantly increased, which generated good socio-economic and environmental benefits, although more could have been done to integrate informal workers.

On components 4 and 5: The project team (at MEE/FECO and UNDP China Office) as well as the LPMOs are well established, collaborates on a regular basis and are dedicated and competent in ensuring the project success.

On sustainability: The project results are likely to be sustainable overall.

Table 4: Comparison of targets and outcomes

Targets	**Outcomes**	Met or not
At least **250** management personnel trained	Finished **679 people/time** management personnel trained	Yes
At least **25,000** technical workers trained	Finished **65,000 people/time** technical workers trained and about 32% were women	Yes
At least **2 BAT/BEP** technologies for pre-treatment demonstrated and relevant technical guidelines finalized	Finished **5 types of e-waste dismantling demonstration** and **2 types of removing components from Waste Printed Circuit Boards**	Yes

	BAT/BEP technology	
At least **2 BAT/BEP** technologies for disposal demonstrated and relevant technical guidelines finalized	Finished **CRT disposal treatment**, **WPCBs wet & incinerator treatment** and **waste resin reusing treatment** BAT/BEP technology	Yes
Estimated 50% increase of WEEE collected and processed	2 million WEEE were collected in the first year, and 11.86 million WEEE were collected in three demonstration provinces at the end of 2018, which is almost 5-fold increase	Yes
3 types of WEEE collection/recycling demonstrated in three demonstration provinces	4 types of WEEE collection mode (include extra mode: Baidu recycle mode, internet+) and covered 8 provinces (covered by the Baidu recycle)	Yes
Over 5,000 tons of BFR containing plastic/resins performed/reused annually	284,890 tons of BFR containing plastic/resins performed/reused in this project	Yes
Over **5,000** tons of CRT to be recycled annually from environmental emission annually	From 2017**, 15,000 tons of CRT** recycled annually from environmental emission annually	Yes
Improved WEEE management System	Finished **3 policy recommendations** on EPR subsidy funds at the national level	Yes
5 WEEE technical guidelines about eco-design finalized	Finished **6 WEEE technical guidelines** about eco-design	Yes
Eco-design for at least **one** electrical and electronic equipment developed	Develop Eco-computer (by Lenovo company) **Lenovo K43c-80** computer	Yes

Recommendations

- Impressive results have been obtained to find practical solutions for WEEE management especially in two provinces and in Tianjin. It is recommended to undertake a short but decisive final summarizing assessment on the status quo and assess the compatibility of the systems in terms of coverage of the WEEE waste streams and the management options including the treatment facilities. These final assessments can form the basis for replication in other provinces in China and can serve as a model for other countries.
- Since some solutions are quite local and cover less than 100,000 people (in Wuhan, we did see one company that served 40,000 people and was technologically and economically successful), the “Chinese” model has a good potential to be transferred to other countries.
- Although dissemination plan was made for replication including lessons learned and the best practices identified during the demonstrations, it would be more practicable if social and economic level are considered. in act 2.6.
- This project is a snapshot reflecting the present situation; however, the electronics market is rapidly developing also due to new requirements or trends. Any replication or expansion of the project must take into account these changes and inform suppliers for the manufacture of new electronics to allow for future eco-products that do not contain POPs. For the WEEE management, technologies as well as workplaces have to be reviewed with quite high frequency to take into account more modern products.
- There is a need to regularly monitor the content of POPs, especially PBDEs including deca-BDE but also HBCD in the electronic product categories to ensure that contents are below the low POP content established under the Basel Convention.
- The project has identified the e-waste stream of CRTs as a resource for secondary and primary metal smelters. CRTs are hazardous waste in China and can be considered as a raw

material for lead smelters. Such applications, which need special permits in certain jurisdictions should be further explored and promoted for mutual benefit.

- For communication and trainings, performance or output indicators should be developed to assess efficiency and effectiveness of the trainings as well as needs for renewals/repetitions.
- Trainings should focus more on outcomes (e.g. capacities being built and consequent improvements in operations) rather than outputs (e.g. numbers of trainings, numbers of participants), and each training should be documented (e.g. agenda, presentations and/or training material, pictures, list of participants, survey of knowledge/skills improvement). A training of trainers' approach should be encouraged whenever possible/appropriate in order to promote efficiency, reach higher returns and set a momentum for replication.
- It may be difficult to put final numbers on the efficiency to reduce the informal workforce into formal employments but overall, the integration of informal workers into employments has been successful. Part of the success is also due to the physical establishment of "shops" where WEEE pieces can be disposed or are collected before transport into a treatment facility.
- The integration of handicapped people into society is one of the big achievements in the project with mutual benefit that the people have found work and the companies receive pre-sorted WEEE materials of good quality.
- The provinces and others have learnt from the experience of Shandong and Guangdong, with specific industrial parks for storing and dismantling for local citizens (farmers) to do dismantling there instead at home. WPCBs could be provided to the smelters, which is a furnace that specializes in the disposal of circuit boards but according to our understanding, this is not a continuous working furnace, and it is different from the copper smelting co-processing circuit board recommended by our project (continuous production of furnaces is more helpful for the control of dioxin).

2 INTRODUCTION

2.1 Purpose of the evaluation

The TE will be conducted according to the guidance, rules and procedures established by UNDP and GEF as reflected in the UNDP Evaluation Guidance for GEF Financed Projects.

The objectives of the TE are to assess the project design, implementation and achievement of project results; draw lessons that can both improve the sustainability of benefits from this project; and aid in the overall enhancement of UNDP programming.

Evaluations for UNDP Supported GEF financed projects have the following complementary purposes:

- To promote accountability and transparency, and to assess and disclose the extent of project accomplishments.
- To synthesize lessons that can help to improve the selection, design and implementation of future GEF financed UNDP activities.
- To provide feedback on issues that are recurrent across the UNDP portfolio and need attention, and on improvements regarding previously identified issues.
- To contribute to the overall assessment of results in achieving GEF strategic objectives aimed at global environmental benefit.
- To gauge the extent of project convergence with other UN and UNDP priorities, including harmonization with other UN Development Assistance Framework (UNDAF) and UNDP Country Programme Action Plan (CPAP) outcomes and outputs.

2.2 Scope & Methodology

The methodology applied to conduct the terminal evaluation is compliant with international criteria and professional norms and standards; including the norms and standards adopted by the UN Evaluation Group.

The present evaluation was done in accordance with the "UNDP Evaluation Guidelines 2019" and as well as the "Guidance for Conducting Terminal Evaluations of UNDP-Supported, GEF-Financed Projects". The evaluation aims to provide evidence-based information that is credible, reliable and useful. The evaluation followed a participatory and consultative approach ensuring close engagement with the project team and UNDP Country Office, as well as government counterparts (MEP-FECO and LPMOs).

An overall approach and method for conducting the project terminal evaluations consisted of the following tools, in line with the UNDP Handbook[2]:

- Documentation reviews;
- Stakeholder interviews;
- Site visits;
- Focus groups discussions.

[2] For additional information on methods, see the Handbook on Planning, Monitoring and Evaluating for Development Results, Chapter 7, pg. 163

The project was evaluated with regards to the criteria of relevance, effectiveness, efficiency, sustainability, and impact, as defined and explained in the UNDP Guidance for Conducting Terminal Evaluations of UNDP-supported, GEF-financed Projects (see Table 5). A set of questions covering each of these criteria have been developed and are included in Annex 6.7

Table 5: UNDP Evaluation Criteria

1. Relevance
The extent to which the activity is suited to local and national development priorities and organizational policies, including changes over time. The extent to which the project is in line with the GEF Operational Programs or the strategic priorities under which the project was funded. Note: Retrospectively, the question of relevance often becomes a question as to whether the objectives of an intervention or its design are still appropriate given changed circumstances.
2. Effectiveness
The extent to which an objective has been achieved or how likely it is to be achieved.
3. Efficiency
The extent to which results have been delivered with the least costly resources possible; also called cost effectiveness or efficacy.
4. Results
The positive and negative, foreseen and unforeseen changes to and effects produced by a development intervention. In GEF terms, results include direct project outputs, short to medium-term outcomes, and longer term impact including global environmental benefits, replication effects and other local effects.
5. Sustainability
The likely ability of an intervention to continue to deliver benefits for an extended period of time after completion. Projects need to be environmentally, as well as financially and socially sustainable.

The evaluation carried out the following activities:

- Review documents and prepare the mission
- Collect and review project documents
- Discuss with UNDP *via* teleconference and emails and the WeChat group (created for easy communication for this evaluation) about the report, additional documents needed and organisation of the mission
- Elaborate and submit the Inception Report
- Carry out the field mission, verifying/triangulating the data with supporting evidences, collecting additional information and documents, interviewing the project partners
- Provide a mission debriefing in the form of a presentation to UNDP/FECO at the end of the mission to present findings and initial conclusions and recommendations
- Undertake an in-depth analyse all the information and additional documents collected
- Carry out follow-up interviews and emails with the project team (UNDP and FECO) for clarification purposes
- Elaborate and submit draft evaluation report

- Finalize Evaluation Report

The field mission included visits to Beijing (UNDP China office and MEP-FECO office), Hubei province, Jiangsu province and Tianjin municipality, including the following project sites: Wuhan, Jingmen, Changzhou, Nanjing and Tianjin. Focus group discussions and interviews were conducted with representatives of the following organisations: the International Environmental Cooperation Centre of Ministry of Ecology and Environment (initially named FECO-MEP), the Ecology and Environment Department of Hubei Province, the Ecology and Environment Department of Jiangsu Province, the Ecology and Environment Department of Tianjin, GEM Co., Ltd., Bowang Xingyuan Environmental Recycling CO., Ltd, Daye CO., Ltd, TCL Aobo Resources Recycling CO., Ltd., Xiangyu Environmental Technology CO., Ltd, etc.

Although the documents, such speeches, PPTs, the news by the media and reports of the inception were well achieved and kept in the each province, the inception meetings were hold at different time, and separated in each province, there are three inception reports in two demonstration provinces and one Tianjin. All project documents by IA, EA and all stakeholders (private sector as well as local governments) available for consultation on-site. This approached proved to be very efficient and useful since upon arrival at any of the locations visited (see sections 6.3 and 1.1 as well as Table 13), PowerPoint presentations to summarize activities and reports were readily available in paper and electronically. The essential information was also translated into English. During the revision of the TE, FECO prepared the combined inception report and submitted to UNDP.

All relevant sources of information were reviewed, such as the project document, project reports – including annual (APRs and PIRs) and quarterly (QPRs) progress reports, project budget revisions, the Mid-Term Review, progress reports, GEF focal area tracking tools, project files, national strategic and legal documents, and any other materials considered useful for this evidence-based assessment. A full list of documents used for this evaluation is provided in Annex 6.9

The assessment of the project performance used the following rating scales (see Table 6).

Table 6: Rating Scales[3]

Ratings for Outcomes, Effectiveness, Efficiency, M&E, I&E Execution	**Sustainability ratings**
6. Highly Satisfactory (HS): The project had no shortcomings in the achievement of its objectives in terms of relevance, effectiveness, or efficiency **5. Satisfactory (S):** There were only minor shortcomings **4. Moderately Satisfactory (MS)**: There were moderate shortcomings **3. Moderately Unsatisfactory (MU)**: The project had significant shortcomings **2. Unsatisfactory (U):** There were major shortcomings in the achievement of project objectives in terms of relevance, effectiveness, or efficiency **1. Highly Unsatisfactory (HU):** The project had severe shortcomings	**4. Likely (L)**: Negligible risks to sustainability **3. Moderately Likely (ML):** Moderate risks **2. Moderately Unlikely (MU):** Significant risks **1. Unlikely (U):** Severe risks
	Relevance ratings:
	2. Relevant (R) **1. Not relevant (NR)**
	Impact ratings:
	3. Significant (S) **2. Minimal (M)** **1. Negligible (N)**
	Additional ratings where relevant: Not Applicable (N/A) Unable to Assess (U/A)

2.3 Structure of the evaluation report

The report is structured according to UNDP Evaluation Guidelines 2019 and as well as Guidance for Conducting Terminal Evaluations of UNDP-Supported, GEF-Financed Projects.

Section 1 is the Executive Summary of the project Terminal Evaluation, with a brief description of the project, an overview of the evaluation ratings and a summary of conclusions, recommendations and lessons.

Section 2 gives an introduction of the Terminal Evaluation (TE), with purpose, scope and methodology.

Section 3 presents a description of the project and its development context.

Section 4 describes the findings of the TE regarding the project design/formulation, the project implementation and the project results (in terms of the project relevance, effectiveness and efficiency, country ownership, mainstreaming, sustainability and impact).

Section 5 offers the conclusions of the TE as well as its recommendations and lessons.

Finally, section 6 provides the annexes to this report.

3 PROJECT DESCRIPTION AND DEVELOPMENT CONTEXT

3.1 Project duration and scope

According to the approved Request for GEF CEO Endorsement, the project started on 25 April 2014 and was supposed to finish by 25 April 2018, thus lasting a total period of 48 months. However, the project was later extended up to 25th Oct, 2019.

The project covered nine municipalities (i.e. Tianjin, Anyang, Xuzhou, Changzhou, Jingmen, Wuhan, Huangshi, Xiangyang and Beijing) from five provinces (i.e. Tianjin, Henan, Jiangsu, Hubei and Beijing).

3.2 Problems that the project sought to address

Majority of China's WEEE dismantling process employs more basic, manual or simple machinery technologies. WEEE contains persistent toxic chemical contaminants (such as POPs and other brominated flame retardants, heavy metals, etc.) that can be released into the environment through improper treatment and residual waste disposal processes. Also, improper treatment processes cause the release of other types of POPs such as dioxins, serious threats are imposed to the ecological system and the human health at the dismantling sites and further to global commons. The problems and obstacles that China is facing can be summarized as follow:

- Existing references all point to the fact that WEEE contains POPs/PTS substances, and that improper treatment will release additional POPs; China has not undertaken quantitative analysis on POPs/PTS substances during the production process of electronic products; nor had it undertaken qualitative and quantitative identification of the types and quantities of POPs/PTS discharge or emission in the waste treatment and disposal process.
- Enterprises undertaking WEEE dismantling or processing perform only part of dismantling and material recovery work. For example, a licensed enterprise that can handle the four major types of home appliances (television, refrigerator, washing machines, air conditioner) and computer, was found to only crush the plastic shell of sorted WEEE and then the waste was sold to the market and how it was subsequently treated remains unknown. This increases the difficulties in controlling POPs/PTS substances flow during the dismantling and treatment processes of WEEE and not conducive to the management and reduction of POPs/PTS release.
- At present, there is a variety of technologies used for WEEE dismantling and treatment process. While it is known that in general POPs/PTS substances are released during the dismantling and treatment process, however, in the absence of monitoring and control mechanism, enterprises do not pay attention to whether the wastes generated contain POPs/PTS substances nor the quantities generated. This results in difficulties to take effective measures to control and reduce POPs/PTS emission, and that also impacts on China's compliance with the Stockholm Convention.
- Currently the main aim for WEEE disposal and treatment process centres on resources and regeneration, and barely considers environmental protection, paying little concern on assessment and management of POPs/PTS release. Furthermore, the lack of related emission standards, emission reduction guidelines and corresponding environmental impact assessment guidelines on WEEE limits the sound management and supervision of POPs/PTS release.

- Existing studies fail to find qualitative and quantitative solutions for an effective management strategy that encompasses multi objectives including economic costs, recycling rate of WEEE, management and reduction of POPs/PTS, thus making it difficult for an efficient state- and local-level environmental management effort, or to offer local enterprises a constructive and practical programme on reducing POPs/PTS release.

Beginning in 2003, China initiated work on development of a national WEEE management system that has involved promotion of development of a formal processing sector employing environmentally sound technologies. This has resulted in a series of regulatory initiatives undertaken by the Ministry of Environmental Protection (MEP), Ministry of Industry and Information Technology (MIIT), and, at the state level, through the Ministry of Finance (MOF), which have now been replaced by a permanent WEEE management system financed by an Extended Producer Responsibility (EPR) mechanism under the state level Regulations on the Administration of Recovery and Disposal of Waste Electrical and Electronic Products. This was introduced in 2009, came into effect in 2011 with the plan of being fully implemented by 2015.

The current implementation plan for the EPR based WEEE management system in China is based on few critical assumptions which define on one end the main barriers to achieve the overall goal and, at the same time, help identifying the areas where the GEF funds, during the project, will help:

1. The current informal sector will be replaced by or absorbed into the new formal sector, something that will depend on the effectiveness and competitiveness of the EPR system relative to the informal sector that should be achieved by the financial incentives a well-funded EPR system can preferentially provide to the formal sector and the private sector investing in it as a consequence;

2. The current large volumes of imported e-waste which might otherwise sustain a competing informal sector will be eliminated;

3. There is a broader coverage of WEEE than currently provided for; and

4. International experience related to implementing EPR systems and introducing processing technology based on international BAT/BEP is available and applicable to the Chinese context.

3.3 Immediate and development objectives of the project

The four-year project will help China to fulfil the requirement of the Stockholm Convention. Consistent with this objective, the project will address the POPs/PTS release sensitive e-waste stream in the recycling, dismantling, treatment, and final disposal processes of Waste Electrical and Electronic Equipment (WEEE). The project as outlined is structured with five components:

Component 1: Development and implementation of the national EPR system for WEEE

Component 1 covers national WEEE management system development and implementation in terms of scope, administration, business arrangements and promotion with the UNDP-GEF support being focused on introduction of international experience and lessons learned. This component intends to:

- Improve and strengthen existing EPR treatment fund
- Bring in international experience
- Upgrade information/data management system
- Promote eco-labelling and eco-design
- Manage e-waste importing

Component 2: Demonstration and development of market based WEEE processing

Component 2 covers the development of the required infrastructure and the demonstration of BAT/BEP technologies with the UNDP-GEF support focused on introduction of international technology and capability. This component intends to achieve:

- Emissions control, clean production & energy saving
- Technology demo
    - Hazardous fractions
    - Recovery & reuse of valuable/useful materials
- Emission standards, emission reduction guidelines and environmental impact assessment guidelines

Component 3: Upgrading of informal WEEE processing and its integration into the EPR System

Component 3 addresses the integration of the informal sector into the formal EPR system with UNDP-GEF support focused on demonstration of collection systems and information exchange, training and international cooperation related to illegal imports. This component intends to:

- Characterization of the informal sector through study
- Improve enforcement, supervision capacity at local levels
- Multi-channel collection demonstrations

Component 4: Project Monitoring and Evaluation

Component 4 the projects are monitored and evaluated with APRs, OPRs, and annual implementation reports, the MTR activities also exerted very important role in this regard. Besides, the sporadic audit was arranged by UNDP for the project.

