INDEPENDENT EVALUATION DIVISION
OFFICE OF EVALUATION AND INTERNAL OVERSIGHT

Independent Terminal Evaluation

Capacity building for environmentally sound PCBs management and disposal in Mongolia

UNIDO Project No.: 104049
GEF Project ID: 3542

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

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LIST OF ACRONYMS AND ABBREVIATIONS

CEO	Chief Executive Officer
ESM	Environmental Sound Management
GEF	Global Environment Facility
HQ	Head quarters
ICCT	Institute of Chemistry and Chemical Technology
MDG	Millennium Development Goal
MOET	Ministry of Environment and Tourism
MOH	Ministry of Health
MOE	Ministry of Energy
MTU	Mobile Treatment Unit
NCMC	National Chemical Management Council
NGO	Non-governmental Organization
NIP	National Implementation Plan
NPC	National Project Coordinator
NPD	National Project Director
NPTG	National Power Transmission Grid company
PCB	Polychlorinated biphenyls
PET	Project Expert Team
PIR	Project Implementation Review
PIU	Project Implementation Unit
PM	Project Manager
POP	Persistent Organic Pollutant
PRF	Project Results Framework
PSC	Project Steering Committee
SDC	Swiss Agency for Development and Cooperation
SSIA	Specialized State Inspection Agency
TE	Terminal evaluation
TOR	Terms of Reference
UNIDO	United Nations Industrial Development Organization

EXECUTIVE SUMMARY

A. Introduction

The full size project "*Capacity building for environmentally sound PCBs management and disposal*" funded by the Global Environment Facility was implemented from July 2009 to December 2017 by the United Nations Industrial Development Organization. The project was nationally executed by the Ministry of Environment and Tourism in co-operation with the Ministry of Energy, Mongolia.

The objective of the project was to create capacity for environmentally sound management of PCBs for preventing PCBs releases from the electric equipment, avoiding cross-contamination of electric equipment and disposing of 1,000 tons of PCBs wastes. The evaluation covered the whole duration of the project.

B. Evaluation findings and conclusions

The in-depth evaluation was conducted and included a review of project documents and a field visit to Mongolia to interview project personnel, intended beneficiaries, project partners, and other stakeholders involved in the project by using a participatory approach. Based on the information available and the findings of the discussions held, the evaluation made the following conclusions.

Relevance: The project is relevant to Mongolian environmental priorities and policies, and was designed to assist Mongolia in phasing out PCB containing equipment by 2020. It is also relevant to GEF strategic priorities in the POPs focal area.

Efficiency: Due to deficiencies in the M&E implementation, the project was slow to start. By taking corrective actions, following recommendations made by the midterm evaluation, the project implementation unit that was adequately supported and guided by UNIDO was able to get the project on the right track. In the end, despite significant delays, mainly due to a fire accident that completely destroyed the mobile treatment unit, the project has been successful in delivering quality outputs and outcomes. In particular, the cost for treatment in this project (about $2.11 per kg) is more cost effective compared to costs ($3 to $5 per kg) required for destruction by dedicated international commercial facilities.

Effectiveness: All the stated project objectives have been achieved. PCB regulations have been developed and adopted by the government, and are being enforced at borders by the competent authorities to prevent the entry of PCB containing equipment in the country. All PCB contaminated equipment have been identified and inventoried, and except for four PCB containing equipment located in remote regions, the rest have been soundly treated by the project.

Sustainability: Given that no risks that might jeopardize project results have been identified, chances of continuous sustained impact of the project are considered very high. Mongolia will very likely achieve its goal of completely phasing out PCB by 2020.

Project implementation and management: The approach, giving national counterparts responsibility for carrying out activities at country level, helped to develop a strong ownership of the project. In particular, the proactive and dedicated project implementation unit has been very effective in getting the key stakeholders actively involved in the project through awareness raising and information sharing. Some of the deficiencies due to lack of

information for informed management were overcome by adequate adjustments and influence of the project unit.

Country ownership and driven-ness: Ownership is considered very high. The project was hosted at the Ministry of Environment and Tourism within which a National Project Director was nominated. The project implementation unit was located in the office of the project director, which facilitated the planning, coordination and organization of project activities. Active involvement was seen from government officers and key stakeholders in project activities such as project steering committee meetings, inventory, and training and awareness workshops, which contributed to successful completion of activities and delivery of quality outputs.

Financial planning and management: The standard procedures of the executing agency was applied. According to information available, the GEF funds were effectively managed and all the outputs were satisfactorily delivered within planned budgets.

UNIDO supervision and backstopping: The role of UNIDO in the project was crucial for the project to meet its objectives. It has taken timely and critical actions, and provided technical back-stopping by hiring international experts, and introducing PCB treatment technologies to national counterparts. UNIDO's administrative support was highly appreciated by the project unit, and it allowed timely procurement of goods and services for the project.

Monitoring and evaluation: The midterm evaluation found numerous deficiencies in the implementation of the M&E system. For example, annual project Implementation reviews were not undertaken. Following corrective measures and adjustments, project progress was adequately monitored. For instance, the annual project implementation reviews for subsequent financial years were prepared and timely submitted.

	EVALUATION CRITERIA	RATING
A	**Impact**	**HS**
B	**Project design**	**MS**
1	• Overall design	S
2	• Logframe	MU
C	**Project performance**	**S**
1	• Relevance	HS
2	• Effectiveness	HS
3	• Efficiency	S
4	• Sustainability of benefits	L
D	**Cross-cutting performance criteria**	
1	• Gender mainstreaming	S
2	• M&E: ✓ M&E design ✓ M&E implementation	MS

3	• Results-based Management (RBM)	S
E	**Performance of partners**	
1	• UNIDO	HS
2	• National counterparts	S
3	• Donor	S
F	**Overall assessment**	S

Recommendations

To UNIDO:

1 In future projects, adequate baseline, target and SMART indicators should be proposed for expected results (e.g. outputs, outcomes and impact) in the project results framework that would allow for proper monitoring and evaluation during implementation.

2 For those projects that require expensive equipment, it highly recommended that these equipment are properly insured in order to avoid big losses in case of fire accidents or natural disasters such floods or earthquakes.

To Ministry of Environment and Tourism

3 The project has been successful in treating all the identified PCB contaminated equipment in Mongolia except for two pure PCB containing transformers owned by a mining company and two other PCB contaminated transformers (above 50ppm) located in remote regions. These equipment would be treated as soon as it would be possible. It is nevertheless recommended that these equipment be properly labelled, soundly stored and safeguarded until their final decontamination.

4 Currently, the PCB laboratory at Institute of Chemistry and Chemical Technology is not operational as one piece of equipment (gas generator) of the analytical system (chromatography) is out of order. Given the necessity to have the adequate capacity for PCB identification to prevent entry of imported goods containing PCB in the country, the national authorities should ensure that ICCT take the necessary actions to restore this analytical capacity.

5 For controlling imported equipment at borders, Specialized State Inspection Agency inspectors send oil samples of potentially containing equipment to ICCT for analysis, and wait for the results before taking a decision. Rapid results can be obtained using a PCB test kit. Given that the Institute of Chemistry and Chemical Technology has two such test kits under their responsibility, it is recommended that one is handed over to SSIA. The SSIA inspectors should however be trained on its proper operation.

To Ministry of Energy, Ministry of Environment and Tourism and National Power Transmission Grid company

6 During the implementation phase, the treatment costs of PCB contaminated equipment was paid by the project. According to agreements, it is understood that NPTG would continue to decontaminate PCB equipment but against an operating fee. It is recommended to ensure that the fee charged by the National Power Transmission Grid company is reasonable.

C. Lessons learned

Four key lessons emerged from this project:

1. Ensuring that equipment requiring big investments are properly insured would avoid big losses in case of accidental fires or natural disasters such as floods or earthquakes.

2. Delays were encountered as electrical equipment could not be accessed for inventory or treatment during the cold season due to a policy decision of the Ministry of Energy. Proper planning taking into consideration local climate conditions and prevailing policies would avoid delays in project implementation.

3. A strong stakeholder commitment that would contribute to successful project implementation would be secured by different approaches in involving stakeholders in the project implementation such as effective consultative or steering committees, proactive involvement in project activities and effective coordination and information sharing.

4. In projects that contain a component to develop, adopt and enforce legislation, the design should plan for realistic timeframes as policy component often takes time to be materialized.

1. Introduction

1.1 Evaluation objectives and scope

1. This terminal evaluation had two main objectives. The first was to assess project performance based on the criteria of relevance, effectiveness, efficiency, sustainability and impact. And the second was to develop a series of findings, lessons and recommendations for enhancing the design of new and implementation of ongoing projects by UNIDO. The assessment included an analysis of the completion of project activities, delivery of outputs, occurrence of outcomes, and of risk management. The key question of this terminal evaluation was whether the project has achieved or is likely to achieve the main objective of "strengthening national capacity to fulfill obligations under the Stockholm Convention and promote effective implementation of its provisions". This question was addressed by assessing the extent to which the project contributed to the conditions necessary for the sound management and complete the phasing out of PCB equipment and waste.

2. The purpose of this evaluation exercise was also to draw lessons and recommendations for UNIDO and the GEF that could help improve on the identification, design and implementation of future similar projects. This terminal evaluation report also includes examples of good practices for other projects. The evaluation covered the whole duration of the project, from July 2009 to December 2017.

1.2 Evaluation approach and methodologies

3. The terminal evaluation was conducted in accordance with the UNIDO Evaluation Policy[1], the UNIDO Guidelines for the Technical Cooperation Programme and Project Cycle[2], the GEF Guidelines for GEF Agencies in Conducting Terminal Evaluations[3], the GEF Monitoring and Evaluation Policy[4] and the GEF Minimum Fiduciary Standards for GEF Implementing and Executing Agencies[5].

4. A participatory approach that sought to inform and consult with all key stakeholders of the project was used. The evaluation team consisted of Nee Sun Choong Kwet Yive, international consultant, who liaised with the UNIDO Independent Evaluation Division on methodological issues, and Enkhbold Sumiya, national consultant, who assisted in translation during interviews with national stakeholders[6].

5. The evaluation was carried out from October to December 2017. The theory of change will identify causal and transformational pathways from the project outputs to outcomes and longer-term impacts, and drivers as well as barriers to achieve them. This approach was in particular used to assess the extent to which the project contributed to conditions necessary to achieve the overall objective of the project.

[1] UNIDO. (2015). Director General's Bulletin: Evaluation Policy (UNIDO/DGB/(M).98/Rev.1)
[2] UNIDO. (2006). Director-General's Administrative Instruction No. 17/Rev.1: Guidelines for the Technical Cooperation Programme and Project Cycle (DGAI.17/Rev.1, 24 August 2006)
[3] GEF. (2017). Guidelines for GEF Agencies in Conducting Terminal Evaluations for Full-sized projects (Evaluation Office, Evaluation Document, 11 April 2017)
[4] GEF. (2010) The GEF Monitoring and Evaluation Policy (Evaluation Office, November 2010)
[5] GEF. (2011). GEF Minimum Fiduciary Standards: Separation of Implementation and Execution Functions in GEF Partner Agencies (GEF/C.41/06/Rev.01, 3 November 2011, prepared by the Trustee)
[6] Most of the persons interviewed were not fluent in English.

6. The theory of change is described in detail in section 3 of this report. A combination of methods was used to deliver evidence-based qualitative and quantitative information based on various sources: desk studies, individual interviews, focus group meetings, and direct observation. In preparing for interviews and visits in Mongolia, the evaluation team reviewed the documentation of the project provided by the UNIDO Project Manager and the National Project Coordinator (NPC). This included the project document, the midterm evaluation of the project, minutes of Project Steering Committee (PSC) meetings, annual progress reports for the project, Project Implementation Reports (PIRs), as well as technical and other reports from national experts. The full list of documents consulted and persons interviewed during the evaluation are given in the annexes[7]. The planning of the country visit and the persons to be selected for interview were done in close consultation with the NPC. The use of a theory of change approach and other methods allowed the evaluators to assess causality, explain why objectives were achieved or not, and triangulate information.

7. The field visit in Mongolia took place on 13 – 17 November 2017. During this visit, the evaluation team interviewed the key partners and major stakeholders of the project: ministries, national authorities such as the State Specialized Inspection Agency (SSIA), national experts, and electrical utilities. Among the persons interviewed included technicians, workers and decision makers (e.g. State Secretary of the Ministry of Environment & Tourism and the Executive Director of the National Power Transmission Grid Company). Site visits and interviews took place in Ulaanbaatar. The team interacted repeatedly with the National Project Coordinator, who was very helpful in providing information or missing documents and clarifying issues along the way.

1.3 Limitations of the Evaluation

8. No major limitations in terms of access to information was encountered during the country visit. All visits and interviews took place as scheduled except for the interview with the National Project Director (NPD), who was not available due to an unexpected medical treatment during the evaluation mission. She was however interviewed the following week on November 23, 2017 by the national consultant. On November 17, 2017, the evaluation team presented the preliminary findings and conclusions to the stakeholders. During this presentation, the stakeholders commented on the evaluation and gave their feedback. They mostly expressed their satisfaction and high appreciation of the assistance provided by the project to phase out PCBs in Mongolia.

[7] See Annexes 2 and 3.