The tour studies to the developed and developing countries were conducted, and the developing countries were invited to China for workshops, field visits and discussions. supports the monitoring and evaluation of the project and dissemination of experience, something that is seen as useful for other developing countries dealing with the issue globally , for example, the CRT treatment in China was good experience for the developing countries; This component intends to foster:

- Lesson learnt, experience sharing and knowledge dissemination
- South-South Cooperation
- Participatory campaigns and awareness-raising

Component 5: Project Management

Component 5 strengthens project management capacity to achieve implementation effectiveness and efficiency by taking into consideration of relevant activities of electronic product life cycle from cradle to grave as shown in Figure 2. In the stage of design and production, CCID and LENOVO are involved in LCA, eco-design, eco-labelling, green manufacture. In the stage of consumption, LPMOs and recyclers in Jiangsu, Tianjin, and Hubei take various measures to raise public awareness and collection rate. As for recycling and disposal, recyclers and research institutes work together on POPs/PTS emission control and BAT/BEP demonstration.

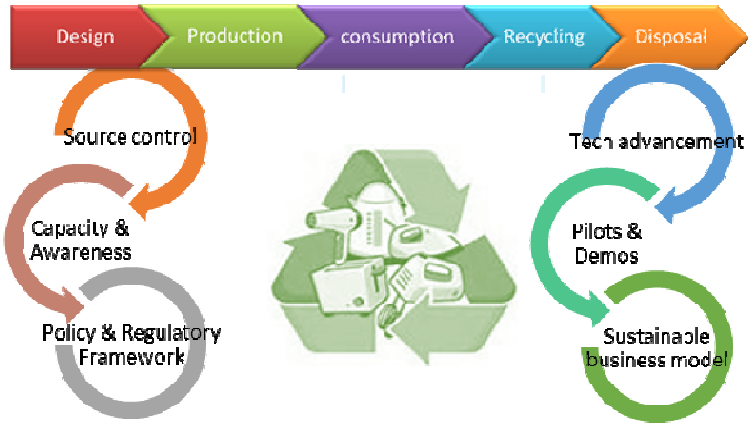


Figure 2: WEEE management throughout the life cycle

3.4 Baseline Indicators established

Table 7: Baseline Indicators according to the Results Framework

Management	**Demonstration**	**Collection and recycling**
• Improved WEEE management system • At least 250 management personnel trained • 5 WEEE technical guidelines about eco-design finalized • Eco-design for at least one electrical and electronic equipment developed; • Guidelines compatible with Basel Convention finalized	• At least 2 BAT/BEP technologies for pre-treatment demonstrated and relevant technical guidelines finalized; • At least 2 BAT/BEP technologies for disposal demonstrated and relevant technical guidelines finalized; • Over 5,000 tons of BFR containing plastic/resins performed/reused annually • Over 5,000 tons of CRT to be recycled annually from environmental emission annually • At least 25,000 technical workers trained	• Three types of WEEE collection/recycling demonstrated • Estimated 50% increase of WEEE collected and processed

3.5 Main stakeholders

The main stakeholders involved in the project are listed in table 8 below. The table does not include subcontractors.

Table 8: Stakeholders in the project.

UNDP China	Implementing Agency
FECO/MEE	National Executing Agency
Hubei Environmental Protection Bureau	LPMO for Hubei province
Tianjin Environmental Protection Bureau	LPMO for Tianjin
Jiangsu Environmental Protection Bureau	LPMO for Jiangsu province

TCL Aobo (Tianjin) Environmental Protection Development Co.	Demonstration enterprise
Jiangsu Changzhou Xiangyu Recycling Resources Co. Ltd.	Demonstration enterprise
Jingmen Green Eco-Manufacturer Co. Ltd	Demonstration enterprise
Hubei Jinyang Metallurgical Incorporated Co. Ltd.	Demonstration enterprise
Wuhan Bowang Xingyuan Property Service Co. Ltd.	Demonstration enterprise
Daye Nonferrous Environmental Protection Co. Ltd.	Demonstration enterprise
Anyang Minshan Nonferrous Metals Co., Ltd	Demonstration enterprise
Jiangsu Xin Chunxing Resource Recycling Co., Ltd	Demonstration enterprise
LENOVO	Eco-Design Micro-Computer / POPs Reduction Project
China Electronic Information Industry Development Institute	Eco-design management and technical policy of electrical and electronic products in China
The solid waste and chemical management center, ministry of environment and ecology	Subcontractor-Policy research on e-waste management
Tsinghua University	Subcontractor-Policy research on Second hand e-product import and e-waste dismantling manual
Beijing Normal University	Subcontractor-Environment risk assessment in and around e-waste facility
South China Institute of Environmental Science, MEE	Subcontractor-Healthy risk assessment in typical illegal disposal area
CSD IDEA (Beijing) Environmental Test & Analysis Co., Ltd.	Subcontractor-Pollutant (PBDE, dioxin) detective in e-waste facility.
Pony Testing International Group	Subcontractor-Pollutant (Pb, dioxin) detective in CRTs treatment enterprises
China National Resources Recycling Association	Subcontractor-Policy research on promotion plan
Center for Ecological Environment, Chinese Academy of Sciences	Subcontractor-Assessment on CRTs demonstration treatment enterprises
China Electronic Equipment Technology Development Association	Subcontractor-Assessment on e-waste recycling mode
The China National Children's Center	Subcontractor-Comic books for children and public on e-waste introduction

The project institutional arrangement is displayed in figure 3 below:

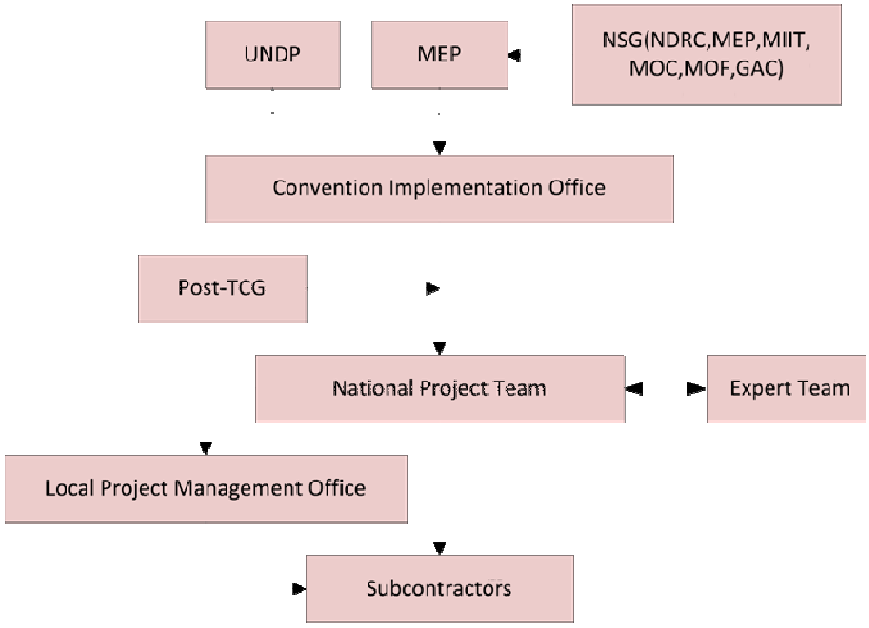


Figure 3: Project Institutional Arrangement

3.6 Expected Results

The overall result of the project is for China to have a domestic WEEE management system financed by a robust sustainable EPR mechanism and operating with BAT/BEP that effectively maximizes the resource recovery potential available while eliminating the major environmental releases, particularly POPs releases currently attributed to WEEE processing. For PCDD/PCDF, this reduction was estimated on a preliminary basis (using from the UNEP Toolkit and technical literature) to be as high as 655 g I-TEQ/year along with avoidance of up to 8.3 t/year of PBDE being released just from cable and printed circuit board combustion as well as plastic waste stream management. However, in three demonstration provinces, the recycled PBDE-contained plastic, is about 6 tons annually, which reduced about 180kg PBDE environmental releasing annually. This system has been expected to have the potential to substantially displace the current informal processing of WEEE that is associated with globally significant POPs releases as well as release of other high impact pollutants, and associated negative impacts on health, air quality, and levels of soil and water contamination.

4 FINDINGS

4.1 Project Design / Formulation

4.1.1 Analysis of LFA/Results Framework (Project logic /strategy; Indicators)

The project's objective is relevant and strategic, in line with the country's obligations under the Stockholm and Basel Conventions, national priorities and GEF indicators (i.e. indicators 1.3.1, 1.4, 1.5.1, 3.2.1). The project document does a good job in explaining the gravity of the problem and how the project build and feed into national priorities, legislation and planning, thus making a convincing case of the relevance of the project as well as its effectiveness, efficiency and sustainability. This objective is clearly translated into the five project components, with a solid causal relationship, where achievement of the activities guaranties the achievement of the overall objective. The approach and structure of the project is fit and comprehensive, covering policy, technology enhancement, private engagement, integration of the informal sector, academic research (with strong promotion of the science-policy interface) and awareness raising among the general public. The three pillars of sustainable development (i.e. environmental, social and economic dimensions) are thus well represented within the project design, which is an important aspect for a UNDP project. The workplan displays a realistic time frame, although the project has been extended. Moreover, the project intends to build on national and international best practices (e.g. EPR, collection systems).

The problem analysis is thorough and well documented, and the results framework has "SMART" indicators/targets, although they could be streamlined into fewer encompassing indicators and some of them could be a bit "SMARTer" (e.g. ensuring quality rather than quantity alone). One important omission, however, is an indicator on reduction of POPs and PTS emissions. Targets only refer to meeting PCDD/PCDF pollution control standards for hazardous waste incineration. The results framework also lacks mid-term targets as well as milestones, which are both very useful for effective M&E (although M&E was well performed in the project and ensured accomplishment of end targets). The conclusions of mid-term review indicate that the log-frame of the project is consistent and well-structured, each one of the five components is broke down in measurable indicators and focusing on operational activities. This is certainly helping the project team to keep track on the progresses of the project and assess the need of corrective measures targeting specific areas of the overall project. It was concluded that the great majority of the activities for the entire project appear to be on track to achieve the expected results through the results of the detailed analysis provided in the MTR report.

4.1.2 Assumptions and Risks

Key assumptions and risks have been identified for each project outcome, and adequate mitigation measures have been put in place, thus securing the success of the project activities to meet the targets.

However, the analysis focused on management, technological and social (e.g. awareness and participation/compliance) assumptions/risks and missed to identify and assess the potential impacts of natural phenomenon or political, economic and institutional challenges.

4.1.3 Lessons from other relevant projects (e.g., same focal area) incorporated into project design

If the project design fails to identify other related/relevant project and their lessons learned (which is something we strongly encourage to consider for future project development, as it would strengthen relevance and efficiency by promoting proper coordination and complementarities), the project gives a strong emphasis in building on international best practices. Hence, the project plans a substantive series of studies on this matter for its different components, such as EPR but also collection schemes and BAT/BEP for dismantling and disposal of POPs/PTS sensitive materials in WEEE.

4.1.4 Planned stakeholder participation

The project was implemented under National Execution (NIM) modality in line with the Standard Basic Assistance Agreement between UNDP and the Government of China and the Country Programme Action Plan (CPAP). The NIM modality involved a wide range of stakeholders building on four main pillars:

- Role of LPMOs: They are key drivers in local implementation of the project and interaction of demonstrators. This is ensuring good ownership at local level and, at the same time, a seamless integration of project's results into the operational framework of policies for e-waste management.
- Engagement of consumers: the project plans various activities to increase awareness and engage consumers.
- Engagement of other stakeholders: for example, the solid and chemicals center, MEE, and Tsinghua University, etc., do some researches for policies, regulations proposal.
- Engagement with international players: contact with potential key partners (e.g. US-EPA, Swedish EPA, Norwegian NEA, GIZ, Swiss Embassy) for e-waste management in China and for improving the visibility of the project. In addition, the project includes a series of trainings for the dissemination of international EPR and WEEE management experience.

4.1.5 Replication approach

The project also addresses international dissemination and replicability of the project achievements and lessons learned through international conferences and exchanges (on WEEE management and EPR), focusing on South-South cooperation, although more could be done in disseminating the large quantity of guidelines generated by the project as well. More action should also be done at disseminating these lessons and guidelines within the platforms of the Stockholm and Basel Conventions, SAICM as well as other relevant chemicals and waste international fora.

4.1.6 UNDP comparative advantage

The project is a sustainable development project, driven by environment(i.e. environmentally sound management of chemicals and waste), which is the direct mission of UNDP, the environment and poverty alleviation and health are the main work of UNDP in China, (in comparison to other UN agencies in China, UNDP has good experience in the environment project management). Yet, UNDP is one of the international organisations with the strongest presence in China since 1979 and has a long history of collaboration with the government, including MEP. Moreover, a crucial component of the project is the integration of the informal sector, which is a social dimension where UNDP has

extensive experience to tap into for guarantying success, as well as for reaping the highest social benefits.

4.1.7 Linkages between project and other interventions within the sector

The project is one of three GEF projects coordinated by MEP which are directed at reducing POPs releases. One of them is the World Bank Municipal Solid Waste (MSW) Project that includes the segregation of e-waste that enters the MSW stream. The other is the UNDP project to reduce releases of unintentional POPs within the secondary copper industry. The project also engages with potential key international players for e-waste management in China and for improving the visibility of the project, such as US-EPA (e.g. ""US-China Strategic and Economic Dialogue"" and US ""National Strategy on Electronics Stewardships""), Swedish EPA, Norwegian NEA, GIZ (e.g. technology transfers), as well as the Swiss Embassy (e.g. study, information exchange and capacity building programs). The project also works in close collaboration with the United Nations University (UNU) ""Solving the E-waste Problem"" (StEP) Initiative as well as the Basel Convention Regional Centre in Beijing (BCRC-Beijing) to organise an international stakeholder meeting in Beijing and a provincial stakeholder dialogue in Shenzhen, as well as to set up an online platform for sharing information. Communication was also carried out with the BCRC for Asia and the Pacific.

4.1.8 Management arrangements

The project is being implemented in line with the Agreement between UNDP and the Government of China and the Country Programme Action Plan (CPAP). FECO/MEP is the entity in the implementation of activities for the project. In each demonstration province a Local Project Management Office (LPMO) has been identified and appointed for the local execution, including relationship with sub-contractors. To ensure smooth and efficient implementation of the project under the arrangement between UNDP and FECO/MEP, major component of the project activities is implemented with the support of qualified technical national and international experts and institutes, to be engaged through contractual agreements (subcontracts) by FECO/MEP, through competitive bidding process.

4.2 Project Implementation

The project team has stayed the same since the beginning, except for the project manager at UNDP, which left the organisation only last October (2019) to start working for another organisation. This stability has most likely helped in implementing the project smoothly and successfully, not least in keeping knowledge and institutional memory.

4.2.1 Adaptive management (changes to the project design and project outputs during implementation)

Overall, the project team (i.e. the National Project Team and LPMOs) demonstrated very strong competencies to manage the project, as is being reflected by the high project's achievements. Although the external and internal conditions of the project remained stable throughout the project and no changes consequently occurred regarding the project's objectives, the NPT undertook any adaptive measure when necessary/preferable while UNDP has programme team responsible for project oversight. For instance, after the MTR, the team took the corrective actions required to respond to the recommendations of the report (see Annex 6-10 "Corrective Actions to MTR"). Moreover, the quarterly and annual reports also reflect the different adaptive measures that the UNDP, NPT and LPMOs adopted to fully meet the project's objectives and to reach greater

achievements. For example, when facing challenges with Daye's non-ferrous metals smelting factoring for the treatment of the hazardous waste from WPCBs, the PMO and the experts working with Daye, coordinated with the Local EPB and got the permit for treatment of hazardous waste for Daye.

Besides, the project held annual meetings with the project partners to discuss project's achievements to date as well as the two-years workplan (including any adaptive measures). These meetings, together with the project's reports, ensured good communication with the project steering committee and other key partners and stakeholders.

4.2.2 Partnership arrangements (with relevant stakeholders involved in the country/region)

Although the project document does not display a formal stakeholder mapping, we found the project to skilfully identify the key project partners and to effectively arrange partnerships, during project design (see "Management Arrangements" in the project document) as well as implementation. All the relevant ministries (i.e. MEP, NDRC, MIIT, MOC, MOF and the General Administration of Customs) were represented and involved within the National Steering Group (NSG), and the provincial and local authorities were closely involved through the LPMOs. The project also has strong representation of the relevant actors from the private sector (i.e. WEEE facility operators and investors). In addition, a thorough analysis has been carried out to evaluate and select the demonstration sites and enterprises (see Annexes II and III of the project document). However, the civil society is weakly represented in these partnerships (the only involvement of the civil society in the project were some consultations with organisations representing consumers as well as outreach to the general public. The project addresses directly to the general public by establishing the communication systems (e.g., Apps) for the collection of e-waste from households and established collection point (“shops”) within the cities for easy access (Changzhou example).

4.2.3 Feedback from M&E activities used for adaptive management

See "Adaptative management" above

4.2.4 Project Finance:

Total Budget: US$58.65 million

GEF Fund: US $11.65 million（US$11.197 million, revised in 2020）

Co-finance: US$ 47 million

Table 9: Approved budget, budget revisions and actual expenditures

		Component 1	Component 2	Component 3	Component 4	Component 5	Gain/loss	Total
2014	Planned*	404,000.00	1,349,200.00	391,000.00	65,500.00	121,750.00		2,331,450.00
	Revision **	353,000.00	414,000.00	310,000.00	29,500.00	108,500.00		1,215,000.00
	Actual†	105,293.79	643,639.99	354,695.85	9,325.01	26,257.82	-13,470.54	1,125,741.92
	Ratio	30%	155%	114%	32%	24%		71%
2015	Planned*	550,500.00	2,313,100.00	619,500.00	129,500.00	135,000.00		3,747,600.00

	Revision **	152,000.00	1,652,060.00	789,440.00	70,000.00	136,500.00		2,800,000.00
	Actual	182,954.67	1,293,419.70	426,101.69	45,365.64	100,323.43	3,559.67	2,051,724.80
	Ratio	120%	78%	54%	65%	73%		78%
2016	**Planned***	472,900.00	1,727,800.00	568,500.00	75,500.00	140,000.00		2,984,700.00
	Revision **	498,600.00	836,500.00	465,500.00	123,000.00	139,500.00		2,063,100.00
	Actual†	111,051.16	476,517.45	327,588.76	93,154.43	119,366.17	33,420.23	1,161,098.20
	Ratio	22%	57%	70%	76%	86%		62%
2017	**Planned***	400,000.00	1,359,900.00	311,700.00	198,500.00	140,000.00		2,410,100.00
	Revision	535,000.00	1,866,000.00	339,000.00	43,000.00	119,000.00		2,902,000.00
	Actual†	322,886.29	1,786,145.22	101,532.69	23,353.85	91,155.72	-41,339.13	2,283,734.64
	Ratio	60%	96%	30%	54%	77%		63%
2018	Planned	72,600.00	50,000.00	9,300.00	31,000.00	13,250.00		176,150.00
	Revision	720,500.00	1,508,500.00	406,500.00	47,000.00	117,500.00		2,800,000.00
	Actual	367,552.37	933,945.16	521,514.44	6,103.82	120,138.33	30,646.37	1,979,900.49
	Ratio	51%	62%	128%	13%	102%		71%
2019	Planned	-	-	-	-	-		-
	Revision	565,065.00	1,525,151.00	147,784.00	294,450.00	67,550.00		2,600,000.00
	Actual	461,918.73	986,241.67	79,833.18	130,526.11	42,888.26	22,417.02	1,723,824.97
	Ratio	82%	65%	54%	44%	63%		62%
2020	Planned	-	-	-	-	-		-
	Revision	233,700.00	332,000.00	142,000.00	117,000.00	47,100.00		871,800.00
	Actual	N/A	N/A	N/A	N/A	N/A		N/A
	Ratio	N/A	N/A	N/A	N/A	N/A		N/A
TOTAL	Planned	1,900,000.00	6,800,000.00	1,900,000.00	500,000.00	550,000.00		11,650,000.00
	revision	3,057,865.00	8,134,211.00	2,600,224.00	723,950.00	735,650.00		15,251,900.00
	Actual†	1,551,657.01	6,119,909.19	1,811,266.61	307,828.86	500,129.73	35,233.62	10,326,025.02
	Ratio	51%	75%	70%	43%	68%		68%

The expenditures planned in the project document experienced several revisions. As explained above, every year, a two-year work plan (TYWP) is being developed, to adapt the budget to the changing circumstances and keep it realistic/appropriate. In parallel, a budget revision has been done almost every year, covering up to until 2019 (as far as the documents provided to us go). It is still unclear to us why such revisions have been done in parallel and are not consistent, as can be seen in table 10 below, which seems not only duplicating efforts but confusing the planning and subsequent implementation. We thus recommend that future planning stick to one source of revision only (either TYWPs or budget revisions). During the revision of the terminal report, UNDP and FECO claimed due to the implementation of the project, some activities are not progressed as planned, the disbursements were delayed, therefore, the readjustment of TYWP and budget were conducted every year.

Table 10 : Comparison by year of figures between TYWPs and the last budget revision (2020-

Year	Prodoc	TYWPs	Revision
2014	2,331,450.00	1,215,000.00	1,125,741.92
2015	3,747,600.00	2,800,000.00	2,051,724.80

2016	2,984,700.00	2,063,100.00	1,161,098.20
2017	2,410,100.00	2,902,000.00	2,283,734.64
2018	176,150.00	2,800,000.00	1,979,900.49
2019	N/A	2,600,000.00	1,723,824.97
2020	N/A	871,800.00	N/A
Total	**11,650,000.00**	**15,251,900.00**	**10,326,025.02**

Financial planning was found to be appropriate for each project component, which was latter adapted to implementation realities thanks to good project monitoring and regular revisions at annual meetings and within the two-year work plans.

Regarding co-financing, the project was able to raise a very high level of financial commitments from the project partners (USD 47 millions), the vast majority from the private sector (almost USD 33 millions) but also from the ministries and provincial governments as well as academic institutes. All the sources of co-financing as well as the distinction between in-kind and cash co-financing are clearly presented and well documented. The original commitment letters on co-financing has been provided to us and the co-finance were well documents by the final beneficiaries of the grant. As the final audit report will be carried out after project finished, the numbers are reported below in table 11 just for reference.

Table 11: Co-financing, planned vs actual contributions

Source of co-financing	Grants (USD)		In-kind (USD)		**Total**	
	Planned	Actual	Planned	Actual	**Planned**	**Actual**
UNDP			159,000	162,000	**159,000**	**162,000**
Government	3,800,000	2,814,285	8,616,000	9,855,714	**12,416,000**	**12,669,999**
FECO	600,000	650,000	3,006,000	3,100,000	**3,606,000**	**3,750,000**
Tianjin	600,000	800,000	1,290,000	1,342,857	**1,890,000**	**2,142,857**
Jiangsu	1,630,000	650,000	1,360,000	1,270,000	**2,990,000**	**1,920,000**
Hubei	970,000	714,285	2,960,000	4,142,857	**3,930,000**	**4,857,142**
Private sector	16,798,000	33,084,805	16,045,000	16,335,362	**32,843,000**	**49,420,168**
Jiangsu Xiangyu	4,470,000	2,393,891	630,000	1,025,953	**5,100,000**	**3,419,844**
Tianjin TCL	2,190,000	6,895,391	5,000,000	2,955,168	**7,190,000**	**9,850,559**
Hubei Daye	400,000	468,382	4,300,000	200,735	**4,700,000**	**669,118**
Hubei GEM	1,170,000	13,695,668	2,483,000	5,869,572	**3,653,000**	**19,565,240**
Hubei Bowang	1,868,000	1,727,302	632,000	1,151,534	**2,500,000**	**2,878,836**
CRT Enterprises	3,500,000	6,428,571	3,000,000	4,500,000	**6,500,000**	**10,928,571**
Lenovo	3,200,000	1,475,600	-	632,400	**3,200,000**	**2,108,000**
Institutes	542,000	-	1,040,000	-	**1,582,000**	**-**
cQinghua	40,000		40,000		**80,000**	
EMSW	415,000		80,000		**495,000**	
MIIT	7,000		400,000		**407,000**	
Beiing Normal University	80,000		520,000		**600,000**	**-**
Total co-financing	21,140,000	35,899,090	25,860,000	26,353,076	**47,000,000**	**62,252,167**

Two audits (2014 and 2015), one micro-assessment of financial risks (2016) and one external validation of accounting (2018) were performed. The audits and the validation confirmed that financial management was in conformity with the approved budget and purpose of the project as

well as UNDP rules and procedures. No issue or inconsistency were found in the financial management, and expenditures were supported by properly approved vouchers and other supporting documents. This was confirmed by our own observations. In every provinces we visited, we were provided access to the bookkeeping and could find proper accounting and supporting invoices/materials. The micro-assessment, however, rated risk management as low (on a scale of 'high', 'significant', 'moderate', 'low') for every aspects considered (implementing partner; programme management; organizational structure and staffing; accounting policies and procedures; fixed assets and inventory; financial reporting and monitoring; and procurement). The assessment found a lack of control over the risk of foreign currency, a lack of reconciliation between the direct staff salary and the actual amount of staff time spent on the project, and that not all suppliers with long-term cooperation are under performance review. Besides, we did not see any official due diligence performed on the entities receiving founding, but the environmental performance of the enterprises was considered in selecting the enterprises for demonstration of collection, treatment and disposal technologies, and "industry leadership" as well as "commitment to the responsibility of green sustainable development" were two of the three criteria used for selecting the demonstration enterprise in eco-design. Furthermore, these enterprises had to comply with the conditions of registration of the EPR scheme and several had either a licence (e.g. Wuhan Bowang Xingyuan Group Co. Ltd.'s licence to handle hazardous waste disposal) or received national awards (e.g. Jingmen Green Eco-Manufacturing Co. Ltd. has received national awards in distinguished recycling units, recycling education and "urban mining". During revision of the terminal revision, UNDP expressed although the main selection of the companies for participating in the GEF project were conducted by FECO, and the government issues selection of criteria, related to the Due diligence to some extent. In Future, if UNDP selected the companies, UNDP will pay importance to the due diligence

As indicated above, co-financing has been high and was a selection criterion for the project partner. Moreover, actual expenditures have been actually well above the amounts committed, as can be seen in table 11. This high level of contribution to the project demonstrates strong ownership by the different project partners, which was confirmed by the visits and interviews we undertook onsite. The partners expressed a strong awareness and responsiveness to the new policies and national priorities regarding reduction of POPs/PTS releases as well as pollution reduction, environmental protection and circular economy more broadly.

4.2.5 Monitoring and evaluation: design at entry and implementation

The M&E plan has been conducted in accordance with established UNDP and GEF procedures and consisted of the inception report, annual project implementation reviews (PIRs), quarterly and annual progress reports (QPRs and APRs), and external mid-term and final evaluations. Moreover, annual review meetings were conducted as well as two-years work plan developed every year. Funding Authorization and Certificate of Expenditures (FACEs) were produced on a quarterly basis. The only reports missing or not provided to us so far were: the QPRs for Q3 of 2018 and for Q1 to Q3 of 2019; Portfolio indicators 2015, 2016 and 2018; the GEF Tracking Tools for 2017 and 2018; and the FACEs for Q4 of 2017 and for Q1 to Q4 of 2018.

Overall, the M&E has been effective at keeping the project on track and ensuring targets were met or exceeded.

4.2.6 UNDP and Implementing Partner implementation / execution coordination, and operational issues

We found good communication and management for both, the IA and the EA.

The EA showed good focus on results and timeliness, with implementation going smoothly and according to plan. Yet, the project was extended of two years, which represents 50% of the planned duration of the project. The government, on the other hand, demonstrated strong ownership. The project fed directly into policy and MEP was dedicated in making the project successful in increasing e-waste treatment and recycling/disposal in an environmentally sound manner, in integrating the informal sector within the formal sector, and in reducing POPs and PTS releases.

On the other hand, we think UNDP should be careful to the maintain a strong "firewall" between the IA and the EA, to avoid conflict of interests affecting the objectivity of judgement, as the division between the two is not so clear at times in actual practice (e.g. project design and development, preparation of reports).During the revision of the terminal report, UNDP stated in the project document, there are definition of UNDP responsibility and FECO. Briefly speaking, UNDP oversight the work of FECO through quarterly, semi-annual, annual report, the annual work plan, and the financial management together with some on-site visits. While FECO and LPMOs are responsible for the concrete work, activities of the project.

4.3 Project Results

4.3.1 Relevance

We found the project highly relevant to international and national endeavour as for POPs/PTS emission control.

At international level, the project addresses an important and growing issue for China and is well in line with the national and local development priorities and legislation/regulations as well as China's international obligations under the Basel, Rotterdam and Stockholm Conventions as well as its activity within the International Conference on Chemical Management (ICCM) and the Intergovernmental Negotiating Committee (INC) process leading to the Minamata Convention.

At national level, the Action Plan of China's 2007 National Implementation Plan (NIP) for the Stockholm Convention places a high priority on reducing unintentional POPs (e.g. PCDD/PCDF) releases through technical evaluation, environmental impact assessment, revised release standards, monitoring capacity building and BAT/BEP demonstration. POPs are also targeted through a specific sub-plan under the 12th National Five-Years Plan, which is the most authoritative document for national priorities.

The project has been approved under GEF-5 together with two other projects in order to address PCDD/PCDF priority source categories, i.e. WEEE, municipal solid waste and pulp and paper. China is considered the world’s largest current processer of e-waste. While imports have picked and are anticipated to decline, the domestic consumption is experiencing rapid escalation (e.g. WEEE generated from personal computers was expected to increase by 400% by 2020 as compared to 2007, according to a survey by Tsinghua University).

Since WEEE can be a significant source of harmful pollutants such as releases of POPs and PTS (see section 3.1), if not managed in an environmentally sound manner, it has the potential to generate a considerable pollution burden for the environment and public health issue. Considering all the resources embodied in electrical and electronic products, such as precious metals, sound WEEE management also represents an important segment of a circular economy. The main issues for ESM of WEEE are: the responsibility of the producers to manage the waste and pollution generated by their products (thus tackling the problem at source); the need for proper financial resources,

infrastructures, technologies and know-how; and the high proportion of informal activities. The project addresses all of them.

Regarding the Extended Producer Responsibility (EPR), which has gained momentum in environmental protection over the years (especially for WEEE), the principle has been incorporated into Chinese law from 2005 and given practical implications for WEEE with the 2011 "Regulation on the Administration of the Recovery and Disposal of Waste Electrical and Electronic Products", but the system was not efficiently implemented prior to the project. The project aims to improve the EPR system as well as formal infrastructures for WEEE collection, treatment and disposal, and to use them as a tool to integrate the informal sector.

The project is well in line with the GEF Operational Programs. The project document does a good job at identifying the relevant GEF-5 Strategy outcomes and indicators the project is contributing, namely[4]:

Table 12 The relevant GEF-5 Strategy outcomes and indicators

outcome 1.3, indicator 1.3.1:	"Amount of unintentionally produced POPs releases avoided or reduced from industrial and non-industrial sectors; measured in grams TEQ against baseline as recorded through the POPs tracking tool"
outcome 1.4, indicator 1.4	"Amount of POPs related waste prevented, managed and disposed"
outcome 1.5, indicator 1.5.1	"Progress in developing and implementing a legislative and regulatory framework for environmentally sound management of POPs, and for the sound management of chemicals in general, as recorded in the POPs tracking tool"
outcome 3.2, indicator 3.2.1	"Countries implement SAICM relevant activities that generate global environmental benefits and report to the International Conference on Chemicals Management"

The project objectives are systemic and did not suffer from changing circumstances, and the circumstances relevant for the project did not experience significant changes anyway.

4.3.2 Effectiveness & Efficiency

The project is 99% complete overall in terms of targets, activities (it is expected 100% complete by the financially completed), and we are confident that all targets should be fully completed by the project ends. It demonstrated a high level of commitment from the management team and project partners, an impressive amount of activities and accomplishments, thoughtful planning and implementation, thorough research, mainstreaming of lessons learned and best practices into technical guidelines and standards, as well as an inspiring level of innovation. Hence, we consider the project to be very effective, especially since most objectives have been exceeded (sometimes highly) and the project had additional activities than initially planned, including mobile phone eco-design guideline, guideline of LCD TV dismantling, “Internet+” community recycling system, communication of project impacts, etc.

As highlighted above, targets have been met within the approved budget, with a good portion of these targets being even exceeded (sometimes even highly so). In fact, only 89% (USD 10,326,025.02) of the approved GEF budget (USD 11,650,000) has been spent to date by the end of 2019 while reaching the targets. Regarding time management, however, the project has been extended of 18

[4] These contributions are detailed in p.11 of the project document

months (thus an extension of 37.5% of the project initial duration) to reach these targets. According to the letter to request the extension of the project by FECO to UNDP on 28 February 2018, the reasons to extend the project are as following. 1. The policies changes;2 the market of recycled material changes due to the economic sluggishness. 3. lack of the permission of treatment for recycled material by some demonstration.

We highlight below the key accomplishments of the project, by component. Further details are provided in table 13 hereafter.

Component 1

The 18 new enterprises have been registered in the EPR system and around 3.84 billion RMB of subsidy has been delivered by the EPR Fund. 64 million units of WEEE in 19 dismantling enterprises in 3 demonstration provinces are reported to have been collected and dismantled in period of implementation of the projects (2014 to 2018). 19.69 million Units of WEEE were collected and dismantle by three demonstration enterprises (GEM in Hubei，TCL in Tianjin，Xiang Yu in Jiangsu) from 2014 to 2018. The national EPR policy has been upgraded. To support effective monitoring of operations, financial monitoring of the Fund as well as implementation of the EPR system (e.g. fund subsidy audits), a management information system (MIS) has been adopted in the three demonstration provinces, consisting of waste weighting and bar codes, photos, scanning and online video viewing of operations, among others and depending of the province. After pilot testing in 2018, the MIS is now completed and will be officially online soon.

The demonstration of collection systems was successfully completed, targeting final user collection, especially developing reverse logistics strategies and web-based solutions. In Hubei, GEM has developed the “recycling brother APP” as well as a public service platform for green recycling of WEEE, which combines recyclers, associations, WEEE treatment factories and universities; whereas in Tianjin, TCL has launched “Baidu Recycler”, which contributes to bridging users and disassembling enterprises, using big data to analyse and process industry data, and which received a UNDP 2015 award for innovation as a global solution. In Changzhou (Jiangsu), for instance, take-back and collection is done *via* free telephone service (1), community collection points operated by disabled people (10). In Jingmen (Hubei), 100 collection points, 5’000 e-waste bins and a “take-back brother” APP are provided. In Tianjin, collection is done via free telephone service (1), “e+” website, collection agents in 22 cities and 80 transfer stations.

In addition, relevant national and local policies, regulations, and standards have been formulated/revised. Three guidelines / policy recommendations have been developed on WEEE enterprise management system building and the EPR system (e.g. subsidy funds) at the national level, as well as technical standards for POPs/PTS release sensitive WEEE streams. The regulations on the management of recycling and treatment of WEEE has been evaluated and revised. Standards on disassemble and disposal operations, production management guidelines and disassembly and disposal audit guidelines have been prepared, as well as revised guidelines for qualification examination and licensing of enterprises dealing with WEEE. A notice on further strengthening supervision and management of dismantling and handling of WEEE has been released in Jiangsu province, and technical specifications for disassembly and disposal of WEEE has been released in Hubei province. Guidance documentation for LCA/LCM and eco-design evaluation standards for 6 WEEE types have been formulated and released, as well as a Policy Research and Assessment on the Implementation Effectiveness of the Eco-design of E-products. The Lenovo Zhaoyang K43c-80 laptop has been developed in accordance of eco-design standards (see Figure 4 below) and reduces the use of at least 30 substances, with a reduction of at least 20% of the use of POPs or hazardous chemicals. Furthermore, an Environmental Risk Assessment on POPs and Other Hazardous Chemicals Contained in E-products have been finalized. Six technical guidelines on WEEE types (TVs, air-conditioners,

refrigerators, washing machines, computers and mobile phones) have been finalized and will be published by the end of the project.

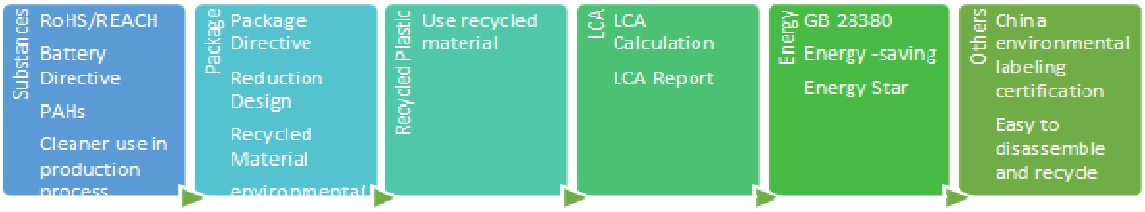


Figure 4: Sketch of steps in the eco-design project by Lenovo Company

The project “Research on eco-design management and technical policy of electrical and electronic products in China” was implemented by CCID with 7 outputs, (1) worldwide eco-design polices and implementing progress report, (2) report of identification of POPs and hazardous substances in electrical and electronic products, (3) LCA report of 6 electronic products, (4) eco-design guidelines of 6 electronic products, (5) report of principles for evaluation of green manufacturers, (6) draft book of ecological design of EEE in China, and (7) report of polices recommendations for eco-design of EEE in China.