2. Country and Project context

2.1 Country overview

9. Situated in Northeast Asia between Russia and China, with a population of 2.8 million people and covering nearly 1.6 million square kilometers, Mongolia is the 19th largest country in the world. It is landlocked, dominated by sparsely populated steppes and semi-deserts, and subject to extreme variations in weather, especially harsh winter droughts. Roughly one-third of the population lives in the capital, Ulaanbaatar; nearly 40% of the population is engaged in livestock herding in the country's extensive pasture lands.

10. The economy had traditionally been dominated by herding and livestock production. But the country possesses major reserves of over 80 different minerals, including copper, gold, coal, and crude oil. Driven by significant foreign investment in the mineral sector, Mongolia in recent years has become one of the world's fastest growing economies, reporting 17.5% growth in 2011, and16.7% in the first quarter of 2012 (growth in 2012 is predicted at 15% (Asian Development Bank and Economist Intelligence Unit)). This growth has translated into some benefits for the people of Mongolia - poverty has been on a downward trend over the past decade, decreasing from 39.2 percent in 2010 to 29.8 percent in 2011. Substantial progress has also been made in regard to several Millennium Development Goals (MDGs) at the national level, though significant regional disparities prevail.

2.2 PCBs issues in Mongolia

11. Mongolia ratified the Stockholm Convention on POPs on 30 April 2004 and prepared the National Implementation Plan (NIP) that reviewed particular POPs issues, considered the provisions of relevant international commitments and developed detailed strategies and action plans, including timetables and costing of their implementation. The NIP identified PCBs as one of the top priorities in managing POPs. The NIP also identified the need to conduct a thorough inventory on PCBs for gradual withdrawal and final disposal of the PCBs-containing equipment and wastes. The NIP also highlighted serious weaknesses of the current hazardous waste management practices and the need for institutional and regulatory development, capacity building, and public awareness in POPs management.

12. The institutional framework was initiated during the NIP development. However, there were no regulations specifically addressing PCBs and the management of PCB-containing electric equipment. There are no specific standards and guidelines that would provide a progressive phase-out and elimination of PCBs and PCB-containing electric equipment. The NIP also identified that public participation in management of POPs was lacking.

13. Given the gaps identified, there was therefore need for extensive targeted capacity building, specifically for enhancing the decision making, managerial and technical capabilities of government officials to enable them to assume their leading role in implementing the NIP action plans and be capable in providing guidance to public and private enterprises in environmentally sound PCBs management. It was also identified that there was a lack of qualified human resources for the enforcement of the existing and future regulations, which lead to non-compliance of legislations and improper management of PCBs. Human and technical capacities for PCBs monitoring, especially the proper laboratory

services for PCBs analysis as well as the necessary methodology, national standards and accreditation procedures were also lacking.

14. PCBs have never been produced in Mongolia. The period of the large-scale electrification of the country from 1960 to 1980 coincided with the peak of exporting PCB-containing equipment. According to the PCB inventory of May 2006, approximately 4,637 pieces of transformers, 3,847 circuit breakers, and 83 capacitors existed in the country, a large portion of which was imported from the former Soviet Union before 1980. The NIP concluded that 96-98% of all transformers used in Mongolia might have PCB-containing oils. During the POPs preliminary inventory, over 500 pieces of equipment were analyzed with Test Kit CHLOR-N-OIL, which revealed that 7.5 percent of the PCB-contaminated transformers contained above 50ppm of PCBs. Therefore, it was estimated that 350 transformers were contaminated with PCBs in the whole country, with a total weight of 2,300 tons.

15. Awareness on the harmful effects that PCBs pose on human health and the environment was generally low. Technical staff and workers could potentially have direct contacts with electric equipment and materials containing contaminated fluids without knowing the associated health risks. The significant quantities of PCB-containing electric equipment, which were mostly unattended and that needed to be phased out, replaced and disposed, would have high social costs for the health of population, deterioration of the environment and excessive expenditures for late mitigation measures if these were not undertaken in an environmentally sound manner.

2.3 Project overview

16. The project was designed to support Mongolia's implementation of their NIP and the country's commitments to the Stockholm and Basel Conventions. The overall objective was "to create capacity for environmentally sound management (ESM) of PCBs for preventing PCBs releases from the electric equipment, avoiding cross contamination of electric equipment and disposing of 1,000 tons of PCBs wastes". The total GEF grant was US$ 2,650,000 and the expected co-financing (cash and in-kind) at project approval was US$ 5,558,318, for a total cost of US$ 8,208,318.

2.3.1 Project objectives

17. The immediate objectives of the project were to:

- Strengthen the legal and regulatory framework for environmentally sound management (ESM) and disposal of PCB-containing equipment and oil;
- Improve institutional capacity at all levels of PCBs waste management and disposal;
- Remove PCBs wastes from targeted contaminated sites and transport them to the disposal unit;
- Decontaminate PCB oils in in-service transformers and
- Dispose of wastes in an environmentally sound manner.

18. Two substantive outcomes were developed to achieve the project's objectives:

- **Outcome 1** would result in capacity building for implementing the PCBs related measures of Stockholm Convention. Capacity building would be carried out in regulatory and institutional development, strengthening PCBs monitoring capabilities, enhancing public information, awareness and education, as well as

by introducing socio-economic assessment and comprehensive data management.

- **Outcome 2** would result in environmentally sound management (ESM) of PCB-containing electrical equipment. To achieve this outcome the PCBs inventory would be completed, ESM for PCB-containing equipment in use and PCBs disposal as well as environmental monitoring system (EMS) for PCBs would be introduced and applied.

19. In addition to the above substantive activities, national counterparts were supposed to provide ongoing project management, monitoring, and evaluation under Outcome 3, including establishment of a Project Steering Committee (PSC) composed of national and local stakeholder agencies, establishment and staffing of the project management team at the national and local levels, recruitment of national and international consultants, execution of a management training program for project staff (particularly at the local level), and ongoing monitoring and reporting of project activities.

Project Factsheet

Project Title:	Capacity building for environmentally sound PCBs management and disposal
UNIDO project No. and/or ID:	GF/MON/08/X02
GEF project ID:	3542
Region	Asia and the Pacific
Country(ies):	Mongolia
GEF focal area(s) and operational programme:	POPs focal area for GEF-4
GEF implementing agency(ies):	UNIDO
GEF executing partner(s):	Ministry of Environment & Tourism of Mongolia (MOET)
Cooperating agency:	Ministry of Energy of Mongolia (MOE)
Project CEO endorsement / : Approval date:	23 March 2009
Project implementation start date: (First PAD issuance date) :	July 2009
Original expected implementation end date:	30 June 2013
Revised expected implementation end date (if applicable) :	30 September 2015
Actual implementation end date:	31 December 2017
GEF project grant: (excluding PPG, in USD) :	2,650,000
GEF PPG (if applicable, in USD) :	130,000
UNIDO co-financing (in USD) :	100,000 (in-kind)
Total co-financing at CEO endorsement (in USD) :	5,558,318 (cash + in-kind)
Materialized co-financing at project completion (in USD) :	6,959,861
Total project cost (excluding PPG and agency support cost, in USD; i.e., GEF project grant + total co-financing at CEO endorsement) :	8,208,318
Mid-term review date:	March 2012
Terminal evaluation date:	October – December 2017

2.3.2 Project implementation and execution arrangements

20. UNIDO was the GEF implementing agency for the project. At national level, the project implementation arrangements were designed to involve a number of government offices of Mongolia with the MOET being the lead agency. The project implementation responsibilities were as follows:

- The Ministry of Environment & Tourism (MOET) was the lead agency was responsible to make legal coordination, make amendments and additions to relevant legislation and develop regulations and procedures for POPs related activities; to facilitate cooperation inter-relations between stakeholders and to provide the stakeholders with centralized management; to conduct inventories of production and utilization of POPs chemicals; to set up a database and establish an information sharing network; to provide individuals, agencies and companies with information; to exchange information with international organizations; to organize proliferation activities, trainings, workshops and seminars, and to monitor and assess the implementation of responsibilities and duties of stakeholders and prepare a report and then submit the report to supreme bodies and the Convention Secretariat.
- The Ministry of Energy (MOE) is responsible for assisting in the implementation of the activities and measures for limitation, elimination and monitoring of import and use of PCB containing equipment and reduction of unintentional production of POPs chemicals. It was also in charge of making amendments and additions to relevant laws and regulations, as well as develop rules and procedures in relation to the above activities and measures.
- National Power Transmission Grid (NPTG), a state owned company, which falls under the Ministry of Energy, was selected as the entity responsible for the decontamination of the PCB equipment during the project
- National Chemical Management Council (NCMC) operates at ministerial department level. It is located at the MOET, but reports directly to the Prime Minister's office. NCMC is staffed with four full time professionals and also includes representatives from each of the twenty-one agencies involved with all aspects of chemical management. The secretary of the NCMC was nominated as the National Project Director (NPD) of the project.
- Project Implementation Unit (PIU) consisted of a full time National Project Coordinator (NPC), recruited by the project, and was supported by a Project Expert Team (PET) (see below). The PIU was under the supervision of MOET, and worked closely with MOE, and reported through MOET to UNIDO. The PIU was located at the MOET.
- Project Steering Committee (PSC) consisted of representatives of MOET, MOE, Ministry of Industry and Trade (MIT), NCMC, the PIU, the NPC, the CTA, SSIA, NPTG and UNIDO.
- Project Expert Team (PET) consisted of a policy expert, inventory expert and a database management expert, Institute of Chemistry and Chemical Technology (ICCT) and they provided technical expertise and assisted the PIU for the coordination, execution and organization of project activities.

2.3.3 Position of UNIDO in the project

21. UNIDO was the GEF implementing agency for the project. As the UN's specialized agency for industrial development, UNIDO has a comparative advantage in the industrial sector, including the technologies for PCBs treatment and disposal. It has assisted several countries in the development of their NIPs, and has accumulated knowledge and experience through the implementation of a number of demonstration and capacity building projects

geared to support Stockholm Convention implementation in a wide range of developing countries and countries with economies in transition.

3. Reconstructed theory of change

22. No explicit theory of change (TOC) was developed for this project. However, the project document and the logical framework provided enough information to enable construct a theory of change indicating how the project was expected to contribute to bring about conditions to achieve impact.

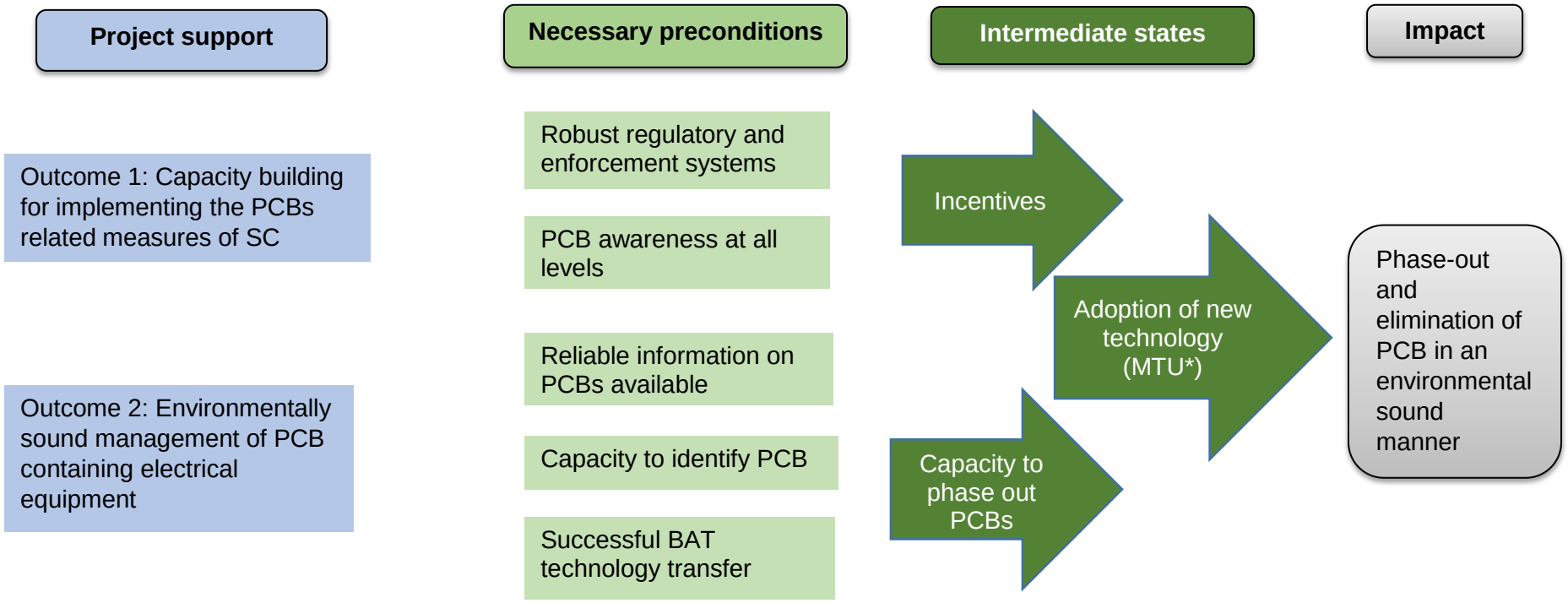
23. The TOC (Figure 1) developed by the evaluation proposes that in order to bring about behavioral changes for effective impact of the project in Mongolia, it is critical that a set of necessary preconditions are achieved, which include: putting in place a robust regulatory and enforcement system, developing awareness on the risk of PCBs and ways to manage these risks, and making available reliable information on PCBs to all stakeholders including decision makers and owners of equipment likely to contain PCB, laboratory capacity to identify PCB and capacity to treat PCB contaminated equipment by adapting, demonstrating and successful technology transfer. The TOC proposes that in order to eliminate PCBs in Mongolia by 2020, it is critical to achieve a technological transformation and other related behavioral changes. Incentives for change would be achieved by putting in place a robust regulatory and enforcement system, by developing awareness on the risk of PCBs and ways to manage these risks, and by making available reliable information on the location and extent of PCBs to decision makers, technicians, workers and the public. Capacities to bring about change would be accomplished by adapting and demonstrating technologies and approaches to eliminate and manage PCBs in the Mongolian context, and by having reliable information on PCBs and capacity to identify PCBs.

24. The project has assisted Mongolia to put in place these preconditions. However for effective impact, these preconditions are not sufficient and it is necessary that a number of intermediate states, identified by the evaluation, need to occur. These are: authorities effectively undertaking inspection and enforcing PCB regulations; benefitting from the incentive programme put in place by the project utilities and private owners are phasing out PCB containing equipment; and PCB equipment are being treated by the fully operational treatment unit acquired by the project. According to information available, inspecting equipment for PCBs and enforcing PCB regulations are already included in the routine duties of SSIA inspectors. The incentive is that the project would bear all the cost for the treatment of the 1,000 tons of PCB contaminated equipment. In addition, the mobile treatment unit not only decontaminate the transformer oil by dechlorination, it also regenerates the fluid that can be re-used for several more years. It would be much more cost effective to have the oil treated than to replace it. Indeed, according to an estimation made by NPTG, treating the oil would be US$ 0.5 per litre compared to US$ 2.5 per litre for replacement.

25. Several important assumptions were made during project development. One of the main ones was that the key stakeholders were willing to participate, cooperate and share information, which was vital to obtain accurate and reliable information on PCBs in Mongolia. This assumption proved to be correct as the key stakeholders participated actively and shared information. The key driver to achieve success was the high ownership and commitment of Mongolia to fulfill its obligations. With increased awareness and political willingness, the legal framework would be strengthened to establish compulsory standards and norms for the management and phase-out of PCBs. This also proved to be correct as

the corresponding laws and regulations for sound management of PCBs have been developed and approved by the parliament in 2012.

Figure 1: Theory of Change



Driver: High ownership and Mongolia committed to fulfill its obligations with regard to the Stockholm Convention

Assumption: Keys stakeholders willing to participate, cooperate and share information

*MTU: Mobile Treatment Unit[8]

[8] The technology adopted in Mongolia was a mobile treatment unit running on a low temperature dechlorination process for PCB decontamination

4. Project assessment

4.1 Project identification and formulation

26. Project identification, formulation and design required the assessment of the adequacy of the project preparation processes and the overall readiness for implementation. The project was formulated to address PCBs-related priorities identified in the NIP, which was developed during the POPs enabling activities in 2004 - 2006. These included: (i) Institutional and regulatory strengthening measures for the management of PCBs, (ii) stop use of PCBs-containing equipment and complete de-contamination of polluted equipment by 2020 (iii) environmentally sound storage of PCBs-containing equipment until their final elimination (iv) and complete elimination of PCBs containing wastes through environmentally sound method by the end of 2020. The project was designed based on gaps identified and inventories carried out during the NIP development in 2006. However, it was not clear on what basis the target of treatment of 1 000 tons contaminated equipment within the electrical sector was established.

27. As highlighted by the midterm evaluation, the Project was identified and prepared in close collaboration with national stakeholders. In particular, it was built on the cooperation previously established within the POPs enabling activities supported by GEF (also implemented by UNIDO). National stakeholders contributed in particular to the identification of barriers. The project document was adopted by the Mongolian Government and national project team, and the ministry representatives confirmed their participation in design and preparation of project.

4.2 Project design

28. The project components and interventions included in the project were adequate and relevant to the achievement of project objectives. The outcomes were also sufficiently clear to help guide project implementation. The midterm evaluation highlighted that component 2, which relates to the management and disposal of PCB contaminated material, was very well explained throughout the project document and adequately transposed into output and activities. Yet the same level of focus was not seen for component 1 that relates to capacity building, strengthening of the legislation framework and awareness raising, which are essential for project success and effectiveness and especially for long-term sustainability.

29. The midterm evaluation also pointed out that while some activities were adequately described others were defined too broadly. For example, the scope of the activity 1.1.4 “Develop and implement regulations for PCB content in imported equipment and products” and that of activity 1.2.1 “Develop system and capacity to determine PCB content in imported equipment and products (Activity 1.2.1), were not well-defined and it is hard to quantify their successes.

30. The Logical framework approach was used for the design of activities and measures to implement the project, based on the PIF outline. As reported by the midterm evaluation, the logical framework developed for this project was rather poor in delivering an operational framework for managers and evaluators to carry out proper monitoring and evaluation. This was

mainly due to lack for baseline, target and well defined SMART indicators. One of the recommendation of the midterm evaluation was to review and propose adequate target values and SMART indicators for those activities that remained to be executed. However, this revision was not undertaken.

4.3 Changes in the project during implementation

31. Except for the two no-cost extensions that were granted to allow for completion of project activities due to significant delays (discussed under the section Efficiency), no major changes occurred during project implementation.

4.4 Implementation performance

4.4.1 Relevance and ownership

4.4.1.1 Relevance

32. The project was highly relevant as Mongolia is a signatory party to the Stockholm Convention and is committed to fulfil its obligation to soundly manage POPs. In particular, this project was designed to assist Mongolia to phase out PCB containing equipment by 2020, which was one of the priorities identified in the NIP. Moreover, the project objectives are in line with national priorities to protect the environment such as Concept for National Safety (1994, Parliamentary resolution No. 56), which promotes activities increasing ecological safety; Sustainable Development Plan for the 21st Century, which was enacted in 1998; and the Millennium Development Goals enacted by the Parliament in April 2005. All the stakeholders, including government officers, electricity sector representatives, and national experts found the project highly relevant for solving the PCB issues in Mongolia and highlighted the importance of the project to assist Mongolia to become PCB free by 2020.

33. The project is also highly relevant to GEF. It is consistent with POPs – Sub-Programme1 (SP1) and POPs-SP2. The project is directly relevant to Articles 6 and 10 of the Stockholm Convention as it was aiming to eliminate releases from stockpiles and wastes of PCBs, as well as public information, awareness raising and education. The project was also highly relevant to UNIDO's commitment to help countries address problems of toxic waste and meet their commitments to international environmental convention regarding management of POPs.

4.4.1.2 Country ownership and stakeholder participation

34. Ownership by the national stakeholders is very high. The project was hosted at the MOET within which a NPD was nominated. The PIU was located in the office of the NPD, which facilitated the planning, coordination and organization of project activities. Active involvement was seen of government officers and key stakeholders (e.g. from ministries, SSIA, NPTG, electrical sector, and ICCT) in project activities such as PSC meetings, inventory, and training and awareness workshops and contributed to successful completion of activities and delivery of outputs. For instance, the PCB Regulation was approved by a joint Order of the Minister of Environment and Minister of Health on 11 January 2012, and the corresponding piece of

legislation was amended and approved by the Mongolian Parliament in October 2012. Since then, the SSIA, the authority responsible for control and inspection, together with customs officers have been enforcing those regulations. The State Secretary of the MOET that the evaluation met re-affirmed the commitment of the Mongolian Government to fulfil its obligation with regards to the Stockholm Convention and stated that Mongolia would be PCB free by 2020.

4.4.2 Effectiveness

35. Effectiveness is rated as Highly Satisfactory. Assessment of effectiveness is based on: i) the extent to which the outputs have been delivered and the outcomes accomplished, and ii) the extent to which outcomes have contributed to the conditions likely to lead to the desired long-term changes.

4.4.2.1 Accomplishment of project outputs and outcomes

36. The Project included 56 activities that were designed to deliver 12 outputs and to contribute to 3 outcomes. Annex 4 provides a tabulated summary of assessment and ratings for the activities and outputs of the project. 10 of the outputs referred to 2 components that contributed to substantive project outcomes: (i) 6 outputs pertained to capacity building for implementing the PCB related measures of the Stockholm Convention and (ii) 4 outputs were to support the environmentally sound management of PCB-containing electrical equipment. The remaining 2 outputs were related to project management and monitoring and evaluation activities. The summary of ratings for the project is reported in Table 1.

Table 1: Ratings of outputs for the project

	HS*	S*	MS*	MU*	U*	HU*	Total
Outcome 1	2	3	1				6
Outcome 2	2	1	1				4
Outcome 3		2					2
Total	4	6	2				12

*HS: highly satisfactory; S: satisfactory; MS: moderately satisfactory; U: unsatisfactory; HU: highly unsatisfactory

37. Overall, the project performed very well. For outcome 1, the biggest achievement was the approval of the new regulation on PCB's environmentally sound management and that of the amended law on PCB in October 2012, and their effective enforcement by the SSIA officers. The project also helped to strengthen laboratory capacity for PCB monitoring. These were the two key outputs that were highly rated. The project also helped to raise public awareness at all levels. In particular, a Policy workshop was undertaken on 12 February 2011, to raise awareness of the Cabinet Secretariat of the Government of Mongolia. According to feedback gathered, this workshop greatly contributed to increase the visibility of the project and gain the full support of the policy makers.

38. For outcome 2, the major achievements were the completion of PCB inventory and the successful best available technology (BAT) transfer for the treatment of PCB contaminated

electrical equipment. The inventory that covered all the 21 provinces of Mongolia was completed thanks to the close collaboration of the key stakeholders: the National Power Transmission Grid Company and the Electricity Network Distribution Company that own more than 85% of the electrical equipment. The rest are owned by the National Power Plants and mining companies, which are state owned. While the inventory was designed to be completed in the first year of implementation, it actually required four years for its completion. The main reason was that according to an existing regulation of the Ministry of Energy, no maintenance or other activities are allowed on the electricity network during the cold season (October to March). The inventory exercise was thus interrupted during that period as it was not possible to access the electrical equipment for PCB identification (for oil sampling and analysis).

39. After an international bidding exercise, the Sea Marconi company from Italy was selected to provide the PCB mobile treatment unit (MTU) for a total cost of US$ 1.17 million that included the cost for the patent for the technology, the mobile treatment unit, the training of the staff that would operate the MTU, and the chemicals required for the treatment of 1,000 tons of PCB contaminated equipment. The technology purchased is suitable for the treatment of low level PCB contaminated equipment, and not for pure PCBs or oil containing more than 3000 ppm of PCB (0.03% by weight). The MTU was delivered in December 2012 and was operated by 3 staff of the NPTG, who were adequately trained for 3 months in Italy, at Sea Marconi, the technology provider. In November 2014, while treating a 40-tonne transformer at the Power Plant No 3 in Ulaanbaatar, the MTU was completely destroyed by an accidental fire. By that time, 733 tons of PCB contaminated electrical equipment had already been treated. An expert inquiry undertaken by Sea Marconi revealed that the fire occurred due to the connection of two external pieces of equipment (a centrifuge and a heater) to the MTU. The NPTG was recognized as responsible for the destruction of the MTU. At a high level tripartite meeting attended by the Minister of Environment and Tourism, the Minister of Energy, the executive director of NPTG, UNIDO and Sea Marconi in December 2014 in Ulaanbaatar, three days after the fire accident, in order to move forward it was mutually agreed that no party would be blamed or held accountable for the accident. It was unanimously agreed to purchase of a new mobile treatment unit. Subsequently at another tripartite meeting in June 2015, in Vienna, Sea Marconi agreed to provide the project with a new treatment unit at a reduced cost of US$ 270,000 (NPTG: US$ 120,000, project: 150,000). It took time for Sea Marconi to construct a second unit, which was delivered in February 2017. From March 2017 to November 2017, the NPTG succeeded in treating a further 269 tons of PCB contaminated equipment to reach a total of 1,002 tons. According to information available, the current status in Mongolia regarding PCB is the following: (i) two transformers containing pure PCB belonging to a state owned mining company, (ii) 2 PCB contaminated transformers (slightly above 50 ppm) belonging to NPTG but located at a remote region and (iii) all other transformers in Mongolia are considered either PCB free or contain PCBs at a level less than 50ppm but greater than 20ppm (iv) all other electrical equipment and devices (circuit breakers, etc.) are PCB free. The NCMC has already officially informed the owners of the four PCB containing equipment to properly label and safeguard these contaminated equipment. For the pure PCB transformers, decision will be taken by the authorities on their sound management while for the two PCB contaminated transformers decision has already been made to treat them in 2018 after the cold period (October – March)[9].

[9] See paragraph 38, according to a regulation of the Ministry of Energy no maintenance or other work can be made on the electricity network during the period October – March.

Many of the stakeholders met during the field mission are claiming that Mongolia is already PCB free, and they greatly recognized the invaluable contribution of the project.