On the discrimination between second-hand product and e-waste imports, guidance, brochures have been developed and distributed, and trainings have been conducted to customs. "The national customs anti-smuggling department combating the garbage smuggling special training course" was held at Tsinghua University on 11 July 2018 and had 43 customs officers attending (35% women). Finally, the project undertook visits and study tours (e.g. with other countries to promote experience sharing and lessons learned. A policy study report on the import management of e-waste and second-hand products has been prepared, and guidance manual on import identification of e-waste and second-hand products have been developed. Finally, 679 management personnel and 65,000 technical workers are reported as trained based on the reports from provinces to FECO.

Component 2

Demonstration activities have been successfully completed. Three BAT/BEP have been demonstrated for WEEE pre-treatment/dismantling, namely: (1) WPCB hydroprocessing at TCL-Aobo Environmental Protection and Development Co., Ltd. (in Tianjin); (2) improved ventilation for dry processing for all five types of WEEE at Jingmen GEM Co., Ltd. (in Hubei); and (3) enhanced WPCB dry processing (with two-steps shredding) at Wuhan Bowang Xingyuan Environmental Technology Co., Ltd. (in Hubei). Equipment for shredding and dust precipitation have been upgraded, and the technical guidelines on dismantling have been developed for all five WEEE types.

In addition, three BAT/BEP have been demonstrated for WEEE disposal, namely: (1) CRT glass co-processing through primary lead smelting at Anyang Minshan Nonferrous Metals Co., Ltd. (Henan), and through secondary lead smelting at Hubei Jinyang Metallurgical Incorporated Co., Ltd. and Jiangsu New Chunxing Resource Recycling Co., Ltd.; (2) WPCB incineration treatment at China Daye Non-Ferrous Metals Mining Ltd. in Hubei and WPCB wet treatment at TCL-Aobo Environmental Protection and Development Co., Ltd. in Tianjin ; and (3) WPCB waste resin integration in the production of street pavement bricks at Jiangsu Changzhou Xiangyu Resource Regeneration Technology Co., Ltd. All of these disposal technologies have end gas discharge of PCDD/PCDF up to China standard (tests were done by CETA / CSD IDEA Environmental Test & Analysis Co, Ltd., in

Beijing), and 15,000 tons of waste CRT glass are reported as being recycled. Furthermore, the project carried out analysis of environmental pollution characteristics and health impact assessment in typical e-waste disposal areas, which helped at identifying priority control factors and for raising public awareness.

Yet, we wish to express a word of caution regarding the figure on reduction of POPs/PTS, which is the overall objective of this GEF project. It appeared during our field mission that the BAT/BEP demonstrated on the treatment of WPCB plastic (i.e. mixing the plastic with concrete for street pavement or using it for the production of wood plastic) might not have treated the plastic actually containing PBDE. The reported figure of 284,890 tons of PBDE-containing plastics (2014-2018) are reported as safely recycled and treated in three demonstration provinces under the the GEF project, the data was come from the PIR and accumulated from 2014-2018.

The achievement on POPs reduction of the eco-design Lenovo computer might also be less impressive than reported.

Component 3

The WEEE collected and treated by the formal sector has increased. The 18 new WEEE enterprises have been registered to the EPR scheme and the WEEE catalogue has been extended to 14 types (the five initial types (waste refrigerator, air conditioner, TV, computer, washing machine (5 initial types), plus nine new types (extractor hood, electric water heater, gas water heater, printer, copying machine, fax machine, monitor, mobile phone, telephone), more recycling sites have been built, financial incentives have been provided through the EPR Fund to reward formal activities, and much have been done to crack down illegal WEEE activities and their related hazards to health and the environment. Additional jobs have thus been created within the formal sector. An integration programme for disabled people to participate into the collection scheme (by managing collection shops) has been carried out in Changzhou. However, the integration of the informal sector could have place a stronger emphasis on direct measures to help informal workers integrate into the formal sector and the EPR system, thus increasing the social dimension of the project and its impact on poverty reduction, which are at the core of UNDP mission and priorities. This could have been done by informing them about the project, risks of POPs/PTS releases in WEEE as well as the EPR scheme, involving them in the planning phase, and incorporating them in the formal activities and trainings.

18 public awareness campaigns were conducted in total for the three demonstration provinces, involving 3 million people (50% women) and using various traditional and social media and communication tools, such as CCTV and local TV, China Daily, local newspapers, video in the subway, street campaigns, but also WeChat, Weibo and their own websites. Other publicity campaigns include a TV program, a science exhibition to students, outreach on Sina portal and live broadcast, and a public competition for university students. It is reported that 4.9% of public are aware of the danger of improperly handling of e-waste and 95% of public are willing to turn over their household electrical appliances to formal recyclers.

It is worth mentioning that the project demonstrated some inspirational cases of innovation, such as using the Internet of Things for information management system (e.g. QR code associated to WPCB units) and for “online-to-offline” community recycling system for the collection of household WEEE (e.g. "Baidu Recycler").

Components 4 and 5

M&E and project management activities have been carried out according to plan, in close collaboration with UNDP, and improved the management and supervision capabilities in the demonstration provinces. Besides, the NPT processed and signed 33 contracts with experts. A Project Management Manual has been published and disseminated. Procurement has been processed and annual onsite inspections have been done.

Table 12: Terminal Evaluation Results Progress Matrix

LEGEND
Indicator shows expected completion by the end of the project
Completed, indicator shows successful achievement
Indicator shows poor achievement – unlikely to be completed by project closure

Project Strategy	Indicator	Baseline	End of project target	End of project status*	Terminal evaluation comments	Rating **
Project Objective: The project will address the POPs/PTS release sensitive e-waste stream in the recycling, dismantling, treatment and final disposal processes of Waste Electrical and Electronic Equipment (WEEE).	Efficient and functional EPR and WEEE management system	EPR Treatment Fund established but not efficiently operational	National policy about EPR finalized	Policy upgraded.	The national EPR policy has been upgraded by various related studies (e.g. gap analysis, policy suggestions, standards, auditing, registration rules). 18 new WEEE enterprises registered to the EPR during the project.	5
			Improved operational mechanism of EPR Treatment Fund and WEEE management	100% completed, with 3 guidelines on WEEE enterprise management system building / 3 policy recommendations on EPR subsidy funds at the national level.	LPMOs demonstrated robust competencies in EPR and WEEE management. Jiangsu released a notice on further strengthening supervision and management of dismantling and disposal of WEEE, and Hubei is completing the construction of a comprehensive management system for disassembly and treatment.	5
			At least 250 management personnel at national and demonstration locations trained on EPR concept and WEEE management system	685 persons reported as trained (55% women).	The target has been exceeded by over 2.7 times.	5
	Amount of WEEE treated by permitted recyclers in the three demonstration locations	Over 2 million units of WEEE collected and processed by permitted recyclers at the 3 demonstration provinces / municipality	Estimated 50% increase of WEEE collected and processed	64 million units of WEEE collected and dismantled.	The target of 3 million has been exceeded by 21 times. 4 types of WEEE collection modes have been demonstrated and covered 8 provinces.	5

	Number of facilities replicating or establishing sound WEEE recycling		At least 2 BAT/BEP technologies for pre-treatment demonstrated and relevant technical guidelines finalized	3 pre-treatment BAT/BEP demonstrated and technical guidelines developed for the 5 WEEE types	The BAT/BEP are: (1) WPCB hydroprocessing; (2) improved ventilation for dry processing for all five types of WEEE; and (3) enhanced WPCB dry processing. The dismantling review and report of the 3 demonstration provinces has been completed, which will be released in due course after the review by MoF.	6
			At least 2 BAT/BEP technologies for disposal demonstrated, end gas discharge of PCDD/PCDF to meet pollution control standards for hazardous waste incineration if incineration technology selected. Relevant technical guidelines finalized	3 disposal BAT/BEP demonstrated. All have end gas discharge of PCDD/PCDF up to China standard.	The BAT/BEP are: (1) lead glass co-processing; (2) WPCB wet & incineration treatment; and (3) waste resin integrated utilization.	6
	Numbers of workers received training in sound WEEE processing		At least 25,000 technical workers trained on BAT/BEP and sound WEEE processing	65,000 technical workers reported to have been as trained (55% women).	The target has been exceeded by 2.6 times. The training has also been provided to workers not directly working for demonstration companies.	5
	Market based WEEE processing infrastructure demonstrated and developed	Low rate of WEEE collection and recycling by formal sector	Demonstration of collection successfully completed at selected enterprises.	Demonstration successfully completed, with 19.69 million units of WEEE collected.	The demonstration enterprises focused on final user collection, especially developing reverse logistics strategies and web-based solutions.	6
		Dominated by primitive and manual processing of WEEE	Technology demonstration activities at selected enterprises at the three demonstration provinces/municipality successfully completed	Technology demonstrations and dismantlement standards completed.	-	5
			Over 5,000 ton of BFR (brominated flame retardant) containing plastic/resins performed/reused annually	284,890 tons of PBDE-containing plastics reported as safely recycled and treated.	The target is well exceeded according to reports, yet site visits revealed that the plastics being recycled/treated is not the one containing g PBDE. Moreover, there are no annual records on BFR containing plastics to verify the reported numbers.	5

			Over 5,000 tons of CRT to be recycled annually from environmental emission annually in the demonstration locations	100% completed. 15,000 tons of waste CRT glass reported as recycled.	After almost 3 years constriction and implementation of the projects, the operation of recycled CRT began at beginning of 2018, the annual recycled CRT is more than 75,00 tons.	6
			5 WEEE technical guidelines about eco-design finalized	100% completed. A Policy Research and Assessment on the Implementation Effectiveness of the Eco-design of E-products as well as an Environmental Risk Assessment on POPs and Other Hazardous Chemicals Contained in E-products have been finalized. 6 technical guidelines on new WEEE types (TVs, air-conditioners, refrigerators, washing machines, computers and mobile phones) have been finalized and will be published by the end of the project.	The guidelines have been completed. the target will be exceeded by 1.6 times.	5
			Eco-design for at least one electrical and electronic equipment developed	100% completed. Lenovo Zhaoyang K43c-80 laptop has been developed in accordance of eco-design standards, and the self-assessment report will be completed by the end of the project.	Lenovo Zhaoyang K43c-80 laptop reduced 92 kinds of chemicals and 20% or POPs in the wire, power cords, fan, and circuit board, which did not use PBB, PBDE, SCCP and HBCD remobilized substances.	6
	Informal WEEE processing facilities upgraded and integrated into EPR system through diversion into formal processing facilities	Large percentage of WEEE is estimated to be collected and processed by the informal sector	Three types of WEEE collection/recycling demonstrated and successfully completed at three selected provinces/municipality.	3 types of WEEE collection/recycling successfully demonstrated.	Innovative collection systems (e.g. online to offline) have been set up in the three provinces along with publicity campaigns.	5

	Number of newly registered WEEE processors	Zero	Increase WEEE collected and channeled by informal or newly registered (ex-informal) collectors to formal recycling enterprises for treatment	WEEE collected and treated by the formal sector has increased.	18 new enterprises have registered and the WEEE catalogue has been extended to 14 types. More recycling cites have been built. Financial incentives have been provided through the EPR to reward formal activities. Besides, much have been done to crack down illegal WEEE activities especially the illegal disposal of WEEE. However, more could have been done on the integration of informal pickers/peddlers, and the extent of the project's impact on the informal sector is difficult to assess as little information is available in this regard.	5
			New WEEE entities registered and qualified and eligible to receive EPR Treatment Fund subsidies	The 18 new WEEE enterprises have been registered.	Besides, the suggestion report on updating the management rules for registration of different WEEE enterprises is completed. The guideline for review of disassembly and disposal of WEEE (2019 edition) was issued by MEE in June and is helping the first 5-types of WEEE treatment enterprises to receive EPR Treatment Fund subsidies. Audit guidelines have been prepared.	6
Component 1: Develop and implement national EPR system for WEEE						
Outcome 1.1 Operational national EPR system covering priority POPs/PTS release sensitive E-Waste streams	Number of companies in EPR system	Approximately 120 formal enterprises	All newly established and qualified formal enterprises are required to be registered	The 18 new enterprises have been registered.	The number of WEEE treatment factories has currently been capped at 109, as this is far bigger than the annual production of 5 types of WEEE in China already.	6
	Amount of WEEE processed by companies receiving EPR Treatment Fund	2,000,000 units WEEE collected and processed at the three demonstration provinces/municipality	Estimated 50% increase in WEEE collected and processed in the demonstration locations	64 million units of WEEE are reported to be collected and dismantled.	The target of 3 million units has been exceeded by 21 times.	5
	Amount of fund disbursed by the EPR Treatment Fund		Nationally, RMB 500 million disbursed annually from EPR Treatment Fund	~3.84 billion RMB of EPR subsidy.	The target has been exceeded by almost 2 times (3.84 billion instead of 2 billion totals for the 4 years).	6

	At least one training per year conducted disseminating international EPR experience	No training with input of international experience	3 trainings conducted	3 International Conferences on WEEE Management and EPR held.		5
	Integrated information/data management system installed and utilized by MOF for disbursement under the EPR Treatment Fund	Preliminary database used by MOF to calculate and manage subsidy and disbursement	Fully established data-base, with all EPR Treatment Fund disbursements released through the Integrated Information Data Management System	After pilot testing (in 2018), the IMS is now completed and will be officially online soon.	The IMS has potential for ensuring effective monitoring of operations and creating baseline for financial monitoring of the Fund.	5
Outcome 1.2 Adopted and implemented national technical standards and operational business documentation governing the management of WEEE in support of the EPR system.	Number of technical standards finalized	No specific technical standard document available for collection, logistics, pre-treatment, material recovery and hazardous waste disposal	2 technical standard documents finalized	The research on reuse circuit board components and complete policy recommendation report provides technical support for the improvement of national hazardous waste list, exemption management system and hazardous waste identification management system. The Notice on further strengthening the supervision and management of disassembly and disposal of WEEEs in Jiangsu province was issued in 2019, which can positive significance to promote the implementation of EPR system and the construction of "waste free city" in China.	This work has been done.	5
Outcome 1.3 Applied LCA/LCM procedures and labeling for product design and production.	Five eco-design standard documents	None exist	Eco-design document finalized and made available	100 % completed. Draft report on EEE, ecological design policy research and implementation effect evaluation is finished. Draft guidelines on 6 types of EEE to be completed in Sept 2019.	This work has been done. The target will be exceeded by 1.6 times.	5
	Electric and electronic product eco-design developed		Eco-design for at least one electrical and electronic equipment developed	100% completed. Lenovo Zhaoyang K43c-80 laptop reduced 92 kinds of chemicals and 20% of POPs.	In addition, a self-assessment report has been completed in Sept 2019.	5

Outcome 1.4 Achieved public awareness and stakeholder consensus on the detailed design and implementation of the national EPR system.	One stakeholder nodal body is established	No coordination body exist for WEEE stakeholders	1 multi-stakeholder platform established	2 multi-stakeholder platforms established: (i) GEM public service platform for green recycling of WEEE, which combines recyclers, associations, WEEE treatment factories and universities; (ii) Baidu Recycler, made by TCL in Tianjin City, which contributes to bridge users and disassembling enterprises, using big data to analyze and process industry data.	Target exceeded 2 fold	5
	At least one public awareness campaign conducted every year	None. Level of awareness to be established during first year of implementation	3 public awareness campaigns conducted in the demonstration provinces/municipality	15 public awareness campaigns conducted, involving1.2 million people (50% women). Jiangsu (see PPT), Lenovo (Huiyang, Wuhan and Shenzhen for World Environment Day), online (WeChat, Weibo).	Target exceeded by 5 times, with smart and highly visible campaigns. The total number needs to be updated, as achievement is much bigger than reported.	6
Outcome 1.5 Implementation of effective discrimination between second hand product and e-waste imports.	Training Guidelines for the control of imports are made available to the relevant government agency	None existed	Guidelines compatible with Basel Convention finalized and made available and used by relevant government agencies	The "guidance manual and training textbook on import identification of e-waste and second-hand products" compiled and provided to customs for training.		5
	Training program and workshop	None implemented	Guidelines documents of the Basel Convention are used	"The national customs anti-smuggling department combating the garbage smuggling special training course" was held at Tsinghua University on 11 July 2018, sponsored by the general administration of customs anti-smuggling bureau. 43 customs officers attended (35% women).		5
	Criteria for discrimination between e-waste and second hand product established and used by relevant government authorities	None implemented	Guideline documents of the Basel Convention are used as reference	Research report on the import management policy of electronic waste and second-hand products, as well as research report on the countermeasures of illegal cross-border transfer of electronic waste have been completed and refer to the BC guidelines.		5

	Contacts and communication with major exporting countries established	No active activities	Possibilities and mechanisms of cooperation and coordination explored and activities initiated	Several exchanges reported with other countries on reducing POPs in e-waste, on the project and on China's new laws/bans on solid waste imports (2016, 2018, Indonesia, Pakistan, Sri Lanka, Maldives and other countries). Besides, China will provide disposal technology and support to developing country.	No contact and communication with major exporting countries have been reported however, which is the focus of the target.	3
Component 2: Demonstration and development of market based WEEE processing						
Outcome 2.1 Utilization and upgrading of the existing domestic WEEE collection system to efficiently and cost effectively supply registered WEEE processing facilities particularly for POPs/PTS sensitive e-waste constituents.	Diagnostic studies and action plan conducted with at least one recycler in each demonstration province.	None	3 diagnostic reports and action plan finalized	3 diagnostic reports and action plans developed.	The reports are said to show the implementation effect of recycling at the 3 demo enterprises, comparing their collection modes piloted with the tradition modes, and analyzing the advantages and disadvantages of China's self-recycling system versus foreign country experience.	5
Outcome 2.2 Operation of a comprehensive national network of	Authorized recyclers registered with the EPR Treatment Fund	Only about 120 formal recyclers registered	All newly established formal recyclers in the demonstration provinces/municipality are registered	The 18 new enterprises have been registered.	The number of WEEE treatment factories has currently been capped at 109, as this is far bigger than the annual production of 5 types of WEEE in China already.	6

registered WEEE processing facilities to dismantle and process POPs/PTS release sensitive materials in an environmentally sound manner utilizing demonstrated BAT/BEP technologies.	Operational Guidelines for upgrading to technical standards are made available	None	3 operational guideline documents finalized and made available	4 technical guidelines finalized, for: (i) dismantling EEE; (ii) decommissioning WPCBs; (iii) wet WPCBs disposal; (iv) fire disposal of WPCBs. In addition, 5 technical guidelines have been developed to support the publication of technical documents: (i) disassembly and disposal of WPCBs; (ii) CRT glass disassembly treatment; (iii) refrigerant disassembly and treatment; (iv) disassembly and treatment of waste refrigerator insulation layer material; (v) disassembling and disposing of waste washing machine.	Target has been exceeded 3 fold.	5
	Technical guidelines for pre-treatment of WEEE prepared	Not existed	Technical guideline for pre-treatment of WEEE finalized and made available	6 technical guidelines for pre-treatment of WEEE on CRT-TV, LCD-TV, refrigerator, air conditioner, washing machines and computers.		5
	Demonstration initiatives implemented with at least one recycler in each demonstration province/municipality	None	3 demonstration activities implemented	All demonstrations completed.		5
	Risk assessment undertaken to evaluate the establishment of a network of regional facilities	None	At least 3 assessment reports completed	100%. This work was done. 3 assessment reports completed and shown 4 demonstration WEEE dismantling enterprises were well implementation effect under this project. 1 assessment report on CRT treatment enterprises was completed and shown 3 demonstration CRT glasses treatment enterprises were well implementation effect under this project.	Activities reported: the campaign technical renovation work has been completed in enterprise technical innovation project has been contaminants inspections of work before and are conducting pollutant emission testing work after the technical transformation, technical reformation effect evaluation. All to be completed in Oct 2019.	5