40. The outputs for the third outcome, which related to project management and M&E, were satisfactorily delivered and are discussed later in the report (section 4.4.9)

4.4.2.2 Project contribution to the conditions that lead to the elimination of PCBs in Mongolia

41. The framework presented in the project theory of change (TOC) was used to assess the project's contributions to the conditions leading to the desired behavioral changes and technological transfer that in the long term are likely to result in Mongolia becoming PCB free by 2020 as stated in its NIP. The project has made important contributions to all the five necessary preconditions identified by the TOC.

42. **Robust regulatory and enforcement systems**. Prior to the project, there were laws existing to regulate the export, import, cross-border transport, production, storage, trade, transport, use, destruction and control of toxic and hazardous chemicals. Although PCBs were added to the list of banned chemicals, only a few regulations made direct reference to PCBs and most aspects of the PCBs life cycle management were not regulated. Similarly, enforcing agencies paid little or made no attention to PCBs and had no capacity for PCBs monitoring. The project provided adequate support and helped facilitate the development of regulations that cover all aspects of PCB life cycle sound management. The proposed regulations assign roles and responsibilities for PCB management, oversight, reporting and enforcement to public administration agencies, PCB owners and other stakeholders. These regulations, which were developed in close consultation with key stakeholders, were approved by a Joint Decree of the Minister of Environment and Tourism and the Minister of Health (A-17/16) on 11 January 2012. The project has also contributed to build the capacity of custom officers and inspectors and SSIA officers on the implementation of the PCB regulations through 6 national and regional workshops undertaken in 2012 and 2013. These officers are effectively enforcing the PCB regulations, which have been mainstreamed in their routine duties. At the entry borders, SSIA has an inspection check list for imported goods. A list of equipment likely to contain PCB (with HS code in the list) was prepared by the SSIA, approved by the deputy Prime Minister, and added to this check list. Since then, at all entry borders, the SSIA inspectors together with customs systematically check all imported equipment for PCBs. In most cases, checking the documents of the equipment is sufficient. In case the documents do not specify that the equipment is PCB free[10] then a sample is taken and sent for analysis at the ICCT laboratory. While awaiting for the results of the analyses, the equipment is kept under the custody of the customs. Depending on the outcome of the analyses, either the equipment is allowed to enter the country (if level less than 2ppm) or it is re-exported to the country of origin (if PCB level is greater than 2ppm). Such a case happened in 2014, whereby two imported transformers were found to contain 4ppm of PCB. For this particular case, the transformers were not re-exported, they were treated by the MTU of the project, and then they were restituted to the owners.

[10] Or PCB level is less than 2ppm as per the PCB regulations

43. **PCB awareness at all levels**. Although a series of training programs on the general concept of the Stockholm Convention, POPs risk to human health and environment and preliminary inventory of the POPs chemicals was undertaken in the framework of NIP Enabling Activities Project in 2004, specific knowledge on PCBs, associated risks on exposure to these chemicals and the need for their sound management was generally low among major stakeholders. For those who have heard about PCBs, they did not fully understand their risks and ways to manage such risks. This gap was adequately addressed by the project through numerous awareness and training workshops targeting policy makers, government officers, workers and engineers of electrical utilities. For example, the Policy workshop that was undertaken on 12 February 2011, targeting the Cabinet Secretariat of the Government of Mongolia, greatly contributed to gain the full support of policy makers.

44. **Reliable information on PCBs available**. It is vital to have reliable information on the extent and location of PCBs containing equipment to enable the planning of their phasing out and elimination. The preliminary PCB inventory done in 2006 in the context of NIP enabling activities provided an estimation of PCB contaminated equipment in Mongolia. However, it was not until the complete inventory carried out within the project that more reliable information was obtained. The inventory that was done based on field testing and laboratory analyses revealed that much less PCB existed in Mongolia than originally estimated. These reliable information on the extent and location of PCBs-contaminated equipment obtained through output 2.1 were managed by a database management system developed by the project, and uploaded on a webpage (https://pcb.gps.mn) that facilitated tracking and monitoring of PCB phasing out and elimination. This webpage was regularly updated until November 2014, when project implementation was interrupted due to the fire accident. The fee for the webpage was no longer paid, thus the webpage was no longer active. However, since March 2017 when implementation restarted, NPTG, the MTU operator, regularly updates the PCB database[11].

45. **Capacity to identify PCB**. Prior to the project, while some laboratories in Mongolia were equipped with adequate equipment and could carry out analyses on environmental samples and imported products, they did not however have the expertise and capacity for PCB analysis. The project contributed to build national capacity for PCB analysis. It invested US$250,000 to fully equip the ICCT laboratory with state of the art analytical equipment, and three laboratory personnel of ICCT went for training on PCB analysis in Italy and Russia. The laboratory was fully operational since 2012 using recognized internationally accepted procedures (IEC 61619). National standards for PCB analyses in insulating fluid and soil: MNS CEI EN 61619:2012 and MNS ISO 10382: 2012 were subsequently developed and approved by the Mongolian Agency for Standardization and Metrology. Between 2012 and 2014, the ICCT laboratory analyzed around 600 samples, 400 for the project and 200 for private companies and customs. Currently, the PCB laboratory at ICCT is not operational as one piece of equipment (gas generator) of the analytical system is out of order. ICCT is working on the issue to find a solution. If the piece of equipment cannot be repaired, a new one will be purchased.

46. **Successful BAT technology transfer**. Before the project, no facilities existed in Mongolia either for the sound disposal or storage of PCB contaminated equipment and associated wastes. As Mongolia is a land locked country (in the north by Russia and in the

[11] The PCB database is an Excel file

South by China) with no access to the sea, exportation of PCBs for destruction was not a feasible option. The possible options were either the in-country decontamination or in-country destruction of the PCB equipment and wastes. The national counterparts opted for the decontamination technology as it offered the attractive possibility of reducing costs to the end-user by allowing re-use of the resulting treated oil, and it would also significantly reduce the amount of PCB waste which must be disposed of. The project introduced different decontamination technologies through study tours and demonstrations by different service providers. In the end, the national counterparts opted for the technology proposed by the Sea Marconi company in Turin, Italy, which had the following advantages: it has a PCB decontamination capacity down to 2ppm; the technology operates on a low temperature dechlorination process with patented reagents; it can regenerate used oils to very acceptable standard and that can be re-used; it is suitable for Mongolian condition (mobile and easy to handle); decontamination is done in closed circuit with no cross-contamination risk and generation of PCB free wastes; and it is a safe technology with no leakage or explosion risks. While the project invested US$1.17 M for purchase of the MTU and the training of operators (see section 4.4.2.1), the national counterparts provided funding for the construction of a building to host the MTU and also for the construction of a storage transformer facility. The technology was successfully transferred to Mongolia, and by the end of the project 1,002 tons of PCB contaminated equipment was soundly treated.

4.4.3 Impact

47. Impact is assessed based on the extent to which the project has brought about changes in the human condition or in the environment. Changes, whether intended or unintended, can be positive or negative. For this project the evaluation did not find any evidence of negative impacts on human health or on the environment. The overall objective was to create capacity for environmentally sound management of PCBs for preventing PCBs releases from the electric equipment, avoiding cross-contamination of electric equipment and disposing of 1,000 tons of PCBs wastes. The positive impact for the project meant to reduce the risks of PCBs releases to the environment to prevent the subsequent negative effects on humans and on the environment. In terms of this indicator of impact, the project contributed to the successful treatment of 1,002 tons of PCB. The following paragraphs describe the occurrence of intermediate states mentioned in the TOC for impact.

48. **Actual enforcement**. As already described earlier (4.4.2.2, paragraph 42) there are strong evidences that enforcement of PCB regulations at borders have started since early 2014. Currently all imports and exports must be physically examined as part of the customs clearance process in Mongolia. Following recent policy change at the Mongolian Customs and General Administration, all inspections at the borders fall under the responsibility of State Specialized Inspection Agency (SSIA). Physically, it is impossible to check all imported goods in Mongolia, the SSIA however pointed out that they pay special attention to the importation of chemicals, hazardous chemicals and products and equipment likely to contain hazardous chemicals. And as mentioned earlier, PCB has been added in the checking list. In Mongolia, there are 26 entry border points across the country, and SSIA inspectors from all these entry border points have participated in the training workshops on PCB regulations and enforcement. Currently, checking for PCBs is effectively being done at all the 26 entry border points. For the detection of PCBs, the SSIA greatly relies on the ICCT laboratory. However since 2016, the laboratory is not

functional due to a technical failure (4.4.2.2, paragraph 45). It is therefore recommended to assist ICCT in finding a solution for this technical failure and ensure that the laboratory is fully operational earliest possible to restore the analytical capacity for PCBs.

49. **PCB owners phasing out PCBs**. The inventory that covered the 21 provinces of Mongolia revealed the existence of two transformers containing pure PCB and 1920 tons of electrical equipment contaminated with PCB: 763 tons over 50 ppm and 1257 tons in the range 20-50 ppm. According to the Stockholm Convention, an equipment is considered PCB contaminated if it contains more than 50 ppm (0.005% by weight) PCB. By the project end, 1002 tons of PCB contaminated equipment have been treated by the MTU. These include, all[12] the PCB contaminated equipment[13] and part of the electrical equipment containing between 20ppm and 50ppm PCB[14]. As mentioned earlier (4.4.2.1, paragraph 39), just before the fire accident that destroyed the MTU in November 2014, 733 tons of equipment had already been treated. These facts clearly indicate that PCB owners were phasing out their PCB containing equipment as early as 2013, which was confirmed by MTU operator. The approval of the PCB regulations in 2012 was mostly likely the driving force for this active phasing out of PCBs. According to information available, all the PCB owners were informed about the new PCB regulations, in particular their responsibility as owners on the need for sound disposal. The project paying for the treatment costs (up to 1,000 tons of equipment) and the possibility of re-using the treated oil were also determining incentives in the phasing out of PCBs.

50. **MTU operational and treating PCB**. In Mongolia, the NPTG[15] buys electricity from the power plants and sells it to the distribution companies, which are all state owned. More than 85% of electrical equipment belong to these state owned companies. Choosing one of these companies to be the operating entity of the MTU was obvious, and therefore NPTG was selected. A project unit was established within NPTG consisting of three full time staff, one engineer and two workers. Prior to the delivery of the MTU, these three staff followed intensive training on the operation of the treatment unit for three months at the Sea Marconi Company in Turin, Italy. According to agreed modalities, the three staff of the project unit were partly paid by the project and by NPTG. As operating entity, NPTG was responsible for the operation and maintenance of the MTU, the day to day planning and management of the treatment facility, and for updating the management database. The evaluation found that the commitment showed by the NPTG was a key factor for the successful transfer of technology and achievement of the target value of 1,000 tons of equipment treated.

4.4.4 Likelihood of sustainability

51. Sustainability is understood as the likelihood of continued benefits after the project ends. Sustainability is assessed in terms of the risks confronting the project, the higher the risks the lower the likelihood of sustenance of project benefits. The four dimensions or aspects of risks to sustainability as mentioned in the TOR namely sociopolitical, financial, environmental, and institutional frameworks and governance risks are discussed below.

[12] It does not include the two pure PCB transformers and two transformers containing more than 50ppm PCB but located in remote regions of Mongolia
[13] According to the definition of the Stockholm Convention
[14] Not PCB contaminated according to the Stockholm Convention
[15] The only transmission company in Mongolia

4.4.4.1 Sociopolitical risks

52. Sociopolitical risks are considered low for the following reasons. Mongolia has signed the Stockholm Convention on 17 May 2002 and ratified it on 30 April 2004. It transmitted its National Implementation Plan on POPs to the Secretariat on 8 January 2008. The updated NIP with inclusion of new POPs was approved by the Government of Mongolia on 18 October 2014 through resolution No 341 and transmitted to the Secretariat. Moreover, the project has helped raise awareness of PCBs risks and their management targeting key stakeholders, which contributed to gain their confidence and active participation in the project. As a result project stakeholders, including government officials, laboratory technicians, customs and SSIA inspectors, electricity companies, and citizens in affected areas, have developed a strong sense of ownership of the project's interventions.

4.4.4.2 Financial risks

53. Financial risks are rated low. The national counterparts have already contributed significant resources (see section 4.4.5, paragraph 58), and the project has been successful in treating all the PCB equipment above 50ppm except for four PCB contaminated transformers (see footnote 12). Limited additional financial resources would be required for the sustainability of project results/outcomes. The NPTG representatives that met the evaluation team, have already informed that NPTG would invest to increase the storage area and to train new staff on the operation of the MTU.

4.4.4.3 Institutional framework and governance risks

54. The risks associated to institutional framework and governance are rated low. The current government has demonstrated a strong ownership of the project. While it is not possible to foresee the priorities of future governments, Mongolia will remain bound to its obligations to conform to the Stockholm Convention. There is no particular reason to expect that future governments will not fulfill these obligations. Furthermore, as mentioned earlier, PCB regulations have been adopted in 2012 (paragraph 42) and enforced by SSIA officers at entry borders in Mongolia (paragraph 48). To complement training workshops on PCBs carried out by the project, the SSIA has carried out an internal training workshop to strengthen the capacity of its inspection officers. The SSIA has also included goods and equipment likely to contain PCBs in the list to be controlled at the borders.

4.4.4.4 Environmental risks

55. The project is considered to be ecologically sound and sustainable as it was designed to build national capacity for the sound management and disposal of PCB containing equipment. The hazardous wastes generated during the treatment of the contaminated equipment are non-PCB containing and are soundly stored at the premises of NPTG. Moreover, as no environmental risk that can influence or jeopardize the project outcomes and future flow of project benefits has been identified, environmental risks are rated low.

4.4.5 Efficiency

56. The project efficiency is considered satisfactory. The project was originally planned for four years, but lasted eight years and five months, from July 2009 to December 2017. The project was slow to start due to deficiencies in the M&E system as highlighted by the midterm evaluation (section 4.4.7.2, paragraph 64). Many of the outputs, although successfully achieved, were delivered with significant delays. For example, the PCB regulations which were adopted in October 2012, were due in April 2011 according to the timeline of activities given in the project document. A significant delay of two years and 4 months (November 2014 to March 2017) occurred due to the interruption of project implementation because the mobile treatment unit was completely destroyed by an accidental fire in November 2014 (section 4.4.2.1, paragraph 39). Delays were also due to the fact that during the cold season (October to March) the project could not access the electrical equipment for inventory or for treatment (Section 4.4.2.1, paragraph 38).

57. Despite the delays, the project management costs were kept within the planned budget. For instance, when the fire accident destroyed completely the MTU, the implementation was stopped and the contract of the project team was not renewed and all activities were interrupted. UNIDO worked out an efficient solution to retain the project team by ensuring that the NPC was in the meantime recruited to manage another GEF-funded and UNIDO-implemented project on mercury management. When the PCB project restarted in March 2017, the NPC was hired again to manage the project until its closure in December 2017. During the interruption of the project, although recruited by the mercury project, the NPC was overseeing the project whenever required, and attended the high level meetings to decide on the purchase of a new mobile treatment unit (see section 4.4.2.1, paragraph 39).

58. The materialization of co-funds (cash and in-kind) from the Ministry of Energy/NPTG ($6,731,993), the Ministry of Environment & Tourism ($158,867) and the Ulaanbaatar Electricity Distribution Network Stock Company ($38,890) for a total amount of $6,929,750 (of which $6,859,860 in cash) contributed to effective delivery of outputs. However due to confusion between Sea Marconi, the technology provider, and NPTG, the mobile unit operator, the MTU was not insured, and an additional amount of $270,000 (NPTG: $120,000 and project: $150,000) had to be re-invested for the purchase of a new mobile treatment unit, thus reducing efficiency. The evaluation considers that UNIDO should have ensured that the MTU was properly insured given the cost of the mobile treatment unit ($1.17 million).

59. The cost for destruction of PCB contaminated equipment at dedicated destruction facilities is generally in the range of $3,000 to $5,000 per tonne of contaminated equipment. These costs would include the cost for packing, local transport, shipment and destruction at a dedicated hazardous treatment facility (generally located in developed countries in Europe, North America or Asia). For this project, of the total co-finance provided by national counterparts, $942,240[16] was directly related to the treatment of the PCB contaminated equipment. If the project costs are included ($1.17 M) a total amount of $2,112,240 has been disbursed for the treatment of 1,002 tons of PCB contaminated equipment: meaning a cost of $2,108 per tonne of equipment treated. These figures suggest that the project has been quite

[16] The remaining cash co-finance ($5,917,620) was for replacement of oil containing breakers with gas breakers.

cost effective compared to costs proposed by dedicated destruction facilities. As the MTU can treat more PCB contaminated equipment, this would further reduce this treatment cost per ton, and cost effectiveness of the project would be even higher. For these reasons, despite losses incurred due to the fire accident, project efficiency is rated satisfactory.

4.4.6 Project management and co-financing

4.4.6.1 Project management.

60. Project management is rated highly satisfactory. The project implementation unit (PIU) was established and hosted at the MOET. The PIU was constituted by the NPC and three national experts (legal, data management and inventory). Besides planning and coordination of activities, the unit was also in charge of a large portion of the technical work, such as carrying out the PCBs inventory, drafting legislation, and preparing information material and publications, as well as carrying out trainings and awareness raising activities as key speakers and resource persons. Even though it is somewhat unusual to have such a wide range of responsibilities for a project team, the project was executed efficiently and some of the deficiencies due to lack of information for informed management were overcome by adequate adjustments and influence of the team. In particular, eight of the nine recommendations made by the midterm evaluation were taken into consideration and adequate corrective actions have been taken to address them. For example, one of the recommendation was to ensure that the PCBs database is more widely available, the project team responded by creating a webpage (https://pcb.gps.mn) accessible to the general public, and in particular to PCB owners and utilities. All the stakeholders unanimously recognized the dedication and the excellent work of the project team, which greatly contributed to the success of the project. Conforming to agreed modalities, the financial management of the project was done by UNIDO (all payments were carried out through UNIDO HQ, or through the UNDP office in Mongolia), which did not hamper with project implementation. All resources required, payments and disbursements were provided in a timely manner.

4.4.6.2 Co-financing

61. As reported earlier (section 4.4.5, paragraph 58), the total co-finance from national counterparts that materialized was $6,929,750 exceeding the total amount at design (US$ 5,558,318) by about $ 1.4 M. The Ministry of Energy/NPTG contributed for $6,731,993, most of the amount was for replacement of oil containing breakers with gas breakers ($5,917,618). The rest was for the construction of a building for the storage and hosting the MTU: $447,000, and for training costs, office space, operating costs, staff time etc: $367,375. The contribution of Ministry of Environment and Tourism ($158,867) was mainly for the renovation of the PCB treatment facility building, office space and consumables, local transport and other local costs. Co-finance by the Ulaanbaatar Electricity Distribution Network Stock Company ($40,000) was for the training of seven of its officers on PCBs management provided by Sea Marconi.

4.4.7 Assessment of monitoring and evaluation systems

4.4.7.1 M&E Design

62. **Baseline.** The project document provided baseline information on the institutional and regulatory setting at the time of design, and also identified the main barriers to the sound management of PCBs in Mongolia. These included legal, institutional, technical knowledge, laboratory capacity for identification and monitoring, and awareness barriers. The baseline information on the extent and location of PCB contaminated equipment and sites was based on the preliminary inventory done in the context of the NIP on POPs (2008). These baseline information was sufficient to provide an overall picture of the conditions in Mongolia at the start of the project. However, the midterm evaluation observed some weaknesses on the information provided in the project document. Nevertheless, the project succeeded in gradually generating more reliable information and allowed for the identification and sound treatment of all PCB contaminated equipment in the country.

63. **Monitoring and Evaluation Plan**. The project document provided a detailed M&E plan whose main purpose was to facilitate tracking of implementation progress to outcomes and to facilitate learning, feedback and knowledge sharing and lessons among the main stakeholders. The project logical framework (Annex 1) given in the project document did identify indicators, sources of verification and risks and assumptions for project activities and outputs and outcomes. However as indicated by the midterm evaluation, many of the objectively verifiable indicators associated with activities were not sufficiently specific, or measurable, to allow for proper monitoring or evaluation of progress towards meeting project objectives. They were not SMART indicators. The plan also defined key monitoring responsibilities and activities with UNIDO and the project implementation unit having key roles in the coordination of M&E activities. Key events included the inception workshop, annual tripartite project reviews between UNIDO, the project, and the government, and the external midterm and terminal evaluations. The inception workshop was of particular importance, as it provided an opportunity to all key partners and stakeholders to understand their roles in the project. The plan also called for annual reports as well as an annual work plan to help track progress.

4.4.7.2 M&E Plan implementation (use of adaptive management)

64. The midterm evaluation found numerous deficiencies in the implementation of the M&E system, which was partly the result of shortcomings identified during the design stage. The midterm evaluation also stated that the monitoring system could have been refined at the Inception Workshop, and throughout the first year of implementation and there was no evidence that this was done, and which was probably the reasons for a slow start of the project. In order to implement corrective actions and also to improve the conditions for the final evaluation, the midterm term evaluation recommended the revision of all logical framework indicators in order to apply SMART criteria. This was however not done. Nevertheless, annual progress reports, which provided details of the year-on-year achievements of the project, were timely submitted.

65. The midterm evaluation (2012) also reported that Annual Project Implementation Reviews (PIRs) were not undertaken. Corrective measures were taken and the PIRs for the

subsequent financial years 2013, 2014, 2015, 2016 and 2017 were submitted, noting that implementation was interrupted between November 2014 and March 2017. The midterm evaluation also highlighted that Tripartite Reviews were not conducted. The UNIDO project manager informed that these tripartite reviews were replaced by project steering committee (PSC) meetings. The project steering committee and its membership was established by a decree of the Ministry of Environment and Tourism on 6 July 2010. Meetings were regularly held to review project progress and to make recommendations for future activities. The UNIDO PM, who was based at the UNIDO Beijing Office, attended all the PSC meetings and provided adequate guidance. For example, during the third meeting held on 21 April 2014 in Ulaanbaatar, the UNIDO PM stressed on the need of conducting a technical efficiency assessment of the PCB plant and explained the significance of such assessment for dissemination of the project experience and improvement of the decontamination operation. He also provided the national counterparts with toolkits and similar assessments on other non-combustion technologies to conduct the assessment in Mongolia. He also noted the importance of realistic planning of the PCB decontamination operation for the rest of the period in order to accomplish the task of 1000 tons. The midterm and terminal evaluations were undertaken as planned.

4.4.7.3 Budgeting and funding of M&E activities

66. The project document budgeted $111,000 of the GEF grant for M&E activities in the coordination unit. The co-financing tables also included $877,000 for M&E activities of national counterparts and $26,500 for activities by UNIDO. In practice, most M&E activities became mainstreamed in other project activities such that not all allocated budgets for M&E were used. For example, a consultant was not hired to measure impact indicators. This was rather done by the PIU. By project completion, 78% of the GEF grant funds budgeted for the coordination unit had been used. The budget allocated for midterm and terminal evaluation was too small and therefore extra funds had to be mobilized to conduct the terminal evaluation.

4.4.8 Monitoring of long-term changes

67. The obvious long-term positive impacts are those related to the environment and human health. Based on feedback gathered from beneficiaries, the project has contributed to the establishment of labour safety system for PCB-affected occupations and requirements for workers health and safety, and standardization of requirements for the utilities. It has also greatly contributed to awareness raising on PCBs as a toxic substance and a health hazard for occupationally exposed workers dealing with the electric transformers and oil, which has led to increased demand and use of protective equipment and devices. The long-term impacts are also seen through the enforcement of PCB regulations at entry borders by customs and SSIA inspection officers to prevent the potential entry of PCB containing equipment in the country. Furthermore, the project developed a PCB database in the form of a spreadsheet that was uploaded on a website, which was created by the project and accessible by the general public and particularly by the key stakeholders such as utilities and private electrical equipment owners. Unfortunately, the website is no longer active as the web fee is no longer being paid. However, the database is still being updated by NPTG, the MTU operator.

4.4.9 Assessment of factors affecting achievement of project results

4.4.9.1 Factors that had a positive effect on project results

68. A proactive and dedicated project implementation unit has been very effective in getting the key stakeholders actively involved in the project through awareness raising and information sharing. The project unit has also been successful in coordinating project activities for capacity building and promoting approaches and a BAT technology for the sound management and treatment of all PCB containing equipment in Mongolia. The significant in-kind and cash contributions of national counterparts and utility firms were also favourable factors that helped to achieve success. The sustainability of project results is greatly enhanced by the commitment of the government of Mongolia to strictly control its borders to prevent the entry of PCB containing equipment in the country. The role of UNIDO in the project was also crucial for the project to meet its objectives. It assisted in strengthening national capacities, introduction standards and norms, and in the introduction of best practices in management of technical cooperation projects. It has also taken timely and critical actions, and provided technical back-stopping by hiring international experts and introducing PCB treatment technologies to national counterparts. UNIDO's administrative support was also highly appreciated by the project unit, and it allowed timely procurement of goods and services for the project.

4.4.9.2 Factors that hampered project results or sustainability

69. Project preparation and readiness were factors that hampered project implementation. As earlier described (section 4.4.7.2, paragraph 64), numerous deficiencies identified in the implementation of the M&E system by the midterm evaluation and shortcomings in the project design, were the reasons of a slow start of the project. Despite corrective measures taken by the PIU, following recommendations made by the midterm evaluation, the project had already suffered delays in the implementation of activities. For instance, project outputs, although successfully achieved, were delivered with significant delays (section 4.4.5, paragraph 56).

70. Delays further occurred as the project could not access the electrical equipment during the cold season (October to March) for inventory or for decontamination by the MTU (see section 4.4.2.1, paragraph 38). Another major cause of delays was that the distribution companies could not make available their operating equipment for decontamination as this would mean disconnection of such equipment for fear of possible consequences of regular power supply outage and/or system instability. The fire accident that happened in November 2014 and that destroyed the MTU also negatively impacted the project as the implementation was interrupted for 28 months (see section 4.4.2.1, paragraph 39).

4.5 Gender mainstreaming

71. Given the risks posed by PCBs and PCB contaminated equipment and wastes, the project document mentions that the project would provide significant health benefits to such vulnerable populations as women and children in addition to employees of the electric sector directly exposed to PCBs in their work, among whom there is a high percentage of women. The document also mentions that the project would create awareness among local communities, on the health and environmental effects of PCBs. Although extensive awareness raising campaigns have been undertaken and numerous brochures and other publications produced, there is no

evidence that these targeted specific communities or populations. The evaluation nevertheless recognizes that participation and involvement of women in the project was very satisfactory. The PIU was constituted exclusively by women, the NPD was a woman and participation of women in most training and awareness workshops were satisfactory.