	At least one non-ferrous metal smelter processing printed circuit boards with precious metal recovery >85 %	None	Emission meeting pollution control standard for hazardous wastes incineration	100% completed. Technology of WPCB treatment in Daye (Hubei) furnace is successfully completed with precious metal recovery at 85.7%, and PCDD/PCDF end gas discharge up to China standard. One technical specification for controlling PTS emission from waste resin powder rotary kiln in the recycling process of waste circuit board is compiled by Daye for promotion.	Target is close to completion but it is not clear how many precious metals are recovered (cf. MTR recommendations).	4
Component 3: Upgrading of informal WEEE processing and its integration into the EPR System						
Outcome 3.1 Characterization of overall national scale, scope and impacts associated with the informal e-waste processing inclusive of identification high priority regions and centers.	Characterization study highlighting the most critical processes from the informal WEEE recycling sector undertaken	Several reports mentioned the informal sector but data not clear due to data scarcity	Characterization study report completed and finalized	Reported as 100% completed but if the report mentioned is said to include an optimization plan to channel WEEE to the formal sector, it does not seem to characterize the informal sector itself.		5
	Guidance document completed and information disseminated	No guidance document available on measurement of impacts associated with informal recycling	Guidance document finalized	100%. Health impact of WEEE treatment and disposal areas and surrounding evaluated and discussed. It can well guide the public to correctly understand the environmental risks caused by WEEE, promote the information dissemination activities of stakeholders at the community level, and promote the integration of the EPR system in China.	The link with the informal sector as well as the guidance and dissemination dimensions need to be clarified.	4
Outcome 3.2 Provision of policy, regulatory enforcement and awareness	WEEE flows from informal sector to registered recyclers are monitored by the EPR Treatment Fund	No registered exchange between informal and formal recyclers	Enforcement actions on informal recyclers and efforts to divert e-waste to formal sector	Cracking down actions by local EPBs on informal WEEE treatment sectors.	The target can be considered as met since there was no quantity indicated, but the target is not really in line with the indicator itself (i.e. EPR Fund monitoring of WEEE flows from informal to formal sector).	4

support provided through MEP to the local level related to supervision of the informal WEEE sector.	At least one awareness campaign conducted in each demonstration province/municipality	None	3 awareness campaigns conducted	18 public awareness campaigns, involving 1.2 million people.	Target exceeded by 6 times. Interesting and diversified communication strategy involving various media and addressing different target groups. The total number needs to be updated, as achievement is much bigger than reported.	6
Outcome 3.3 Demonstration of collective infrastructure supporting informal WEEE processors and providing environmentally sound dismantling operations related to POPs/ PTS release developed and integrated with the national EPR system recycling network for further processing.	Pilot interventions implemented based on technical standards for collection and logistics	None	At least 3 pilot interventions implemented	All 3 demonstration plants were upgraded and completed activities according to plan. 19.69 million Units of WEEE collected in total.	The targeted number of pilots is reported as achieved, but clarification is needed on how these pilots demonstrated collective infrastructure supporting informal WEEE processors (outcome 3.3).	5
Component 4: Project Monitoring and Evaluation						
Outcome 4.1 Monitoring and evaluation, knowledge sharing and information dissemination	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 project implementation monitored to achieve project objectives	All M&E activities undertaken according to plan.	Official reports (5 PIRs and APR reports, 15 QPR reports and several FACE forms on time), annual field investigation and work plan meetings as well as regular communication undertaken according to plan.	6
	Quality appraisal in Mid-Term Review and Terminal Evaluation			MTR report undertaken and TE ongoing.		6

	Lessons learnt and experience documented and disseminated; post-project action plan formulated	None	Lessons and experience documented and disseminated	100% completed. Mutual visits and sharing of achievements and lessons learned with Mexico, USA, Maldives, Sri Lanka, Indonesia and Pakistan. An e-waste management book summarizing the project for South-South cooperation.	Good (multi-stakeholder) network at provincial, national and international levels, with various exchanges of experiences and which will help for project results dissemination. No lessons learned report, dissemination activities and post-project action plan have been provided to us, however. The books and the future action plans were completed by the end of April 2020.	5
Component 5: Project Management						
Outcome 5.1 Strengthened project management capacities and efficiency	Timely project implementation and disbursement	Existing staff	Capacity of National Project Team strengthened. In additional to existing staff, a Project Coordinator and a secretary are recruited. National Project Team established, staffed, equipped and trained	NPT established (incl. Project Coordinator and secretary), staffed, equipped, trained, and demonstrating strong project management competencies.	The NPT has fully fulfilled its responsibilities and activities, as demonstrated by the project results. It demonstrated good coordination and cooperation with the project stakeholders.	6
	LPMO established in each demonstration provinces/municipality furnished with staff and equipment	None	LPMOs at each demonstration location established, staffed, equipped and trained	LPMOs established established, staffed (21 people in total in PIR 2019), equipped, trained, and demonstrating strong project management competencies.	The LPMOs have fully fulfilled their responsibilities and activities, as demonstrated by the project results. They demonstrated good coordination and cooperation with the project stakeholders.	6
	Project Implementation Manual (PIM) developed	PIM for other GEF project can be used as reference	PIM finalized and used as guidance for project implementation	Reported as completed.	Reported as complete, PIM has been provided to us and it is clear how much it helped the LPMOs.	5
	Staff of PT and LPMOs staff trained about the PIM and relevant requirements of GEF and UNDP on project management	None	Staff trained and project management capacity strengthened	Reported as 100% completed.		5

	Routine project management activities undertaken to ensure the smooth and timely implementation of the project. The activities include but not limited to: drafting TORs, select and contract with consultants, organize M&E activities, organize the review of substantial report	None	Efficient and effective project management leading to achievement of project objectives	LPMOs demonstrated good project management competencies.	Project management and monitoring show high level of competency and project objectives have been surpassed. Experience exchange between LPMOs have been done through the annual review meetings.	6

*i.e. the current measurement of the indicator, with color code (Green= Achieved; Yellow= On target to be achieved; Red= Not on target to be achieved)

** 6 = highly satisfactory; 5 = satisfactory; 4 = moderately satisfactory; 3 = moderately unsatisfatory; 2 = unsatisfactory; 1 = highly unsatisfactory

† the indications in parenthesis are taken from the project workplan

4.3.3 Country ownership

MEP played an active part in the project design in providing background, technical information as well as feedback. All key ministries are represented in the NSG and the government has been responsible for the project execution at national (MEP/FECO) and provincial levels (LMPOs). On the other hand, the project studies and technical guidelines have been used to guide policies on EPR and WEEE management (e.g. gap analysis, policy suggestions, standards, auditing, registration rules). Thanks to the project, the national EPR policy has been upgraded. In addition, the key WEEE enterprises in the demonstration provinces/municipality have been closely involved during implementation, not only in undertaking the demonstrations themselves but also in maintaining regular communication and good coordination with LPMOs, but also in participating to the annual review meetings. They also applied the technologies identified as BAT/BEP by the project studies and generously co-financed their acquisition as well as the necessary infrastructure for their demonstration (see table 11), thus demonstrated a high level of ownership. These technologies have been fully incorporated in their plans and activities and will thus continue to be used after the project is over.

4.3.4 Mainstreaming

Except for poverty alleviation, where the integration of informal workers should have received a stronger focus (see section 4.3.3), GEF and UNDP priorities have been well mainstreamed within the project. The project provided extensive capacity building in project management and WEEE management (especially regarding EPR and reducing POPs and PTS releases) to the LPMOs as well as the demonstration enterprises. 679 management personnel (50% women) were reported as trained at national and demonstration locations. All project partners demonstrated strong competencies in managing their respective project activities and we are therefore confident that governance has been improved through the project. The project was also sensitive about women's empowerment to the extent of its ability as a technical project (rather than a socio-economic or a political one). The UNDP team was almost exclusively composed of women (until just recently, following the departure of the project coordinator), and teams at FECO as well as the LPMOs had a good proportion of women [provide %]. Moreover, a special emphasis was given at involving the female staff in capacity building activities. Training participants was composed by 36% by women.

4.3.5 Sustainability

The project document includes a risk mitigation plan, with four risks identified and countermeasures to mitigate them (see project document p.20). These risks are:

1. Insufficient funds will be generated under the WEEE EPR management system to adequately attract process facility and associated infrastructure investment, and to sustain the WEEE managements system's operation, particularly for POPs/PTS release sensitive products which might have a lower priority relative to other high volume products in terms of investment demand;
2. The environmental performance objectives of eliminating POPs and PTS release will be technology limited;
3. Continued operation of an informal sector that diverts a substantial amount of WEEE away from the national system and the formal processing operations;
4. Sustained informal operations due to continued availability of illegal WEEE imports with continued environmental impacts and potential to undermine the economic basis for the formal domestic WEEE management system.

This Terminal Evaluation assesses on the project's sustainability in terms of exogenous or endogenous risks to the project outcomes that will affect continuation of benefits after the GEF project ends. This assessment includes: financial risks, socio-economic risks, institutional framework and governance risks, and environmental risks.

Financial risks to sustainability

Financial sustainability of the project is assessed to be moderately likely, with no significant financial risks identified. The demonstration companies have been selected based on their strong commitment, which has been demonstrated in their important co-financing of the project in terms of direct investment in the adoption of new technologies and infrastructures to apply the BAT/BEP. During the interviews, the representatives of the companies expressed their ambition to have a leading position within their industry in terms of cleaner production. Such leadership would strengthen their comparative advantage in being ahead of the new legislation and policies around unintentional POPs reduction and pollution prevention and control, as well as in enjoying a positive, eco-friendly image/reputation. Hence, both companies expect good returns on investment in adopting the BAT/BEP. The BAT/BEP and related technologies and infrastructures are becoming intrinsic elements of the production process once in place and would thus continue to operate after the project ends. On the other end, if WEEE processing and disposal activities have proved profitable, partly thanks to the EPR subsidies, the financial sustainability of the EPR Fund itself needs further study which was not possible in the scope of this evaluation. There needs to be further long-term study as well on the impact of the waste import ban on the reliability of WEEE inputs for the profitable operation of the WEEE enterprises. Besides, we assess as likely that the reduction of the original five types of WEEE in the long-term will be compensated by the increase in the new 9 types of WEEE in order to keep profitable WEEE treatment and disposal operations, but this factor would also need further analysis beyond our scope. Financial sustainability is thus guaranteed by the business incentive to boost return on investment.

Socio-economic risks to sustainability

Socio-economic sustainability of the project outcomes is likely. The project respond to the country's priorities, plans and associated new legislation/policies. POPs emissions reduction has been integrated into the 12th and 13th Five Years Plans (FYP), which is the highest political document in the country setting the overall political and economic strategies. Given such priorities, government ownership has been high. China's commitment to environmental protection and cleaner production has increased exponentially over the years and is expected to keep growing along these lines in the coming decades. Environmental protection has become an increasingly important topic within the general public, who worry about the health impacts on themselves and their children. Local communities to pollution sites are increasingly aware and worried about pollution issues and are consequently strongly supportive of pollution prevention and control. Pollution prevention and control has thus reached a strong political and social momentum which is predicated to only grow in the future. Public awareness efforts are likely to continue in the demonstration provinces after the project ends. Moreover, the lessons learned and best practices from the BAT/BEP demonstration and other project activities have been captured in the development of policies, standards and technical guidelines, thus ensuring their continuation and replication.

Institutional framework and governance risks to sustainability

Institutional and governance sustainability is considered likely. Capacities for effective application of the EPR system and reduction of POPs/PTS releases in WEEE management have been strengthened within MEE/FECO and the demonstration provinces EPBs, and management manuals

and technical guidelines has been developed for future guidance. Moreover, the IMS has been tested and is now ready for full operation as a general management and monitoring tool. Furthermore, since POPs/PTS emissions reduction, sound management of WEEE and effective implementation of the EPR system are in the priorities of the government (see section 4.3.2) and since policies are now being adopted in this regards (partly supported by this project), proper incentives are in place to sustain these institutional and governance progresses.

Environmental risks to sustainability

As this is a circular economy and environmental protection project, environmental sustainability is considered likely. As explained above (in section 4.3.2), China has placed POPs emissions reduction within its core pollution prevention and control priorities. Such priorities are captured in its FYP. Institutional and governance sustainability are therefore also likely.

4.3.6 Impact

We found the project to demonstrate strong positive impacts. Good environmental and economic benefits have been obtained. The formal sector has increased in WEEE management in China, with 18 new enterprises registered within the EPR system, which has improved the production conditions of dismantling and disposal enterprises as well as the exposure of their employees and neighbouring communities to potential health and/or safety risks. This increase in formal WEEE management as also increased employment or at least provided people and associated household members (e.g. children in household WEEE workshops) with safer job alternatives. 64 million units of e-waste were dismantled, 15,000 tons of CRT glass was treated, significantly reducing the emission of toxic and harmful substances such as dioxins and lead. About 3,600 tons of copper, 6,600 tons of aluminium, 164,000 tons of ferrous metal, 303,000 tons of waste plastics and 43,000 tons of WPCBs were recycled in the project period. Furthermore, disabled people have been integrated within the collection scheme in Changzhou, which could set an example to other municipalities to replicate.

5 CONCLUSIONS, RECOMMENDATIONS & LESSONS

5.1 Conclusions

On project objective: The project has greatly contributed to upgrading the EPR system and the formal sector and at identifying technologies and eco-design to reduce POPs/PTS releases in WEEE management, although it remains unclear how much PBDE releases have been reduced. A good level of innovation was demonstrated in project activities.

On project design: The project is highly relevant and enjoys a comprehensive and coherent structure, covering policy, BAT/BEP, guidance and capacity building, as well as awareness raising.

On project implementation: Project management was highly effective and financially efficient, exceeding targets with the funds available and good corrective actions, although a significant time extension was required.

On component 1: The EPR system has been upgraded and eco-design has been promoted, thanks to thorough research, successful demonstrations and an effective information management system.

On component 2: Demonstrations have been successfully completed, with 6 BAT/BEP demonstrated (3 for pre-treatment and 3 for disposal), impressive amounts of POPs/PTS sensitive material treated (i.e. CRT and plastics) and technologies for end gas discharge of PCDD/PCDF up to standard. Yet, the plastics being recycled and treated might not be the PBDE-containing ones.

On component 3: The formal sector in WEEE management has significantly increased, which generated good socio-economic and environmental benefits, although more could have been done to integrate informal workers.

On components 4 and 5: The project team (at MEE/FECO and UNDP China Office) as well as the LPMO are well established, collaborates on a regular basis and are dedicated and competent in ensuring the project success.

On sustainability: The project results are likely to be sustainable overall.

5.2 Recommendations

- Impressive results have been obtained to find practical solutions for WEEE management especially in two provinces and in Tianjin. It is recommended to undertake a short but decisive final summarizing assessment on the status quo and assess the compatibility of the systems in terms of coverage of the WEEE waste streams and the management options including the treatment facilities. These final assessments can form the basis for replication in other provinces in China and can serve as a model for other countries.
- Since some solutions are quite local and cover less than 100,000 people (in Wuhan, we did see one company that served 40,000 people and was technologically and economically successful), the “Chinese” model has a good potential to be transferred to other countries.
- It is recommended to develop a clear dissemination plan for replication including lessons learned and best practices identified during the demonstrations as well as the studies and guidelines developed.

- This project is a snapshot reflecting to present situation; however, the electronics market is rapidly developing also due to new requirements or trends. Any replication or expansion of the project must take into account these changes and inform suppliers for the manufacture of new electronics to allow for future eco-products that do not contain POPs. For the WEEE management, technologies as well as workplaces have to be reviewed with quite high frequency to take into account more modern products.
- There is a need to regularly monitor the content of POPs, especially PBDEs including deca-BDE but also HBCD in the electronic product categories to ensure that contents are below the low POP content established under the Basel Convention.
- The project has identified the e-waste stream of CRTs as a resource for secondary and primary metal smelters. So far, the TE Team has not been aware that CRTs can be considered a raw material for lead smelters. Such applications, which may need special permits in certain jurisdictions should be further explored and promoted for mutual benefit.
- For communication and trainings, performance or output indicators should be developed to assess efficiency and effectiveness of the trainings as well as needs for renewals/repetitions.
- Trainings should focus more on outcomes (e.g. capacities being built and consequent improvements in operations) rather than outputs (e.g. numbers of trainings, numbers of participants), and each training should be documented (e.g. agenda, presentations and/or training material, pictures, list of participants, survey of knowledge/skills improvement). A training of trainers approach should be encouraged whenever possible/appropriate in order to promote efficiency, reach higher returns and set a momentum for replication.
- It may be difficult to put final numbers on the efficiency to reduce the informal workforce into formal employments but overall, the integration of informal workers into employments has been successful. Part of the success is also due to the physical establishment of "shops" where WEEE pieces can be disposed or are collected before transport into a treatment facility.
- The integration of handicapped people into society is one of the big achievements in the project with mutual benefit that the people have found work and the companies receive pre-sorted WEEE materials of good quality.
- The provinces and others could learn from the experience of Shandong and Guangdong, with specific industrial parks for storing and dismantling for local citizens (farmers) to do dismantling at there instead at home. WPCBs could be provided to the smelters.
- For each project, trainings to executing partners on managing GEF projects should be done in the very early stage of the project implementation (ideally starting during project design, if financial resources would allow) in order to increase project management efficiency. The need for such trainings was expressed by project partners as well as the NPT during interviews.

6 ANNEXES

6.1 ToR for TE (excluding appendix)

6.1.1 ToRs international consultant

TERMS OF REFERENCE FOR INTERNATIONAL CONSULTANT TO CARRY OUT MID-TERM

REVIEW AND TERMINAL EVALUATION OF TWO CHEMICALS PROJECTS IN THE UNDP CHINA GEF PORTFOLIO

INTRODUCTION

As an implementing agency of the Global Environment Facility (GEF), UNDP oversees a portfolio of GEF projects in the Chemicals and Waste Focal Area, which are implemented through UNDP's network of Country Offices located in developing countries, as well as numerous UN and other agency partners.