4.6 Overall assessment

72. Table 2 summarizes the assessment of the project by the evaluation.

Table 2: Summary of Assessment and Ratings

	Evaluation criteria	Evaluator's summary comments	Rating
A	**Impact**	The project has been successful in achievement its goal of eliminating PCB in the country. The regulatory and enforcement system in place is adequate to strictly control the entry of PCB in Mongolia.	**HS**
B	**Project design**		**MS**
1	• Overall design	The project components and interventions included in the project are adequate and relevant to the achievement of project objectives.	S
2	• Logframe	The logical framework developed for this project was rather poor due to lack for baseline, target and well defined SMART indicators.	MU
C	**Project performance**	**All stated objectives achieved**	**S**
1	• Relevance	The project is relevant to national environmental priorities and policies, and was designed to assist Mongolia phasing out PCB containing equipment by 2020. It is also relevant to GEF strategic priorities in the POPs focal area.	HS
2	• Effectiveness	All project objectives have been achieved. The PCB regulations have been adopted and enforced at borders. All PCB contaminated equipment have been sound treated in Mongolia	HS
3	• Efficiency	Despite delays and losses incurred due to the fire accident, the project has been quite effective. The cost for treatment for this project (about $2.11 per kg) was more cost effective compared to costs ($3 to $5 per kg) required for destruction by dedicated facilities.	S
4	• Sustainability of benefits	Financial, socio-political and institutional framework & governance risks risks are low, therefore the sustainability of project outcomes are likely.	L

D	**Cross-cutting performance criteria**		
1	• Gender mainstreaming	The involvement and participation of women in the project was satisfactory	S
2	• M&E: ✓ M&E design ✓ M&E implementation	• Many of the proposed objectively verifiable indicators were not SMART and were not sufficiently specific, or measurable, to allow for proper monitoring or evaluation of progress towards meeting project objectives • Numerous deficiencies identified in the implementation of the M&E system by the midterm evaluation and shortcomings in the project design, were the reasons for a slow start of the project	MS
3	• Results-based Management (RBM)	The dedication and the excellent work of the project team, adequately guided by UNIDO, greatly contributed to the success of the project.	S
E	**Performance of partners**		
1	• UNIDO	The role of UNIDO was crucial for the project to meet its objectives. It has taken timely and critical actions, and provided technical back-stopping by hiring international experts and introducing PCB treatment technologies to national counterparts. Procurement of goods and services for the project were also timely done.	HS
2	• National counterparts	Involvement of national stakeholders such as the Ministry of Environment and Tourism, Ministry of Energy and the Electrical companies were key factors for successful achievement of project goal	S
3	• Donor	High mobilization of national co-funding contributed to successful delivery of quality outputs	S
F	**Overall assessment**	All stated objectives have been achieved	S

RATING OF PROJECT OBJECTIVES AND RESULTS

- Highly satisfactory (HS): The project had no shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
- Satisfactory (S): The project had minor shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
- Moderately satisfactory (MS): The project had moderate shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
- Moderately unsatisfactory (MU): The project had significant shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
- Unsatisfactory (U) The project had major shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
- Highly unsatisfactory (HU): The project had severe shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

- Likely (L): There are no risks affecting this dimension of sustainability.
- Moderately likely (ML). There are moderate risks that affect this dimension of sustainability.
- Moderately unlikely (MU): There are significant risks that affect this dimension of sustainability.
- Unlikely (U): There are severe risks that affect this dimension of sustainability.

5 Conclusions, recommendations and lessons learned

5. 1 Conclusions

73. The project has been very successful in achieving all the stated objectives. In particular, it has helped build capacity for the identification, management and disposal of PCB containing equipment in the electrical sector in Mongolia. In doing so, the project has helped establish the foundations for the complete phase out of PCBs in Mongolia by 2020. The project greatly contributed to the development of five necessary conditions to achieve this goal.

- The project provided adequate support and helped facilitate the development of regulations that cover all aspects of PCB life cycle sound management. These regulations, which were developed in close consultation with key stakeholders, were approved on 11 January 2012 and are being enforced by the national authorities.
- The project has helped develop awareness at all levels of the risks posed by PCBs, and options to manage these risks among the relevant public institutions, electricity utilities and other industries. In particular, a policy workshop targeting the Cabinet Secretariat of the Government of Mongolia, greatly contributed to gain the full support of policy makers.
- The project helped to generate more reliable information on the extent and location of PCBs containing equipment in the country that enabled the planning of their phasing out and elimination.
- Thanks to assistance provided by the project, Mongolia has developed capacity to identify PCBs using state of the art analytical equipment and using internationally accepted operating procedures. Subsequently, these international procedures were adapted to the local context and approved by the Mongolian Agency for Standardization and Metrology.
- The project assisted in the successful BAT technology transfer for the treatment of PCB containing equipment. The technology that was purchased and successfully implemented by the project has numerous advantages. It has a decontamination capacity down to 2ppm; it operates on a low temperature dechlorination process; it is suitable for the Mongolian condition (mobile and easy to handle), decontamination is done in closed circuit with no cross-contamination risk and generation of PCB free wastes; and it is a safe technology with no leakage or explosion risks.

74. The project was slow to start and has faced many delays during implementation. By taking corrective actions and making necessary adjustments following recommendations made by the midterm evaluation, the project implementation unit, adequately supported and guided by UNIDO, was able to get the project on the right track. In the end, despite significant delays, mainly due to a fire accident that completely destroyed the mobile treatment unit, the project has

been successful in delivering quality outputs, outcomes and 1002 tons of PCB contaminated equipment have been soundly treated.

75. Given that no risks that might jeopardize project results have been identified, chances of continuous sustained impact of the project are considered very high. Mongolia will likely achieve its goal of completely phasing out PCB by 2020,

5.2 Recommendations

To UNIDO:

1 In future projects, adequate baseline, target and SMART indicators should be proposed for expected results (e.g. outputs, outcomes and impact) in the project results framework that would allow for proper monitoring and evaluation during implementation.

2 For those projects that require expensive equipment, it highly recommended that these equipment are properly insured in order to avoid big losses in case of fire accidents or natural disasters such floods or earthquakes.

To Ministry of Environment and Tourism

3 The project has been successful in treating all the identified PCB contaminated equipment in Mongolia except for two pure PCB containing transformers owned by a mining company and two other PCB contaminated transformers (above 50ppm) located in remote regions. These equipment would be treated as soon as it would be possible. It is nevertheless recommended that these equipment be properly labelled, soundly stored and safeguarded until their final decontamination.

4 Currently, the PCB laboratory at Institute of Chemistry and Chemical Technology is not operational as one piece of equipment (gas generator) of the analytical system (chromatography) is out of order. Given the necessity to have the adequate capacity for PCB identification to prevent entry of imported goods containing PCB in the country, the national authorities should ensure that ICCT take the necessary actions to restore this analytical capacity.

5 For controlling imported equipment at borders, Specialized State Inspection Agency inspectors send oil samples of potentially containing equipment to ICCT for analysis, and wait for the results before taking a decision. Rapid results can be obtained using a PCB test kit. Given that the Institute of Chemistry and Chemical Technology has two such test kits under their responsibility, it is recommended that one is handed over to SSIA. The SSIA inspectors should however be trained on its proper operation.

To Ministry of Energy, Ministry of Environment and Tourism and National Power Transmission Grid company

6 During the implementation phase, the treatment costs of PCB contaminated equipment was paid by the project. According to agreements, it is understood that NPTG would continue to decontaminate PCB equipment but against an operating fee. It is recommended to ensure that the fee charged by the National Power Transmission Grid company is reasonable.

5.3 Lessons learned

Four key lessons emerged from this project:

1. Ensuring that equipment requiring big investments are properly insured would avoid big losses in case of accidental fires or natural disasters such as floods or earthquakes.
2. Delays were encountered as electrical equipment could not be accessed for inventory or treatment during the cold season due to a policy decision of the Ministry of Energy. Proper planning taking into consideration local climate conditions and prevailing policies would avoid delays in project implementation.
3. A strong stakeholder commitment that would contribute to successful project implementation would be secured by different approaches in involving stakeholders in the project implementation such as effective consultative or steering committees, proactive involvement in project activities and effective coordination and information sharing.
4. In projects that contain a component to develop, adopt and enforce legislation, the design should plan for realistic timeframes as policy component often takes time to be materialized.

ANNEX 1: TOR OF THE EVALUATION (Main body)

TERMS OF REFERENCE

Independent terminal evaluation of

Capacity building for environmentally sound PCBs management and disposal in Mongolia

UNIDO Project No.: 104049

GEF Project ID: 3542

October 2017

Contents

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Project Logical Framework

I. PROJECT BACKGROUND AND CONTEXT

1. Project factsheet[17][18]

Project title	[Title]
SAP ID	[Status]
GEF Project ID	3542
Region	Asia and the Pacific
Country(ies)	[Keywords]
Project donor(s)	GEF
Project implementation start date	[Publish Date]
Expected duration	4 years
Expected implementation end date	31 December 2017
GEF Focal Areas and Operational Project	POPs focal area for GEF-4
Other executing Partners	Ministry of Nature and Environment of Mongolia (MNE); Ministry of Fuel and Energy of Mongolia (MFE)
Executing partners	UNIDO
UNIDO RBM code	GC33 (Implementation of MEA) or CE17 (Stockholm Convention)
Donor funding	2,650,000 (excluding PPG)
Project GEF CEO endorsement / approval date	3/23/2009
UNIDO input (in kind, USD)	In kind 100,000; Grant 278,000
Co-financing at CEO Endorsement, as applicable	MNE: US$ 218,500 (cash) and US$ 735,381 (in kind) MFE: US$ 61,000 (cash) and US$ 203,967 (in-kind) Stakeholder Participants: US$ 4,239,470
Total project cost (USD), excluding support costs and PPG	8,208,318
Mid-term review date	12/3/2012
Planned terminal evaluation date	2 October – 21 December 2017

(Source: Project document)

2. Project context

The Stockholm Convention on persistent organic pollutants (POPs) recognizes that POPs including polychlorinated biphenyls (PCBs) “possess toxic properties, resist degradation, accumulate and are transported through air, water and migratory species, across international boundaries and deposited far from their places, where they accumulate in terrestrial and aquatic ecosystems”. Exposure to PCBs, due

[17] Data to be validated by the Consultant

[18] Different data for implementation start date: July 2009 according to mid-term review and October 2011 according to UNIDO Open Data Platform as of August 2017

to their bio magnifications, contaminates traditional foods, which are of a major public health concern, in particular for women and, through them, upon future generations.

Mongolia ratified the Stockholm Convention on POPs on 30 April 2004 and prepared the National Implementation Plan (NIP) that reviewed particular POPs issues, considered the provisions of relevant international commitments and developed detailed strategies and action plans, including timetables and costing of their implementation. The NIP identified PCBs as one of the top priorities in managing POPs. The NIP also identified the need to conduct a thorough inventory on PCBs for gradual withdrawal and final disposal of the PCBs-containing equipment and wastes. The NIP also highlighted serious weaknesses of the current hazardous waste management practices and the need for institutional and regulatory development, capacity building, and public awareness in POPs management.

The institutional framework was initiated during the NIP development. However, there were no regulations specifically addressing PCBs and the management of PCB-containing electric equipment. There were no specific standards and guidelines that would provide a progressive phase-out and elimination of PCBs and PCB-containing electric equipment. The NIP also identified that public participation in management of POPs was lacking.

PCBs had never been produced in Mongolia. The period of the large-scale electrification of the country from 1960 to 1980 coincided with the peak of exporting PCB-containing equipment. According to the PCB inventory of May 2006, approximately 4,637 pieces of transformers, 3,847 circuit breakers, and 83 capacitors are available in the country, a large portion of which was imported from the former USSR before 1980. The NIP concluded that 96-98% of all transformers used in Mongolia might have PCB-containing oils. During the POPs preliminary inventory, over 500 pieces of equipment were analysed with Test Kit CHLOR-N-OIL, which revealed that 7.5 percent of the PCB-contaminated transformers contained above 50ppm of PCBs. Therefore, it was estimated that 350 transformers were contaminated with PCBs in the whole country, with the total weight of 2,300 tonnes. However, it should be noted that the test kit method used for the survey may underestimate the PCBs content in the oil, therefore these results were to be verified.

The GEF Full-Sized Project aimed to consolidate ongoing and planned activities in implementing Mongolia's obligations for reducing and eliminating PCBs to meet the country's obligations under the Stockholm Convention. The project was to focus PCBs in the electric sector through (a) developing appropriate legislation, (b) providing capacity building for key stakeholders, (c) developing an Environmentally Sound Management (ESM) system for electric equipment and incorporating it into a national policy framework, (d) gradual phase-out of PCB-containing equipment (transformers and capacitors), (e) eliminating PCBs cross-contamination, (f) disposal of all PCB-wastes, (g) strengthening environmental monitoring capacities and (h) identifying the most appropriate mitigation measures to reduce social costs of complying with the Stockholm Convention.