In accordance with UNDP and GEF M&E policies and procedures, all full and medium-sized UNDP supported GEF financed projects are required to undergo a Terminal Evaluation (TE) upon completion of implementation. All full-sized UNDP supported GEF financed projects are required to undergo a Midterm Review (MTR).

Specifically, under this TOR, the UNDP China CO has to undertake the following evaluations:-

Terminal Evaluation for USD 11.6 million project "Reduction of POPs and PTS release by environmentally sound management throughout the life cycle of electrical and electronic equipment and associated wastes in China"

The UNDP Global Environmental Finance (UNDP-GEF) Unit is seeking the services of one international consultant to work as part of a team with a national consultant that will undertake the above-captioned MTR and TEs during 2019. The specific responsibilities of the international consultant are detailed later in the Annex of this Terms of Reference.

The international consultant will work in concert with then national consultant, assisting in compiling the relevant information for the report, but more importantly objectively analyzing the data and information collected, and ensuring that the final reports meet with the quality standards as per UNDP Evaluation guidance.

OBJECTIVE AND SCOPE

In accordance with UNDP and GEF M&E policies and guidelines, GEF-financed projects are required to undergo a Terminal Evaluation (TE) when implementation has completed. This evaluation must follow detailed guidance outlined in the UNDP Guidance for Conducting Terminal Evaluations of UNDP-supported GEF-financed Projects.

The objectives of the TE are to: assess the project design, implementation and achievement of project results; draw lessons that can both improve the sustainability of benefits from this project; and aid in the overall enhancement of UNDP programming.

For details on the scope of the TE, please see Appendix 2.

IMPLEMENTATION ARRANGEMENTS

The principal responsibility for managing these evaluations resides with the UNDP China Country Office, Beijing. The UNDP China office will contract the consultants, and ensure the timely provision of per diems and travel arrangements within the country, provision of documentation and support of logistics for on-site meetings, interviews (in person or remote), access to Government and private stakeholders, and field visits for the evaluation team. The Project Teams will be responsible for liaising with the consultant teams to set up stakeholder interviews, arrange field visits, coordinate with the Government etc.

TIMEFRAME

The overall duration of service for the selected team leader will be approximately 45 days including at least 7-day specific project evaluation visits per project. The timeframe for TEs, MTRs is from June 1, 2019 – December 1, 2019, It is broken down as follows (only shown is information in relation to the mid-term review):

The total duration of each Terminal Evaluation will be approximately *23* days over a time period of 10-12 weeks according to the following plan (Note: Completion Date is tentative):

Activity	Number of Working Days	Completion Date TE
Document review and preparing TE Inception Report (TE Inception Report due no later than 2 weeks before the TE mission)	3 days	20 September 2019
TE mission: stakeholder meetings, interviews, field visits	7 days	8-14 October 2019
Presentation of initial findings- last day of the TE mission	1 day	15 October 2019
Preparing draft report (due within 3 weeks of the TE mission)	9 days	5 November 2019
Finalization of TE report/ Incorporating audit trail from feedback on draft report (due within 2 weeks of receiving UNDP comments on the draft)	3 days	19 November 2019

DELIVERABLES

For the Terminal Evaluation, the consultants are expected to deliver the following

#	Deliverable	Description	Timing	Responsibilities
1	**TE Inception Report**	TE team clarifies objectives and methods of Midterm Review	No later 2 weeks before the TE mission (due date: 20 September 2019)	TE team submits to the Commissioning Unit and project management
2	**Presentation**	Initial Findings	End of TE mission (due date: 15 October 2019)	TE Team presents to project management and the Commissioning Unit
3	**Draft Final Report**	Full report (using guidelines on content outlined in Appendix 2, Annex F) with annexes	Within 3 weeks of the TE mission (due date: 5 November 2019)	Sent to the Commissioning Unit, reviewed by RTA, Project Coordinating Unit, GEF OFP
4	**Final Report***	Revised report with audit trail detailing how all received comments have (and have not) been addressed in the final MTR report	Within 2 weeks of receiving UNDP comments on draft (due date: 19 November 2019)	Sent to the Commissioning Unit

*When submitting the final evaluation report, the evaluator is required also to provide an 'audit trail', detailing how all received comments have (and have not) been addressed in the final evaluation report. See Appendix 2, Annex H for an audit trail template.

TEAM COMPOSITION

The consultant teams will be composed of one lead international consultant, who will work with a national consultant. Experience with GEF financed projects is an advantage. The selected consultants should not have participated in the project preparation and/or implementation of particular projects they evaluate and should not have conflict of interest with project related activities.

The International Consultant must present the following qualifications:

- Recent experience with result-based management evaluation methodologies (10 marks);
- Experience applying SMART indicators and reconstructing or validating baseline scenarios for at least 7 years (10 marks);
- Competence in adaptive management, especially on hazardous chemicals or Persistent Organic Pollutants (POPs) (10 marks);
- Experience working with the GEF or GEF-evaluations for at least 5 years (5 marks);
- Experience working in Asian countries preferably in China for at least 3 years (5 marks)
- Work experience in relevant technical areas for at least 10 years including experience on project monitoring and evaluation (10 marks);
- Demonstrated understanding of issues related to gender and *hazardous chemicals*; experience in gender sensitive evaluation and analysis (10 marks);
- Excellent communication skills (10 marks);
- Demonstrable analytical skills (10 marks);

- Project evaluation/review experiences within United Nations system will be considered an asset (10 marks);
- A Master's degree in chemical science, chemical engineering, natural science, environment science, environmental engineering, or other closely related field (10 marks);

It should be noted that for the team leader, there will be added emphasis on the following experience and skills:

- Demonstrable skills in coordination with country offices, project teams and consultants;
- Strong writing ability in English
- Strong ability to analyze and present results in a logical and easy to follow way within the specific constructs of the UNDP reporting formats

CONSULTANT ETHICS

Consultants will be held to the highest ethical standards and are required to sign a Code of Conduct (Appendix 1, Annex D for MTR; Appendix 2, Annex E for TE) upon acceptance of the assignment. UNDP evaluations are conducted in accordance with the principles outlined in the UNEG 'Ethical Guidelines for Evaluations'.

PAYMENT MODALITIES AND SPECIFICATIONS

Mid Term Review and Terminal Evaluation

%	Milestone
20%	At submission and approval of inception report
40%	Following submission and approval of the 1st draft terminal evaluation report
40%	Following submission and approval (UNDP-CO and UNDP RTA) of the final terminal evaluation report

6.1.2 ToRs National Consultant

Same ToRs as for the international consultant but for implementation at national level (China) and in a supportive role to the international evaluation consultant.

6.2 Offeror's Letter to UNDP Confirming Interest and Availability for the Individual Contractor Assignment

6.2.1 Offeror´s Letter Description Consulting Company

The candidacy for the present assignment is submitted by ChemAnalytics Örebro AB in Sweden, a private company established by Dr. Heidelore FIEDLER and registered in Sweden. The team that will carry out this assignment will be composed of Dr Heidelore Fiedler (CEO of the company) and Mr Fabrice Clavien. Dr Fiedler will be leading the evaluations and will carry out the field missions. Both Dr Fiedler and Mr Clavien were not involved in the design nor in the implementation of the two projects covered by this assignment.

Dr Fiedler's more than 25 years of experience in environmental science as well as chemicals and waste management at intergovernmental organizations and academic institutions makes her an ideal candidate for this assignment. She is a professor of chemistry at Örebro University, School of

Science and Technology, and has proven successful in leadership of projects and personnel at the science-policy interface.

Dr Fiedler retired from United Nations Environment Programme (UNEP) on 31 May 2015, where she has been the Team Leader of the Science Team and the Risk Management Team in the Chemicals Branch of UNEP's Division of Technology, Industry and Economics (DTIE), leading major projects in the Chemicals and Waste sub-programme, and successfully developing projects on Persistent Organic Pollutants (POPs) and mercury from the Global Environment Facility (GEF) portfolio, including in China and Asia.

Before joining UNEP, Dr Fiedler had thirteen years as a senior research scientist from the University of Bayreuth, Germany, and the Bavarian Institute for Waste Research, where her research focused on dioxins and furans (on all aspects from sources, abatement, fate and transport until human exposure). she led numerous dioxin and furan or monitoring projects such as with industry (pulp and paper), waste incineration, open burning of waste and in agriculture/forests, metal industry (steel, copper, brass, aluminium), cement, crematoria, as well as POPs monitoring projects for UNEP on the Global Monitoring Plan, including training and quality control of POPs laboratories. All these activities have resulted in more than 150 scientific papers and more than 50 technical reports.

Besides, Dr Fiedler has authored the dioxin/furan Toolkit of the Stockholm Convention and she has been an active member of the BAT/BEP groups under the Stockholm Convention to develop the 2007 Guidelines on best available techniques and best environmental practices. She represented UNEP in all Toolkit and BAT/BEP meetings until 2014, and from 2015, she has been a government-nominated expert for Germany at the Toolkit and BAT/BEP group. She is also the German representative in the Small intersessional working group on polychlorinated biphenyl (PCB) under the Stockholm Convention.

Furthermore, Dr Fiedler has previous experience in monitoring and evaluation (M&E) of GEF-funded projects, being selected as an international consultant for the independent terminal evaluation of UNIDO/GEF project "Reduction of mercury emissions and promotion of sound chemical management in zinc smelting operations" (2015/2016). Finally, she is proficient in the drafting, editing and reviewing of documents to be concise, precise and technically correct, and she has been learning Chinese for several years now (reaching up to level 8).

As for Mr Clavien, he has been working with Dr Fiedler on GEF-funded projects and POPs. At UNEP, he assisted her in developing eight projects. Seven of them were approved, four from the GEF. One of the project developed was on BAT/BEP to eliminate/reduce polybrominated diphenyl ethers (PBDEs) in articles and waste recycling/disposal processes (e-waste in particular).

Mr Clavien brings with him an experience of seven years in international cooperation and results-based management (RBM), as well as a thorough knowledge of environmental protection in China, where he worked for over two years (incl. on cleantech and eco-industrial parks). At the United Nations Institute for Training and Research (UNITAR), for instance, he managed three portfolios on chemicals and waste (worth over 13 mil USD total), including a 2 mil USD GEF-funded project.

Moreover, Mr Clavien has previous experience in M&E. While working for the Don Bosco Foundation for Sustainable Development Inc., a grassroots NGO in the Philippines, he carried out evaluations on six projects (incl. women empowerment) using the Rapid Appraisal Method, the OECD Development Assistance Committee criteria (i.e. relevance, effectiveness, efficiency, impacts, sustainability) and gender balance. These evaluations were used in the strategic planning of the NGO regarding the future of the projects.

Hence, we are confident we would provide state-of-the-art evaluations for the two projects under the present assignment, and we look forward to the opportunity to explain in further details our competencies and motivations.

The National Consultant Prof. Wang Jingwei is the executive director of Shanghai Collaborative Innovation Centre for WEEE Recycling and the professor of Shanghai Polytechnic University (SPU). From 1985 through 1997, he was dedicated to the exploitation of rare earth resources at Baotou research institute of Rare Earth in Inner Mongolia, China. In 1998, he got involved in WEEE recycling when he jointed in an exchange scholar program of Sino-Sweden. During his stay at Luleå University of Technology, he worked on the EU project CARE (Comprehensive Approach for the Recycling of E-waste) VISION 2000.

After coming back from Sweden in the end of 1999, he continued working on rare earth industry in Sichuan Province. In 2002, as the founder of the School of Environmental and Material Engineering of SPU, he started higher education and R&D of WEEE management and recycling in Shanghai. In addition to the involvement of law-making works of central and local level, he developed bioleaching process of PCB scrap, automated recycling equipment of toner cartridge, and dismantling lines for large and small home appliances etc. In 2012, he started master program in particular for WEEE industry in China with approval of the Ministry of Education and meanwhile he set up Shanghai Collaborative Innovation Centre for WEEE Recycling with the approval of the local authority. In 2014, he hosted EWAS event. In 2017 he was selected as the SC member of StEP (Solving the E-waste Problem) of UNU.

The National Consultant will, jointly with, and under the supervision of the International Consultant, support the evaluation. He will be responsible to review documents, translate necessary documents and interpret interviews, meetings and other relevant events for the International Consultant. He will work as a liaison for stakeholders of the project and ensures all stakeholders of the project are aware of the purposes and methods of the evaluation and ensures all meetings and interviews take place in a timely and effective manner.

6.2.2 Approach Proposed in Offeror´s Letter

Objectives

The Terminal Evaluation purpose is to conduct a systematic and impartial assessment of the progress towards the achievement of the project objectives and outcomes as specified in the Project Document according to the guidance, rules and procedures established by UNDP and GEF as reflected in the UNDP Evaluation Guidance for GEF Financed Projects. The objectives of the evaluation are to assess the achievement of project results, and to draw lessons that can both improve the sustainability of benefits from this project, and aid in the overall enhancement of UNDP programming.

Scope and criteria

An assessment of project performance will be carried out, based against expectations set out in the Project Logical Framework/Results Framework, which provides performance and impact indicators for project implementation along with their corresponding means of verification. The evaluation will at a minimum cover the criteria of: relevance, effectiveness, efficiency, sustainability and impact. Ratings must be provided on the following performance criteria. The competed table must be included in the evaluation executive summary. The obligatory rating scales are included in TOR.

Methodology of the evaluation

An overall approach and method for conducting project terminal evaluations has developed over time, and involves using the following tools:

- ✓ Documentation reviews
- ✓ Stakeholder interviews
- ✓ Field visits
- ✓ Questionnaires
- ✓ Focus groups and other participatory
- ✓ Techniques for information gathering

The ToR for the evaluation should propose a mix of these tools, including at a minimum a review of background documents, stakeholder interviews and field visits. The aim is to utilize the best mix of tools that will yield the most reliable and valid answers to the evaluation questions within the limits of resources and availability of data.

The methodology should be agreed with the key participants (UNDP GEF Technical Adviser based in the region, CO, evaluation team and GEF Operational Focal Point) and further detailed in the Inception Report developed by the evaluation team.

The evaluation report will then describe the selected approaches, methods and analysis; the rationale for their selection; and how, within the constraints of time and money, the approaches and methods employed yielded data that helped answer the evaluation questions and achieved the evaluation purposes. The description should help the report users judge the merits of the methods used in the evaluation and the credibility of the findings, conclusions and recommendations.

The TE activities should be as follow:

1. Liaise with the Commissioning Unit and the evaluation team to organize the work;
2. Review the project documents (incl. the baseline GEF focal area Tracking Tool submitted to the GEF at CEO endorsement) and project reports, as specified in the TOR and depending on availability of the documents, as well as other relevant sources of information. Surveys might be circulated to different stakeholders in order to complete the data provided by the project documentation. Develop initial conclusions, methodology and workplan for the evaluation;
3. Preparation of the Inception Report and completion of the GEF focal area Tracking Tool. The Inception Report will inform on the evaluation objectives, criteria, deliverables and indicators/benchmarks (both quantitative and qualitative), the methodology (methods and tools) to be used during the missions to triangulate information in order to validate and/or complement the conclusions and data, a detailed plan of the mission, the list of stakeholders to be interviewed, as well as a schedule of the interviews and of other tasks and activities of the evaluation, etc.;
4. Conduct a field mission and hold stakeholder meetings (e.g. focus group discussions), interviews and field visits. The TE team will follow a collaborative and participatory approach ensuring close engagement with the Project Team, government counterparts and key stakeholders as specified in the TOR. Stakeholder involvement should include interviews with stakeholders who have project responsibilities. The field mission will be done to Tianjin City, Jiangsu Province and Hubei Province including the project sites at FuzhouTianjin, Nanjing, Changzhou, Wuhan, Jingmen, Xiangyang. The UNDP office should ensure that the project partners are informed and available during the visit. Provisions for interpretation maybe necessary;

5. Presentation of initial findings. Gaps especially on documentation necessary for the evaluation report will be highlighted and provisions proposed how to close these gaps (including deadlines for submitting project documentation/information);
6. Preparation of the draft TE report;
7. Finalization of TE report, incorporating audit trail from feedback on the draft report.

6.3 Itinerary

Table 13: Itinerary for field visit of Terminal Evaluation Team

Date	Arrangements	Location
Monday 28 October	**Meeting with key stakeholders of project in FECO** Location: FECO/MEE	Beijing
Tuesday 29 October	AM: Arrive in Nanjing PM: Discuss and exchange with **Jiangsu LPMO**	Nanjing, Jiangsu
Wednesday 30 October	Discuss and exchange with **Demonstration enterprise** and site visit *(TBD)*	Jiangsu
Thursday 31 October	AM: From Nanjing to Wuhan PM: Discuss and exchange with **Hubei LPMO**	Wuhan, Hubei
Friday 1 November	AM: Discuss and exchange with **Demonstration enterprise** & site visit PM: Depart from Wuhan to Beijing by air	Hubei Beijing
Saturday 2 November	Free time	Beijing
Sunday 3 November	From Beijing to Tianjin by Train	Beijing Tianjin
Monday 4 November	AM: Discuss and exchange with **Tianjin LPMO** PM: Discuss and exchange with **TCL-Aobo** & Site visit	Beijing Tianjin
Tuesday 5 November	Debriefing **Location: FECO**/MEE	Beijing

6.4 List of persons interviewed

Table 14: List of participants for the TE of Project E-waste

	江苏省参与单位		Participants of Jiangsu Province	Name	Title
江苏省 Jiangsu Province	江苏省固体废物监督管理中心	顾明事	Solid waste management center of Jiangsu Province (Jiangsu LPMO)	Gu Mingshi	Director General
		黄文平		Huang Wenping	Deputy Director General
		余辉		Yu Hui (presenter)	Section Chief
	江苏省固体废物与化学品处	梁春凯	Division of Solid waste and Chemicals, Dept. of Ecology and Environment of Jiangsu	Liang Chunkai	
	江苏省环境保护宣传教育中心	刘萍	Center for Environmental Education and Communication of Jiangsu Province	Liu Ping	
		顾 宇辉		Gu Yuhui	
		孔德轩		Kong Dexuan	
	江苏省环境经济技术合作中心	洪岚	Center for Environment economic technology cooperation of Jiangsu Province	Hong Lan	
	常州翔宇资源再生科技有限公司	樊文建	Jiangsu Changzhou Xiangyu Resource Regeneration Technology Co., Ltd.	Fan Wenjian (presenter)	General Manager
	江苏理工学院	毕承路	Jiangsu University of Technology	Bi Chenglu	
	江苏兴瑞会计师事务所有限公司	吴江景	Jiangsu Xingrui Accounting Firm Limited Company	Wu Jingjiang	
	常州工学院	周全法	Changzhou Institute of Technology Xinbei Campus	Zhou Quanfa	
	南京大学	韦斯	Nanjing University	Wei Si	

	南京大学环境规划设计研究院股份公司	方雪	Academy of environmental planning and design	Fang Xue	
	回收点	姚军凯	Recycler	Yao Junkai	
湖北省 **Hubei Province**	**湖北省生态环境厅**		**Department of Ecology and environment of Hubei Province**		
	单位	参会人员	Institute	Name	Titel
	省生态环境厅固体废物与化学品处处长	王昉	Division of Solid waste and Chemicals, Dept. of Ecology and Environment of Hubei	Wang Fang	Division Chief
	省固体废物与化学品污染防治中心主任	黄晓明	Center for solid waste and chemicals (Hubei LPMO)	Huang Xiaoming	Director General
	省固体废物与化学品污染防治中心副主任	杨泽华	Center for solid waste and chemicals (Hubei LPMO)	Yang Zehua	Deputy Director General
	省固体废物与化学品污染防治中心科长	杨立群	Center for solid waste and chemicals (Hubei LPMO)	Yang Liqun (presenter)	Section Chief
	省固体废物与化学品污染防治中心	鲁敏	Center for solid waste and chemicals (Hubei LPMO)	Lu Min	
	省固体废物与化学品污染防治中心	阮莎	Center for solid waste and chemicals (Hubei LPMO)	Ruan Sha	
	地方生态环境管理部门		**Local Ecology and environment Agencies**		
	武汉市生态环境局		Wuhan Ecology and environment Bureau		
	黄石市生态环境局		Huangshi Ecology and environment Bureau		
	荆门市生态环境局		Jingmen Ecology and environment Bureau		
	示范企业		**Demonstration enterprises**		
	荆门市格林美新材料有限公司	张宇平	Jingmen GEM Co., Ltd	Zhang Yuping (presenter)	

	大冶有色金属集团控股有限公司	张叙鹏	China Daye Non-Ferrous Metals Mining Limited.	Zhang Xupeng (presenter)	
	武汉博旺兴源环保科技股份有限公司	余军	Wuhan Bowangxingyuan Environmental Technology Co., Ltd.	Yu Jun (presenter)	
	湖北金洋冶金股份有限公司	江姝	Hubei Jinyang Metallurgical Incorporated Co. Ltd	Jiang Shu (presenter)	
	成果支撑单位		**Related units**		
	武汉理工大学		Wuhan University of Technology		
	武汉工程大学		Wuhan Institute of Technology		
	中持依迪亚（北京）环境检测分析股份有限公司		CSD IDEA（Beijing） Environmental Test & Analysis Co.，Ltd.		
	安徽晶奇网络科技股份有限公司		Anhui Jingqi		
天津市 Tianjin	**天津市参与单位**		**Participants of Tianjin**		
	单位	参会人员	Institute/Enterprises	Name	Title
	天津固管中心	梁维华	Solid Waste and Toxic Chemicals Management Center of Tianjin Municipality	Liang Weihua (TBC)	Director General
	天津固管中心电废部	吴雷	Solid Waste and Toxic Chemicals Management Center of Tianjin Municipality	Wu Lei	Director
	项目办	马小垒	Solid Waste and Toxic Chemicals Management Center of Tianjin Municipality	Ma Xiaolei (presenter)	
	TCL 奥博	王晓丹	TCL-Aobo Environmental Protection and Development Co Ltd	Wang Xiaodan (presenter)	

6.5 Summary of field visits

6.6 List of documents reviewed

6.6.1 Administrative Documents

Project design and approval documents

Project documents prepared by UNDP to the GEF for approval:

- Initial Plan for a GEF Project Preparation Grant
- GEF Project Identification Form
- UNDP Project Document (for Project Endorsement)
- Request to the GEF CEO for Project Endorsement

GEF POPs Tracking Tool

- GEF POPs Tracking Tool for 2015
- GEF POPs Tracking Tool for 2016
- GEF POPs Tracking Tool for 2017
- GEF POPs Tracking Tool for 2018

Project Implementation Review (PIR)

Project Implementation Review (PIR) prepared by UNDP to the GEF Secretariat. Period covered:

- PIR 2018

Combined Delivery by Activity (CDR)

Project Implementation Review (PIR) prepared by UNDP to the GEF Secretariat. Period covered:

- CDR 2019

Two-Year Work Plans (TYWP)

Two-Year Work Plans; prepared by UNDP CO to UNDP Regional Office. Periods covered:

- TYWP for 2019-2020

Annual Project Report (APR)

Annual Progress Report; prepared by MEP/FECO to UNDP. Periods covered:

- APR 2016

Quarterly Project Progress Reports (QPR)

Quarterly Project Progress Report; prepared by MEP/FECO to UNDP. Periods covered:

- QPR 2017 Q1 (January to March 2017)
- QPR 2017 Q2 (April to June 2017)
- QPR 2017 Q3 (July to September 2017)

Back To Office Reports (*i.e.* mission reports)

Back To Office Reports; prepared by UNDP CO to UNDP Regional Office. Periods covered:

- Mission of 8-10 August 2017 (Ms HAN Yang)

UNDP Annual Portfolio Indicators

UNDP Annual Portfolio Indicators; prepared by UNDP to the GEF Secretariat. Periods covered:

- Portfolio Indicators 2017 (see Table)

Budget revision

Budget revision prepared by UNDP to the GEF Secretariat. Date of signature:

- 23 April 2019

Other documents

- National Implementation by the Government of UNDP Supported Projects: Guidelines and Procedures

Table 15: UNDP Annual Portfolio Indicator for [year]

6.6.2 Technical Documents

No.	Title
1	Jiangsu Province Waste Electrical And Electronic Equipment Standardized Fine Dismantling Technical Guidelines
2	Research Report On Emission Reduction Technology Of Pops/Pts In Waste Circuit Board Of Disassembled Products Of Waste Electrical And Electronic Equipment
3	Research Report On Emission Reduction Control Effect Evaluation Of Pops/Pts In Waste Circuit Board Treatment Process
4	Research Report On Pops/Pts Analysis And Test Method In Waste Circuit Board Of Disassembled Products Of Waste Electrical And Electronic Equipment
5	Methods For The Analysis Of Pops/Pts From Process Waste In Circuit Boards
6	Static Analysis Methods For Pops/Pts In Waste Circuit Boards
7	Jiangsu Province Waste Electrical And Electronic Products Dismantling Technology Promotion Manual
8	Summary Report On Polishing Plate Pulverization, Separation And Dust Collection Technology
9	Demonstration Enterprise Scheme Of Tin Removal Of Waste Circuit Board
10	Operation Effect Analysis Report Of Cutting Plate Separator
11	Operation And Effect Analysis Report Of Cylinder Type Fully Enclosed Tin Detracting Equipment

12	Technical Scheme Of Fine Classification Of Electronic Components
13	Draft Of Technical Standard For Disassembly And Separation Of Waste Circuit Board
14	Technical Solution For The Treatment And Reuse Of Electronic Components
15	Follow-Up, Detection And Research Report Of Pops/Pts Emission During The Use Of Lipid-Plastic Products
16	Research Report On The Use And Reuse Of Lipid-Plastic Products
17	Disposal Scheme For Used Epoxy Resins Containing Pops/Pts
18	Application Report Of High Value Utilization Of Waste Epoxy Resin Powder
19	Study Report On Emission Reduction Control Effect Of Pops/Pts In Waste Epoxy Resin Powder Treatment Process
20	Study On The Analysis And Test Method Of Pops/Pts During The Treatment Of Waste Epoxy Resin From Disassembling Waste Electrical And Electronic Equipment
21	Analysis And Evaluation Of Pops/Pts In Major Components And Components Of Typical Waste Home Appliances And Key Research On Emission Reduction
22	Evaluation Of Emission Reduction Effect And Technical Recommendation Of Pops/Pts From Waste Electrical And Electronic Products In Jiangsu Province
23	Risk Assessment Of Environmental Status Of Pollutant Discharge From Electronic Waste Dismantling Enterprises
24	Technical Specification For Controlling The Discharge Of Pops Or Pts During Waste Circuit Board And Waste Plastic Recycling Treatment In Hubei Province (Draft)
25	Monitoring Technical Specification For Polybrominated Diphenyl Ethers (PBDEs) (Draft)
26	Electronic Waste Recovery Inspection Standards And Other Guidance Manual
27	Disassembly Standard For Waste Electrical And Electronic Equipment
28	Technical Group Standard For Physical Processing Of Circuit Boards
29	Draft Technical Standard For The Disposal Of Reinforced Physical Circuit Boards
30	Guidelines For Dismantling Waste Liquid Crystal Electrical Appliances In Hubei Province (Draft For Comments)

31	Review Guidelines For Dismantling Waste Liquid Crystal Electric Appliances In Hubei Province (Draft For Comments)
32	Draft Of Technical Standard For Physical Circuit Board Disposal
33	Technical Specification For Wet Treatment Of Circuit Board
34	Technical Specification For Dismantling Discarded CRT Electrical And Electronic Equipment
35	Technical Specification For Disassembly And Disposal Of Waste Washing Machines
36	Technical Specification For Disassembly And Disposal Of Waste Air Conditioning Products
37	Technical Specification For Disassembly And Disposal Of Waste Refrigerator Products
38	Technical Standard For Single-Layer Circuit Board Processing
39	Guidelines For Dismantling, Processing And Production Management Of 9 New Types Of Waste Electrical And Electronic Products (Draft Proposal)
40	Lead-Containing Glass Co-Processing Technical Manual In Hubei Jinyang
41	Lead-Containing Glass Co-Processing Technical Manual In Anyang Minshan
42	Technical Guide For Collaborative Lead Smelting Of CRT Lead-Containing Glass

6.7 Evaluation Question Matrix

Evaluative Criteria	Questions	Indicators	Sources	Methodology
Project Design / Formulation				
Analysis of Results Framework	Were the project's objectives and components clear, strategic, practicable and feasible within their time frame?	Degree of clarity, strategy, practicability and feasibility of the project objectives and components.	Project document; UNDP project management manual.	Documents analysis
	Was the project built on a solid problem analysis and theory of change, and were its indicators/targets "SMART"?	Inclusion of a theory of change and indicators/targets in the document and degree of compliance with UNDP project management manual/guidelines.		
Assumptions and risks	Were the assumptions and risks logical and robust, and have they helped to determine realistic activities and outputs?	Degree of conformity of the assumptions and risks with evidence-based context analysis and UNDP project management manual.	Ibid.	Ibid.
	Were all relevant and influential externalities (e.g. natural phenomenon, political, economic and/or institutional challenges) properly anticipated and did the project have a convincing plan for managing them?	Inclusion of an evidence-based risk management plan.		
Incorporation of lessons from other projects	Were lessons from other relevant projects properly incorporated in the project design?	Prodoc references to lessons from other projects, and degree of compatibility of project interventions with these lessons.	Project document; Background documentation; Project team and relevant stakeholders; Expertise of the national consultant	Desk search; Document analysis; Interviews with project team and stakeholders.

			and other key informants.	
Planned stakeholder participation	Were key stakeholders for the project success properly identified and were partnership arrangements made (with agreed roles and responsibilities) prior to project approval?	Degree of exactitude and pertinence of the stakeholder analysis; Partnership signed and operational with strategic stakeholders.	Ibid.	Ibid.
Replication approach	Did the project incorporate a replication plan? If yes, is the plan achievable and is its scope appropriate?	Degree of inclusion and relevance of the replication plan in the prodoc.	Ibid.	Ibid.
UNDP comparative advantage	Is the project aligned with UNDP's mission and is UNDP the most competent institution to implement this project? If yes, what makes UNDP outstanding or more competent than others?	Degree of alignment of the project with UNDP's strategic objectives. Quality of evidence-based comparative advantage analysis.	Project document; UNDP strategic plan; Background documentation; Project team and relevant stakeholders; Expertise of consultants and other key informants.	Desk search; Documents review; Interviews with UNDP, FECO and stakeholders.
Linkages between project and other interventions	Are there linkages between project and other interventions within the sector, how is the project promoting effective synergies maximizing the project's results?	Amount of synergies with other interventions and their level of effectiveness for increasing results in line with objective.	Project document; Background documentation; Project team and relevant stakeholders; Expertise of the national consultant and other key informants.	Desk search; Document analysis; Interviews with project team and stakeholders.

Management arrangements	Were the capacities, rules and resources (funding, staff and facilities) of the executing institution(s) and its counterparts properly considered when the project was designed, or is the project management plan sufficient to reach these capacities and resources for effective and efficient management and coordination of the project?	Degree of ability of the project team to fulfil its roles and deliver effective and efficient project management.	Project document; Project reports; Project team and relevant stakeholders; Bookkeeping and other supporting evidences.	Document analysis; Interviews with project team and stakeholders; Bookkeeping review.
Project Implementation				
Adaptive management	Were there changes in the environmental and development objectives of the project during implementation? If they were external, were there effective corrective actions taken to keep objectives on track? If they were internal, were they justified, properly processed and effective for the project objective and results? Were these changes and related measures properly communicated, discussed and approved by the project steering committee?	Level of accomplishment of project objective and targets despite eventual changes. Level of consultation with project steering committee over changes.	Project document; Project reports.	Document analysis; Interviews with UNDP, FECO and NSG.
Partnership arrangements	Were the partnership arrangements properly identified and roles and responsibilities negotiated prior to project approval?	Degree of relevance and effectiveness of the partnerships.	Project document; Background documentation; Project reports; Project team and relevant	Document analysis; Interviews with project team and partners.

			stakeholders.	
Feedback from M&E	How were the signals/feedback from the M&E activities used for adaptive management?	Degree of identification of project risks/challenges, degree of timeliness, and degree of effectiveness of the adaptations / corrective actions in staying on track with objectives.	Project document; Project reports; MTR report; Project team and relevant stakeholders; Bookkeeping and other supporting evidences.	Document analysis; Interviews with project team and stakeholders; Bookkeeping review.
	How were the recommendations from the mid-term review (and/or other reviews) addressed?	Percentage of recommendations being addressed and degree of relevance and effectiveness of the measures / corrective actions.		
Project Finance	Was financial planning appropriate in project design and were they effective mechanisms put in place for smooth and cost-effective financial management and control?	Appropriateness of project design	Project document; Project team and relevant stakeholders.	Document analysis; Interviews with project team and partners.
	Were all major sources of co-financing carefully identified and was the difference between in-kind and cash co-financing clear in the commitment and in actual reporting?	Degree of exactitude and pertinence of the co-financing plan and degree of clarity of the co-financing sources.	Project document; Co-financing letters and reports; Project team and relevant stakeholders; Background documentation.	Desk search; Document analysis; Interviews with project team and co-financers/stakeholders.
	Were there variances between planned and actual expenditures (both for GEF grants and for co-financing)? If yes, why and how was it generated and addressed?	Ratio of expenditures compared to budget and degree of pertinence of the justification for deviations.	Project document; Project reports (incl. MTR); Co-financing letters and reports; Project team	Document analysis; Interviews with project team and co-financers/stakeholders; Bookkeeping review.

			and relevant stakeholders; Bookkeeping and other supporting evidences.	
	What were the findings and recommendations from the audits and how were they addressed?	Amount of audits performed, average of their ratings and degree of relevance and effectiveness of the corrective actions.	Audit reports; Project reports (incl. MTR); Bookkeeping and other supporting evidences.	Document analysis; Interviews with project team and stakeholders (and auditors); Bookkeeping review.
	How did this co-financing contribute to the ownership and/or the sustainability of the project?	Level of contribution of the co-financing to the project ownership and/or sustainability.	Project document; Project reports (incl. MTR); Co-financing letters and reports.	Document analysis; Interviews with project team, co-financers, and other stakeholders.
	Did the project team exercised due diligence in the management of funds (including periodic audits)?	Level of conformity of the funds management to UNDP due diligence rules.	Audit reports; Project reports (incl. MTR); Project team and relevant stakeholders; UNDP due diligence guidelines/rules; Bookkeeping and other supporting evidences.	Document analysis; Interviews with project team and stakeholders (and auditors?); Bookkeeping review.
M&E	Was the M&E plan based on a sound methodology, baseline study and SMART indicators, and was it sufficient (e.g. budget, roles, capacity building)?	Level of compliance of the M&E activities compared to plans, and degree of its effectiveness in tracking progress towards objectives.	Project document; Project reports (incl. MTR); Project team and relevant stakeholders; Bookkeeping	Document analysis; Interviews with project team and stakeholders; Bookkeeping review.
	Did the M&E implementation follow			

	the plan (i.e. methods, activities, schedule and logframe)?		and other supporting evidences.	
	Overall, how effective was the M&E at tracking progress and developing timely and effective corrective actions, and how were stakeholders consulted?			
UNDP and Implementing Partner	Was the Implementing Agency (IA) sufficiently focused on results and was its support to the Executing Agency (EA) and the project team sufficient and objective?	yes	Project reports; Project team and relevant stakeholders; Bookkeeping and other supporting evidences.	Document analysis; Interviews with UNDP and FECO; Bookkeeping review.
	Was the Executing Agency (EA) sufficiently focused on results and timeliness? Did the government demonstrated ownership?	yes		
	Was there an appropriate firewall between the IA and the EA? Was implementation smooth and according to plan, and were risks properly managed?	yes		
Project Results				
Relevance	To what extent and how did the project suited to local and national development priorities and organizational policies, including changes over time?	Amount of priorities of the PRC National Implementation Plan (NIP) for the Stockholm Convention and other key national priorities (e.g. Five-Year Plan and national and local laws and regulations) addressed by the project, and degree of relevance and effectiveness.	Project document; NIP 2007, FYP as well as national and local laws/regulations; Project team and relevant stakeholders.	Documentation analysis; Interviews with project team and stakeholders.