Project operations were also meant to create the required appropriate laboratory capacity, labelling system as part of the environmentally sound PCBs management and to complete the inventory for PCB-containing electric equipment. The PCB-containing equipment and wastes were to be collected in a maintenance workshop where they were to be separated for PCB-contaminated oil (approx.30-35% by weight, depending on the transformer's size), PCB-contaminated wastes (paper and wooden parts of transformers –approx.10% by weight) and other parts, which could be recycled (ferrous and non-ferrous

metals– approx.55-60% by weight). The dismantling and phasing out of 1,000 tonnes of PCB-containing equipment and wastes were to eliminate a significant portion of PCBs from the electric network.

3. Project objective and expected outcomes

The project's overall objective is to create capacity for environmentally sound management (ESM) of PCBs for preventing PCBs releases from the electric equipment, avoiding cross contamination of electric equipment and disposing of 1,000 tons of PCBs wastes. This objective was to be achieved through a combination of strategies, including legislative and regulatory development, capacity building, public education, technology transfer, training and technical support.
The immediate objectives of the project are to:

- Strengthen the legal and regulatory framework for environmentally sound management (ESM) and disposal of PCB-containing equipment and oil;
- Improve institutional capacity at all levels of PCBs waste management and disposal;
- Remove PCBs wastes from targeted contaminated sites and transport them to the disposal unit;
- Decontaminate PCB oils in in-service transformers and
- Dispose of wastes in an environmentally sound manner.

Expected Outcomes:

Outcome 1: **capacity building for implementing the PCBs related measures of Stockholm Convention**. Capacity building will be carried out in regulatory and institutional development, strengthening PCBs monitoring capabilities, enhancing public information, awareness and education, as well as by introducing socio-economic assessment and comprehensive data management.

Outcome 2: **environmentally sound management (ESM) of PCB-containing electrical equipment**. To achieve this outcome the PCBs inventory should be completed; ESM for PCB-containing equipment in use; and PCBs disposal as well as environmental monitoring system (EMS) for PCBs introduced and applied.

Outcome 3: project **management, monitoring, and evaluation**, including establishment of a Project Steering Committee (PSC) composed of national and local stakeholder agencies, establishment and staffing of the project management team at the national and local levels, recruitment of national and international consultants, execution of a management training program for project staff (particularly at the local level), and ongoing monitoring and reporting of project activities.

4. Project implementation arrangements

UNIDO is the GEF Implementing Agency (IA) for the project. A project focal point was to be established within UNIDO to assist with project execution. This focal point was meant to consist of dedicated core staff, supplemented by support from support staff colleagues on a part-time as required basis, supervised by a senior professional staff engaged in the management and coordination of UNIDO's POPs and chemical management program. UNIDO was to make these services available as part of its in-kind contribution to the project.
The project management structure was to be as follows:

The **Ministry of Nature and Environment (MNE)** is the lead agency of implementing the National Implementation Plan (NIP) of the Stockholm Convention in Mongolia, as well as coordinating activities and cooperation between relevant stakeholders of the plan.

Ministry of Fuel and Energy (MFE) is responsible for assisting in the implementation of the activities and measures for limitation, elimination and monitoring of import and use of PCB-containing equipment and reduction of unintentional production of POPs chemicals. In addition, the Ministry shall be in charge of making amendments and additions to relevant laws and regulation, as well as develop rules and procedures in relation to the above activities and measures.

Ministry of Industry and Trade (MIT) is responsible for the coordination of import and export of POPs-containing products, assistance in conducting inventory of POPs use and production and for the provision of policy and coordination in introducing and applying alternatives of POPs-containing products and equipment and environmentally sound technology.

National Chemical Management Committee (NCMC) operates at ministerial department level. It is located at the MNE, but reports directly to the Prime Minister's office. NCMC is staffed with four full time professionals and has its own independent budget. NCMC also includes representatives from each of the twenty-one agencies involved with all aspects of chemical management.

Project Implementation Unit (PIU) under the supervision of MNE, was to consist of two full-time professional staff and two support staff, with additional support provided by consultants on an as-needed basis. The PIU is meant to work closely with MFE and MIT, and report through MNE to UNIDO.

A **Project Steering Committee (PSC)** should consists of representatives of MNE, MFE, MIT, NCMC, the PIU, the NPC, the CTA, major stakeholder companies, and UNIDO.

A **Project Expert Team (PET)**, meant to assist the PIU, was to consist of an international Chief Technical Advisor (CTA), a National Project Coordinator (NPC), policy experts, PCBs management and disposal industry experts, chemists, monitoring & evaluation experts and other technical experts as required. The PET was to be recruited by the project.

5. Main findings of the Mid-term review (MTR)

The assessment of project relevance to local and national priorities and policies, priorities related to relevant international conventions, and to the GEF's strategic priorities and objectives, overall project relevance was considered to be SATISFACTORY.
Project design was rated as MODERATELY SATISFACTORY, with strongest side being strong participation of local stakeholders in project identification, the Logical Framework and indicators are not developed adequately to allow for proper adaptive management and monitoring of project results.

It was not clear whether the project would be able to achieve the overall objectives, in spite of clear achievement of a number of the key outputs, mainly due to delays in startup of the PCB cleanup process. Thus, the progress towards achievement of the overall project objective and expected outcomes was rated as MODERATELY SATISFACTORY, but only under condition that the non-cost project extension was approved in order to allow the necessary time to perform actual decontamination of PCB-containing equipment under the project. Implementation of activities/inputs was rated as MODERATELY SATISFACTORY. There were no significant risks for cost-effectiveness noted at the time of the review.

Numerous deficiencies were found in the implementation of the M&E system, which were partly due to the shortcomings of the logical framework. Workplans and project monitoring were found quite basic, and there was no evidence that work plans were updated regularly. The semi-annual and annual project progress reports were submitted to MNET, but only in Mongolian language. The annual progress reports submitted in English provided details of the progress of activities, but not on the progress towards the expected outcomes.

Recommendations included:

- Focus on creating capacities for the enforcement of passed regulations on PCBs in Mongolia, mainly through providing practical tools to the inspection on how to enforce the legislation;
- Conduct well-targeted trainings and measure the level of capacity built;
- Complete accreditation of laboratories as soon as practicable, so that test results are according to international standards, to allow fulfillment of SC reporting requirements;
- Enhance health and safety for the workers in the electricity sector who handle directly the equipment;
- Enhance M&E design and implementation in order to implement corrective actions of the mid-term evaluation and improve the conditions for the final evaluation; and
- Review the logical framework indicators in order to apply SMART criteria.

6. Budget information

Table 1. Financing plan summary

$	***Project Preparation***	***Project***	***Total ($)***
Financing (GEF / others)	130000	2650000	2780000.00
Co-financing (Cash and In-kind)	Click here to enter text.	5558318	5558318
Total ($)	**130000**	**8208318.00**	**8338318.00**

Source: Project document / progress report

Table 2. Financing plan summary - Outcome breakdown[19]

Project outcomes	**Donor (GEF/other) ($)**	**Co-Financing ($)**	**Total ($)**
1. Capacity building for implementing the PCBs related measures of SC	300430	571200	**871630.00**
2. Environmentally sound management of PCB-containing electrical equipment	2219570	4842518	**7062088.00**
3. Project management and monitoring and evaluation	130000	144600	**274600.00**
Total ($)	**2650000.00**	**5558318.00**	**8208318**

Source: Project document / progress report

[19] Source: Project document.

Table 3. Co-Financing source breakdown

Name of Co-financier (source)	Classification	Type	Total Amount ($)
MNE	Counterpart	Cash	218500
		In kind	735381
MFE	Counterpart	Cash	61000
		In kind	203967
Stakeholders	Participants	In kind	4239470
UNIDO	Implementing Agency	In kind	100000
Total Co-financing ($)			**5,558,318**

Source : Project document / progress report

Table 4. UNIDO budget execution (under Grants 200000273, 2000003219 and 4000196)

Item	2012	2013	2014	2015	2016	2017	Total Expenditure ($)
Contractual Services	1214706	33086	-33064	-739	154798	0	13687888
Equipment	193623	83289	1560	0	0	0	278473
International Meetings	36211	3398		46	0	0	39655
Local travel	107964	11552	25671	7355	11608	3472	167622
Nat. Consult./Staff	356849	82270	118708		4991	31166	593984
Other Direct Costs	15096	35407	10798	-628	2895	9748	73318
Premises	0				0	2440	2440
Staff & Intern Consultants	129477	8314	13626		0	0	151417
Staff Travel	0		3800		0	0	3800
Train/Fellowship/Study	64249	-57	0		0	0	64192
Total	**2120186**	**259274**	**143113**	**8049**	**176309**	**48844**	**2743688**

Source: SAP database

II. Evaluation purpose and scope

The purpose of the evaluation is to independently assess the project to help UNIDO improve performance and results of future programmes and projects.
The evaluation has two specific objectives:

(i) Assess the project performance in terms of relevance, effectiveness, efficiency, sustainability and progress to impact;

(ii) Develop a series of findings, lessons and recommendations for enhancing the design of new and implementation of ongoing projects by UNIDO.

The terminal evaluation (TE) will cover the whole duration of the project from its starting date in to the estimated completion date in 12/15/2017**Error! Reference source not found.**.

III. Evaluation approach and methodology

The TE will be conducted in accordance with the UNIDO Evaluation Policy[20] and the UNIDO Guidelines for the Technical Cooperation Project and Project Cycle[21]. In addition, the GEF Guidelines for GEF Agencies in Conducting Terminal Evaluations, the GEF Monitoring and Evaluation Policy and the GEF Minimum Fiduciary Standards for GEF Implementing and Executing Agencies will be applied.

The evaluation will be carried out as an independent in-depth evaluation using a participatory approach whereby all key parties associated with the project will be informed and consulted throughout the evaluation. The evaluation team leader will liaise with the UNIDO Independent Evaluation Division (ODG/EVQ/IEV) on the conduct of the evaluation and methodological issues.

In line with its objectives, the evaluation will have two main components. The first component focuses on an overall **assessment of performance** of the project, whereas the second one focuses on the **learning** from the successful and unsuccessful practices in project design and implementation.

The evaluation will use a theory of change approach and mixed methods to collect data and information from a range of sources and informants. It will pay attention to triangulating the data and information collected before forming its assessment. This is essential to ensure an evidence-based and credible evaluation, with robust analytical underpinning.

The theory of change will identify causal and transformational pathways from the project outputs to outcomes and longer-term impacts, and drivers as well as barriers to achieve them. The learning from this analysis will be useful to feed into the design of the future projects so that the management team can effectively manage them based on results.

1. Data collection methods

Following are the main instruments for data collection:

(a) **Desk and literature review** of documents related to the project, including but not limited to:

[20] UNIDO. (2015). Director General's Bulletin: Evaluation Policy (UNIDO/DGB/(M).98/Rev.1)
[21] UNIDO. (2006). Director-General's Administrative Instruction No. 17/Rev.1: Guidelines for the Technical Cooperation Programme and Project Cycle (DGAI.17/Rev.1, 24 August 2006)

- The original project document, monitoring reports (such as progress and financial reports, mid-term review report, output reports, back-to-office mission report(s), end-of-contract report(s) and relevant correspondence.
- Notes from the meetings of committees involved in the project.

(b) **Stakeholder consultations** will be conducted through structured and semi-structured interviews and focus group discussion. Key stakeholders to be interviewed include:
- UNIDO Management and staff involved in the project; and
- Representatives of donors, counterparts and stakeholders.

(c) **Field visit** to project sites in Mongolia.

2. Evaluation key questions and criteria

The key question of the TE is whether the project has achieved or is likely to achieve its main objective, i.e.

The key evaluation questions are the following:

(a) What are the key drivers and barriers to achieve the long term objectives? To what extent has the project helped put in place the conditions likely to address the drivers, overcome barriers and contribute to the long term objectives?

(b) How well has the project performed? Has the project done the right things? Has the project done things right, with good value for money?

(c) What have been the project's key results (outputs, outcome and impact)? To what extent have the expected results been achieved or are likely to be achieved? To what extent the achieved results will sustain after the completion of the project?

(d) What lessons can be drawn from the successful and unsuccessful practices in designing, implementing and managing the project?

The evaluation will assess the likelihood of sustainability of the project results after the project completion. The assessment will identify key risks (e.g. in terms of financial, socio-political, institutional and environmental risks) and explain how these risks may affect the continuation of results after the project ends. Table 5 below provides the key evaluation criteria to be assessed by the evaluation. The details questions to assess each evaluation criterion are in annex 2.

Table 5. Project evaluation criteria

#	Evaluation criteria	Mandatory rating
A	**Impact**	**Yes**
B	**Project design**	**Yes**
1	• Overall design	Yes
2	• Logframe	Yes
C	**Project performance**	**Yes**
1	• Relevance	Yes
2	• Effectiveness	Yes
3	• Efficiency	Yes
4	• Sustainability of benefits	Yes
D	**Cross-cutting performance criteria**	
1	• Gender mainstreaming	Yes

2	• M&E: ✓ M&E design ✓ M&E implementation	Yes
3	• Results-based Management (RBM)	Yes
E	**Performance of partners**	
1	• UNIDO	Yes
2	• National counterparts	Yes
3	• Donor	Yes
F	**Overall assessment**	Yes

Performance of partners

The assessment of performance of partners will ***include*** the quality of implementation and execution of the GEF Agencies and project executing entities (EAs) in discharging their expected roles and responsibilities. The assessment will take into account the following:

- Quality of Implementation, e.g. the extent to which the agency delivered effectively, with focus on elements that were controllable from the given GEF Agency's perspective and how well risks were identified and managed.
- Quality of Execution, e.g. the appropriate use of funds, procurement and contracting of goods and services.