	To what extent and how did the project was in line with the GEF Operational Programs?	Amount of GEF Chemicals Focal Area outcomes and indicators addressed by the project, and degree of relevance and effectiveness.	Project document; GEF-5 Chemicals Focal Area Strategy and Objective; Project team and relevant stakeholders.	
	To what extent and how did the project was in line with UNDP mission and objectives?	Amount of UNDAF priorities and UNDP Country Programme Action Plan (CPAP) (and its evaluation plan) strategies addressed by the project, and degree of relevance and effectiveness.	Project document; UNDAF and CPAP; Project team and relevant stakeholders.	
	Did the project undertake a solid needs assessment, problem analysis and theory of change? If yes, how did the project addressed these needs/problems?	Degree of effectiveness of the project outcomes in addressing identified needs/problems.	Project document; Background documentation; Project team and relevant stakeholders; Expertise of the national consultant and other key informants.	Documentation analysis; Desk search; Interviews with project team and stakeholders; Site visits.
	To what extent and how did the project objectives were still appropriate given changed circumstances?	Degree of relevance of the project after changes.		
Effectiveness	To what extent did the project targets have been achieved and to what extent do these results achieve the project outcomes and overall objective?	Percentage of achievement of the overall objective and targets, and degree of achievement of the outcomes (see indicators/targets in prodoc logframe).	Project document; Project reports (incl. MTR); GEF Tracking Tools and UNDP Portfolio Indicators; Project team and relevant stakeholders; Bookkeeping	Documentation analysis; Interviews with project team and stakeholders; Site visits.

			and other supporting evidences; Direct observation on site.	
Efficiency	Did the project achieve its results in the most cost-effective way, or to what extent did it surpass (or not) targets with the financial resources provided?	Cost-efficiency of the financial management.	Project document; Project reports (incl. MTR); Audit reports; Project team and relevant stakeholders; Bookkeeping and other supporting evidences.	Documentation analysis; Interviews with project team and stakeholders.
	Were the project activities, outputs and targets achieved according to plan and schedule?	Timeliness of project deliverables.		
	To what extent did the project demonstrated sound prioritisation, methodology, organisation and management skills in implementing the project and in facing assumption changes and risks/challenges?	Level of management skills in implementation.		
Country ownership	How were the government and other stakeholders involved in design and implementation (e.g. steering committee) and how were the outcomes of the project integrated within the government strategies/regulations/ policies?	Percentage of stakeholders mapped in prodoc that have been involved in implementation.	Project document; Project reports (incl. MTR); Government records (incl. websites); Project team and relevant stakeholders.	Documentation analysis; Desk search; Interviews with project team and stakeholders.
		Amount of outcomes integrated in government strategies/regulations /policies		
Mainstreaming	Did the project successfully mainstreamed GEF and UNDP priorities (including poverty alleviation, improved governance, and women's empowerment)?	Amount of UNDAF and UNDP Country Programme Action Plan (CPAP) priorities addressed by the project and degree of achievement (e.g. poverty alleviation within the informal sector and women empowerment).	Project document; UNDAF and CPAP; Project reports and UNDP Portfolio Indicators.	Documents analysis; Interview with UNDP and stakeholders (esp. government).

Sustainability	Overall sustainability: Did the project developed and implemented a sustainability strategy? How likely the project results will continue to deliver environmental and social benefits in the long term after the project's completion, and to what degree (i.e. decreasing or growing benefits over time)?	Likelihood and degree of overall sustainability of project environmental and social benefits in the next 10-15 years.	Project reports (incl. MTR); Lessons learned report; Project team and relevant stakeholders.	
	Financial risks: Did the project established financial and economic instruments and mechanisms to ensure the ongoing flow of benefits once the GEF assistance ends (e.g. public/private investment, income generation, market transformations)?	Likelihood of financial sustainability in the next 10-15 years.	Project reports (incl. MTR); Lessons learned report; Project team and relevant stakeholders.	
	Socio-economic and political risks: Are there social, economic or political risks (e.g. crisis) that may threaten the project outcomes, and did the project established safeguards mechanisms, regulatory/policy frameworks, profitable economic activities and condusive social conditions (e.g. involvment of "champions") to maintain or further the project objectives?	Likelihood of socio-economic and political sustainability in the next 10-15 years.	Project reports (incl. MTR); Lessons learned report; Project team and relevant stakeholders.	
	Institutional framework and governance risks: Did the project developed suitable and	Likelihood of institutional and governance sustainability in the	Project reports (incl. MTR); Lessons	

	lasting/systemic institutional capacity and organizational arrangements (public and/or private) to survive changes in personnel and governance processes?	next 10-15 years.	learned report; Project team and relevant stakeholders .	
	<u>Environmental risks:</u> Did the project established sufficient safeguards to guarantee that project outcomes will not be afftected by nor will affect environmental and ecological factors?	Likelihood of environmental sustainability in the next 10-15 years.	Project reports (incl. MTR); Lessons learned report; Project team and relevant stakeholders .	
	<u>Catalytic role:</u> Have the lessons learned from the project been collected, consolidated and disseminated for replication and/or scaling up, and to what extent?	Scope (e.g. geographic and/or population reach) of the dissemination and replication / scaling up of the lessons learned.	Project reports (incl. MTR); Lessons learned report; Project team and relevant stakeholders .	Document analysis; Interviews with project team, stakeholders.
Impact	What impacts can be estimated/observed of the project during its lifetime up to the long run (>10 years) on the local, national and global environment? Did the project promote ecological status improvements and/or reduction in environmental stress?	Geographic scope affected by the project and overall rating of environmental impacts (using a costs/benefits analysis).	Project reports (incl. MTR); Project team and relevant stakeholders ; Expertise of national consultant and other key informants; On-site observations .	Document analysis; Interviews with project team, stakeholders and other key informants (e.g. experts); Site visits.
	What impacts can be estimated/observed of the project during its lifetime up to the long run (>10 years) on the local, national and global communities and development objectives?	Estimated amount and geographic scope of the people affected by the project, and overall rating of social impacts (using a costs/benefits analysis).		

6.8 TE Data Checklist

Item#	Items	Comments
Project reporting		
1	Project Implementation Reviews (PIR) for 2014, 2015 and 2018	one drive-"PIR & Tracking tool
2	Quarterly Progress Reports (QPR) for 2018 Q3 and 2019 Q1-Q3	Gao Peng
3	Portfolio indicators 2015, 2016 and 2018 (if annual/applicable)	Gao Peng
4	GEF Tracking Tools for 2017 and 2018 (if annual/applicable)	Gao Peng
5	Funding Authorization and Certificate of Expenditures (FACE) 2017 Q4 and 2018 Q1-Q4	Gao Peng
6	Audit reports 2014 and 2015 (see MTR report) as well as 2016 to 2018 (if annual/applicable)	one drive-"Audit"
7	Co-financing letters (as indicated in the prodoc)	commitment letter for Co-finance of Project E-waste
8	Annual reports/letters of co-financing	APR
9	Minutes of the PBDEs & POPs Board Meetings (see ToR, Appendix 2, Annex B)	None
Project objective indicators: sources of verification		
10	List of registration and permitted recyclers	http://weee.mepscc.cn/Index.do?method=entpList
11	EPR Treatment Fund disbursement records	http://weee.mepscc.cn/Index.do;jsessionid=01C4CD6E9D47680EE4A803236F283DC1
12	Finalized national EPR policy	one drive-TE-componet1-output2/2-sub3-
13	Training reports and materials (incl. agenda, list of pax, pictures, PPTs and training modules)	one drive-TE-component 1-sub 17
14	Records of amount of WEE collected and processed	http://weee.mepscc.cn/Index.do;jsessionid=01C4CD6E9D47680EE4A803236F283DC1
15	Report on selection of BAT/BEP for pre-treatment of POPs/PTS release sensitive materials	one drive-TE-sources of verification-15
16	(Pre-treatment and disposal) BAT/BEP demonstration report(s) (incl. lessons learned)	one drive-TE-sources of verification-16

17	Technical guidelines on pre-treatment of POPs/PTS release sensitive materials	one drive-TE-sources of verification-17
18	Technology improvement and records of POPs/PTS release (e.g. lab analysis of POPs/PTS emission samples)	component 2-sub 16
19	Annual records of amounts (in tons) of BFR containing plastic performed/reused and CRT recycled	one drive-TE-component 2 -sub13 (None for BFR/ CRT)
20	Technical guidelines on eco-design	one drive-TE-component1 -sub8-11
21	Report of the demonstration of collection (incl. pictures showing the evolution of the demonstration)	one drive-TE-sources of verification-21
22	List of registered recyclers	one drive-TE-sources of verification-22
Component 1 indicators: sources of verification		
23	EPR Treatment Fund annual activities (and website link)	http://weee.mepscc.cn/Index.do;jsessionid=01C4CD6E9D47680EE4A803236F283DC1
24	Annual reports on the mass flows handled by registered WEEE processors	http://weee.mepscc.cn/Index.do;jsessionid=01C4CD6E9D47680EE4A803236F283DC1
25	Data Information Management System (IMS) (web) link (and reports, if applicable)	one drive-TE-component 1-sub 6
26	Technical standards documents finalized	合同已签（MU Jie）one drive-TE-com1-sub7 （待扫描）
27	Eco-design standard document finalized	one drive-TE-component 1-sub8-11
28	Status and (web) link of the stakeholder nodal body / multi-stakeholder platform	http://www.huishouge.cn/
29	Report of the stakeholder consultation program	None
30	Training guidelines for the control of imports compatible with the Basel Convention	one drive-TE-component 1-sub16-output3 guidelines (Chinese)& output 5&6 (reports in English)
31	Publications, audio visual and other promotion materials	one drive-communication-uploading
32	Surveys on awareness	one drive-communication-uploading

		http://tw.njtech.edu.cn/info/1004/1484.htm
33	Training guidelines for the control of imports compatible with the Basel Convention	same as No.30
34	Cooperation and coordination arrangements	one drive-Meeting
Component 2 indicators: sources of verification		
35	Diagnostic reports and action plans (on the WEEE collection chain)	Gao Peng
36	Extract of EPR Treatment Fund registry	one drive-TE-com1-sub1-output2
37	Operational guidelines for upgrading to technical standards	one drive-TE-com2-sub4
38	Technical guidelines for pre-treatment of WEEE	Gao Peng
39	Implementation plans of the BAT/BEP demonstration enterprises	one drive-TE-sources of verification-39
40	Completion reports and technical reports from demonstrations of BAT/BEP	one drive-TE-sources of verification-PMO work report
41	Risk assessment reports of a network of regional facilities, with recommendations and action plans (target: at least 3 reports)	one drive-TE-com2-sub13 (testing)/sub16 (4 个文件）
42	Material flow audits at nonferrous metal smelter	one drive-TE-com2-sub15
Component 3 indicators: sources of verification		
43	Characterization study report on the informal sector	one drive-TE-com3-sub1
44	Guidance document and proof(s) of dissemination	will provide later
45	Audit reports on mass flows	same as No.35
46	Publications, printed, audio visual and promotion materials	one drive-TE-com3-sub6
47	Contracts for pilot implementation of collective infrastructures supporting informal WEEE processors, and pilot reports	same as No.40
Component 4 indicators: sources of verification		
48	Knowledge products; post-project action plan	will provide later
(Web) links		
49	Baidu Recycle web app (UNDP-Baidu-TCL) (see In Briefing paper of 2015 seminar)	https://apps.apple.com/cn/app/baidu-recycle/id1117766440?l=en
50	GEM- Brother Collctor Online to Offline (O2O) Solutions (see In	http://www.huishouge.cn/

	Briefing paper of 2015 seminar)	
51	Lenovo's Asset Treatment Solution (see In Briefing paper of 2015 seminar)	None
52	Gree's EPR (if part of the project) (see In Briefing paper of 2015 seminar)	None
Management guidelines (financial, administration and operational)		
53	Programme Implementation Manual (PIM) (see prodoc and MTR report)	Gao peng
54	Financial and Administration guidelines used by Project Team (see ToR, Appendix 2, Annex B)	same as No.53
55	Project Standard Operational Procedure (SOP), and any other operational guidelines, manuals and systems (see ToR, Appendix 2, Annex B)	same as No.53
Others		
56	UNDP Environmental and Social Screening results (see ToR, Appendix 2, Annex B)	WJJ
57	UNDP Initiation Plan (see ToR, Appendix 2, Annex B)	WJJ

6.9 Corrective Actions to MTR Recommendations

MTR recommendations	**Corrective actions taken by Project Team***
CORRECTIVE ACTIONS FOR THE DESIGN, IMPLEMENTATION, MONITORING AND EVALUATION OF THE PROJECT	
Component 2	
1. Facilities are adopting technologies in line with the individual product needs but it is recommended to align (progressively) guidelines and standard with international ones, particularly EU WEELABEX/CENELEC. This will not only ensure an easier benchmarking with international standards and practices, but also leverage on the work already done to ensure best practices are adopted. It is suggested to try applying WEELABEX requirements to demonstration facilities to assess the gap between national and international standards.	This problem has been fully considered in the equipment transformation of demonstration enterprises, and they have been upgraded according to international standards.
2. It's vital for the project to assess the effect of the improvement of the demonstration enterprises	Tests and comprehensive evaluations have been conducted on the implementation effects of

implementing BAT/BAT with the scientific and credible monitoring results.	technology demonstration activities to analyse POPs and PTS control technologies in disassembly and deep recycling of waste electrical and electronic products
The monitoring data of the project by now is coming from a 3-day on-site monitoring in different demonstrations and with some uncertain parameter selection. This project launched the assessment of the pollutant one by one. The dismantling line can contain a variety of contaminants, such as PBDEs and Pb and other pollutants can be present together. Superimposed effect of toxic pollutants is still unknown, so the enterprises shall still make a good effort to protect the health and safety of staffs.	
3. Wuhan Bo Wang Xing Yuan cannot carry out hydro-metallurgical process for PCB treatment on schedule. Although the demonstration enterprise applied the FECO with the registration certificate, there are still some risks to achieve the final outcome of the project.	Since the original site of Wuhan Bowang and Xingyuan environmental protection technology co., ltd. do not have the construction conditions for the wet disposal of waste circuit boards, in April 2018, the company will use more environmentally friendly and efficient enhanced physical method for the disposal of circuit boards to replace the wet disposal of circuit boards, which has been proved feasible by the expert group.
4. This project on safety treatment of CRT came up with two different ideas: while the demonstration enterprise of Hubei Jinyang Metallurgical Incorporated Co.Ltd. showed that it's possible to successfully extract the lead form the CRT, in the other case the glass was simply used as flux agent, without recovery of the lead. It will be important to carefully assess the two different options.	Under the project, CRT glass is co-disposed by using recycled lead smelting and primary lead smelting. The results show that the lead in the lead glass can be effectively extracted and the remaining silica can enter into the slag.
5. It is also recommended, when developing processes to treat PCB to progressively increase the number of elements recovered, going beyond Copper, Silver and Gold, but also looking at other critical materials that are present in the PCB and that might be recovered.	In fire disposal of waste circuit board, palladium and other rare and precious metals will also be extracted, the total metal extraction rate reached 85.7%.
Component 3	
6. In the majority of demonstration provinces the strategy to divert material from informal processing is to collect as much as possible directly from consumers but might not be enough especially where informal collection is still very effective. It is recommended to further exchange experiences and feedbacks with Jiangsu province who also developed a strategy for the inclusion of informal collection.	The project carried out a variety of publicity methods to promote the harmless disposal of WEEE. The LPMO among Tianjin, Jiangsu and Hubei also carried out many communication activities and shared their respective experience in the implementation of project activities.
Component 4	
7. It is recommended to develop a dashboard of indicators to check the planned versus actual status of	The guidance to the demonstration area has been strengthened, relevant information has been sent to

the budget at (i) activity level, (ii) outcome level, and (iii) component level; this to ensure a quicker and smoother control of the overall project progresses.	each project office, the work schedule has been developed, and the prompt reply has been urged to improve efficiency.
Component 5	
8. Given the majority of activities and outcome are still running and final results are only expected at the end of the project is suggested to organize virtual/physical bi-annual updates in the remaining 2 years with external experts, to ensure the project keeps working on track.	Relevant information has been sent to all participants to maintain communication, ensure the quality of their work and normative management, improve the quality of their reports, and accelerate the progress of project implementation.
ACTIONS TO FOLLOW UP OR REINFORCE INITIAL BENEFITS FROM THE PROJECT	
Component 1	
1. It is recommended to trace collection and recycling at individual product types (TV, Air-Con, PC, Washing Machines, Fridges). This detailed tracking is enabled by the IT system being developed in the project context and would increase the precision in the calculation of material recovered and input for GEF Tracking tool.	
2. The proper tracking at individual product level could allow to feed data and experiences to the Fund Managers, particularly taking into account a proper accounting of all flows and the economics of their collection and recycling.	
Component 2	
3. Project partners demonstrated good capability to engage external stakeholders and consumers for awareness raising activities. It is suggested to further reinforce the benefits of the project with exploitation of (i) training modules developed and (ii) awareness raising, for instance leveraging further on material developed, engaging in particular younger generations, or on structures like the GEM museum in Hubei province.	

ANNEX E: EVALUATION CONSULTANT CODE OF CONDUCT AND AGREEMENT FORM

Evaluators:

1. Must present information that is complete and fair in its assessment of strengths and weaknesses so that decisions or actions taken are well founded.
2. Must disclose the full set of evaluation findings along with information on their limitations and have this accessible to all affected by the evaluation with expressed legal rights to receive results.
3. Should protect the anonymity and confidentiality of individual informants. They should provide maximum notice, minimize demands on time, and respect people's right not to engage. Evaluators must respect people's right to provide information in confidence, and must ensure that sensitive information cannot be traced to its source. Evaluators are not expected to evaluate individuals, and must balance an evaluation of management functions with this general principle.
4. Sometimes uncover evidence of wrongdoing while conducting evaluations. Such cases must be reported discreetly to the appropriate investigative body. Evaluators should consult with other relevant oversight entities when there is any doubt about if and how issues should be reported.
5. Should be sensitive to beliefs, manners and customs and act with integrity and honesty in their relations with all stakeholders. In line with the UN Universal Declaration of Human Rights, evaluators must be sensitive to and address issues of discrimination and gender equality. They should avoid offending the dignity and self-respect of those persons with whom they come in contact in the course of the evaluation. Knowing that evaluation might negatively affect the interests of some stakeholders, evaluators should conduct the evaluation and communicate its purpose and results in a way that clearly respects the stakeholders' dignity and self-worth.
6. Are responsible for their performance and their product(s). They are responsible for the clear, accurate and fair written and/or oral presentation of study imitations, findings and recommendations.
7. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.

Evaluation Consultant Agreement Form[1]

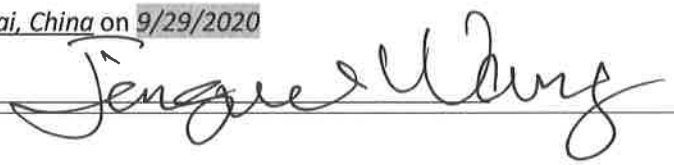
Agreement to abide by the Code of Conduct for Evaluation in the UN System

Name of Consultant: Prof. Wang Jingwei

Name of Consultancy Organization (where relevant): _____

I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.

Signed at *Shanghai, China* on 9/29/2020

Signature: 

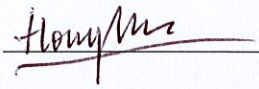
[1] www.unevaluation.org/unegcodeofconduct

ToR Annex G: TE Report Clearance Form

Terminal Evaluation Report for *(PIMS 5044 Reduction of POPs and PTS release by environmentally sound management throughout the life cycle of electrical and electronic equipment and associated wastes in China)* **Reviewed and Cleared By:**

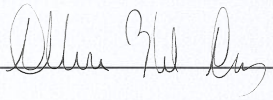
Programme Manager

Name: Hong Yun

Signature:  Date: 19/10/2020

Regional Technical Advisor (Nature, Climate and Energy)

Name: Anderson Alves

Signature:  Date: 19 October 2020