Other Assessments required by the GEF for GEF-funded projects:

The terminal evaluation will assess the following topics, for which ***ratings are not required***:

a. **Need for follow-up**: e.g. in instances financial mismanagement, unintended negative impacts or risks.
b. **Materialization of co-financing**: e.g. the extent to which the expected co-financing materialized, whether co-financing was administered by the project management or by some other organization; whether and how shortfall or excess in co-financing affected project results.
c. **Environmental and Social Safeguards**[22]: appropriate environmental and social safeguards were addressed in the project's design and implementation, e.g. preventive or mitigation measures for any foreseeable adverse effects and/or harm to environment or to any stakeholder.

3. Rating system

In line with the practice adopted by many development agencies, the UNIDO ODG/EVQ/IEV uses a six-point rating system, where 6 is the highest score (highly satisfactory) and 1 is the lowest (highly unsatisfactory) as per **Error! Reference source not found.**.

[22] Refer to GEF/C.41/10/Rev.1 available at: http://www.thegef.org/sites/default/files/council-meetingdocuments/C.41.10.Rev_1.Policy_on_Environmental_and_Social_Safeguards.Final%20of%20Nov%2018.pdf

Table 6. Project rating criteria

Score		Definition	Category
6	Highly satisfactory	Level of achievement clearly exceeds expectations and there is no shortcoming.	SATISFACTORY
5	Satisfactory	Level of achievement meets expectations (indicatively, over 80-95 per cent) and there is no or minor shortcoming.	
4	Moderately satisfactory	Level of achievement more or less meets expectations (indicatively, 60 to 80 per cent) and there are some shortcomings.	
3	Moderately unsatisfactory	Level of achievement is somewhat lower than expected (indicatively, less than 60 per cent) and there are significant shortcomings.	UNSATISFACTORY
2	Unsatisfactory	Level of achievement is substantially lower than expected and there are major shortcomings.	
1	Highly unsatisfactory	Level of achievement is negligible and there are severe shortcomings.	

IV. Evaluation process

The evaluation will be conducted from October to December 2017. The evaluation will be implemented in five phases which are not strictly sequential, but in many cases iterative, conducted in parallel and partly overlapping:

i. Inception phase: The evaluation team will prepare the inception report providing details on the methodology for the evaluation and include an evaluation matrix with specific issues for the evaluation; the specific site visits will be determined during the inception phase, taking into consideration the findings and recommendations of the mid-term review.
ii. Desk review and data analysis;
iii. Interviews, survey and literature review;
iv. Country visits;
v. Data analysis and report writing.

V. Tentative time schedule and deliverables

The evaluation is scheduled to take place from October to 31 December 2017. The evaluation field mission is tentatively planned for week 13 November or 20 November 2017. At the end of the field mission, there will be a presentation of the preliminary findings for all stakeholders involved in this project in the country visited among the participating countries, i.e. .

After the evaluation field mission, the evaluation team leader will visit UNIDO HQ for debriefing and presentation of the preliminary findings of the terminal evaluation. The draft TE report will be submitted

4 to 6 weeks after the end of the mission. The draft TE report is to be shared with the UNIDO PM, UNIDO ODG/EVQ/IEV, the UNIDO GEF Coordinator and GEF OFP and other stakeholders for receipt of comments. The ET leader is expected to revise the draft TE report based on the comments received, edit the language and form and submit the final version of the TE report in accordance with UNIDO ODG/EVQ/IEV standards.

Table 7. Tentative major timelines

Timelines	**Tasks**
18 October -10 November 2017	Desk review
2-3 November	Briefing with UNIDO project manager through skype
13 November 2017	Field visit
Week 20 November (exact date to be confirmed by the project manager) 22 November – 15 December 2017	Debriefing in Vienna Preparation of first draft evaluation report
15 December 2017	Internal peer review of the report by the UNIDO ODG/EVQ/IEV and other stakeholder comments to draft evaluation report
31 December 2017	Final evaluation report

VI. Evaluation team composition

The evaluation team will be composed of one international evaluation consultant acting as the team leader and one national evaluation consultant. The evaluation team members will possess relevant strong experience and skills on evaluation management and conduct together with expertise and experience in innovative clean energy technologies. Both consultants will be contracted by UNIDO.

The tasks of each team member are specified in the job descriptions annexed to these terms of reference. The ET is required to provide information relevant for follow-up studies, including terminal evaluation verification on request to the GEF partnership up to three years after completion of the terminal evaluation.

According to UNIDO Evaluation Policy, members of the evaluation team must not have been directly involved in the design and/or implementation of the project under evaluation.

The UNIDO Project Manager and the project team in Mongolia will support the evaluation team. The UNIDO GEF Coordinator and GEF OFP(s) will be briefed on the evaluation and provide support to its conduct. GEF OFP(s) will, where applicable and feasible, also be briefed and debriefed at the start and end of the evaluation mission.

An evaluation manager from UNIDO ODG/EVQ/IEV will provide technical backstopping to the evaluation team and ensure the quality of the evaluation. The UNIDO Project Manager and national project teams will act as resourced persons and provide support to the evaluation team and the evaluation manager.

VII. Reporting

Inception report

This Terms of Reference (ToR) provides some information on the evaluation methodology, but this should not be regarded as exhaustive. After reviewing the project documentation and initial interviews with the project manager, the International Evaluation Consultant will prepare, in collaboration with the national consultant, a short inception report that will operationalize the ToR relating to the evaluation questions and provide information on what type of and how the evidence will be collected (methodology). It will be discussed with and approved by the responsible UNIDO Evaluation Manager.

The Inception Report will focus on the following elements: preliminary project theory model(s); elaboration of evaluation methodology including quantitative and qualitative approaches through an evaluation framework ("evaluation matrix"); division of work between the International Evaluation Consultant and national consultant; mission plan, including places to be visited, people to be interviewed and possible surveys to be conducted and a debriefing and reporting timetable[23].

Evaluation report format and review procedures

The draft report will be delivered to ODG/EVQ/IEV (the suggested report outline is in Annex 4) and circulated to UNIDO staff and national stakeholders associated with the project for factual validation and comments. Any comments or responses, or feedback on any errors of fact to the draft report provided by the stakeholders will be sent to UNIDO ODG/EVA for collation and onward transmission to the project evaluation team who will be advised of any necessary revisions. On the basis of this feedback, and taking into consideration the comments received, the evaluation team will prepare the final version of the terminal evaluation report.

The ET will present its preliminary findings to the local stakeholders at the end of the field visit and take into account their feed-back in preparing the evaluation report. A presentation of preliminary findings will take place at UNIDO HQ after the field mission.

The TE report should be brief, to the point and easy to understand. It must explain the purpose of the evaluation, exactly what was evaluated, and the methods used. The report must highlight any methodological limitations, identify key concerns and present evidence-based findings, consequent conclusions, recommendations and lessons. The report should provide information on when the evaluation took place, the places visited, who was involved and be presented in a way that makes the information accessible and comprehensible. The report should include an executive summary that encapsulates the essence of the information contained in the report to facilitate dissemination and distillation of lessons.

Findings, conclusions and recommendations should be presented in a complete, logical and balanced manner. The evaluation report shall be written in English and follow the outline given in annex 1.

[23] The evaluator will be provided with a Guide on how to prepare an evaluation inception report prepared by the UNIDO ODG/EVQ/IEV.

VIII. Quality assurance

All UNIDO evaluations are subject to quality assessments by UNIDO ODG/EVQ/IEV. Quality assurance and control is exercised in different ways throughout the evaluation process (briefing of consultants on methodology and process of UNIDO ODG/EVQ/IEV, providing inputs regarding findings, lessons learned and recommendations from other UNIDO evaluations, review of inception report and evaluation report by UNIDO ODG/EVQ/IEV).

The quality of the evaluation report will be assessed and rated against the criteria set forth in the Checklist on evaluation report quality, attached as Annex 4. The applied evaluation quality assessment criteria are used as a tool to provide structured feedback. UNIDO ODG/EVQ/IEV should ensure that the evaluation report is useful for UNIDO in terms of organizational learning (recommendations and lessons learned) and is compliant with UNIDO's evaluation policy and these terms of reference. The draft and final evaluation report are reviewed by UNIDO ODG/EVQ/IEV, which will submit the final report to the GEF Evaluation Office and circulate it within UNIDO together with a management response sheet

Project Logical Framework

Interventions	Objectively Verifiable Indicators	Sources of Verification	Assumptions and Risks
Project Goal	To create capacity for Environmentally Sound Management (ESM) of PCBs, eliminate PCB releases from the electrical equipment, avoid cross-contamination of electrical equipment, and dispose of a minimum of 1,000 tons of PCB containing oil and discarded equipment according to Stockholm and Basel convention guidelines	Progress reports, activity implementation reports, lists of PCB containing oil and equipment maintained or disposed of in environmentally sound manner, copies of guidelines or regulations developed	Project inputs will be adequate to accomplish stated objectives; project activities will be adequate to allow identified barriers to be overcome.
Outcome 1: Capacity building for implementing the PCBs related measures of SC	Capacity created for ESM of PCBs		
Output 1.1: Regulatory standards developed Activity 1.1.1: Develop national standards regulating PCB content in equipment and oil Activity 1.1.2: Legislate national standards regulating PCB content in equipment and oil Activity 1.1.3: Implement national standards regulating PCB content in equipment and oil Activity 1.1.4: Develop and implement regulations for PCB content in imported equipment and	➢ Number of new PCB related regulations adopted; Number enforcement measures undertaken ➢ National standards drafted ➢ National standards adopted ➢ Number of enforcement measures ➢ Regulations developed and implemented ➢ PCBs added to occupational hazards list ➢ Implementing regulations developed	➢ Report on number and content of new PCB related regulations adopted; progress report on # enforcement measures taken ➢ Copy of standards developed ➢ Report on national standards adopted ➢ Implementation report ➢ Implementation report ➢ Copy of occupational hazards list including PCBs ➢ Copy/report of regulations developed	➢ Delays in adoption of legal framework and specific policy and technical guidance may hamper implementation ➢ Laws and regulations not fully and consistently enforced

Interventions	Objectively Verifiable Indicators	Sources of Verification	Assumptions and Risks
products Activity 1.1.5: Add PCBs to occupational hazards list Activity 1.1.6: Support development of implementing regulations under Chemical Management Law to ensure PCB management compatibility with Stockholm Convention			
Output 1.2: Institutional capacity to implement PCBs related issues developed Activity 1.2.1: Develop system and capacity to determine PCB content in imported equipment and products Activity 1.2.2: Establish and train special unit to address PCB issues under National Chemical Management Committee Activity 1.2.3: Establish training programs for new and existing MNE staff on PCB issues Activity 1.2.4: Policy workshops and awareness raising program Activity 1.2.5: Develop and introduce PCB materials for professional training institutes Activity 1.2.6: Targeted public awareness raising	➢ New technical guidelines; number of people trained (environmental inspectorates, specialists, NGOs) ➢ Regulations developed; training program held; testing equipment provided ➢ Special unit established ➢ Training program developed and held ➢ Workshops held ➢ Information materials developed and introduced ➢ Awareness levels increased	➢ Copies of new guidelines; workshop reports ➢ Activity implementation report ➢ Activity implementation report ➢ Activity implementation report; copy of training materials ➢ Activity implementation report; copy of training materials ➢ Activity implementation report; copy of training materials ➢ Survey of targeted audiences to determine increased awareness	➢ Lack of human resources, delayed human resource allocations, or pesonnel changes at key stakeholder agencies could cause delays in project implementation ➢ Awareness raising activities fail to significantly increase awareness levels

Interventions	Objectively Verifiable Indicators	Sources of Verification	Assumptions and Risks
Output 1.3: Strengthened laboratory capacity for PCBs monitoring Activity 1.3.1: Upgrade laboratory facilities to monitor PCBs Activity 1.3.2: Adopt standard methodology for PCB monitoring Activity 1.3.3: Technical training in PCB monitoring	➢ Laboratory capacity strengthened, Number of staff trained ➢ New equipment items purchased and installed ➢ Standard methodology adopted ➢ Number of individuals trained	➢ Activity implementation report ➢ List of equipment purchased and installed ➢ Copy of methodology ➢ Copy of training materials; training report	➢ Laboratory capacity building resources are inadequate to accomplish project monitoring tasks
Output 1.4: Increased stakeholder capacity for PCB management Activity 1.4.1: Targeted technical training Activity 1.4.2: Develop and establish technical certification program Activity 1.4.3: Stakeholder awareness raising	➢ Number of training workshops, Number of on-site training programs, Number of individuals trained ➢ certification program established; Number of individuals tested, Number of individuals certified ➢ Stakeholder awareness levels increased	➢ Copy of training materials; training report ➢ Activity implementation report ➢ Stakeholder interviews	➢ Possible reluctance by stakeholders to participate in awareness raising and other activities that would increase costs (e.g., company owners fear that employees will want higher salaries to deal with dangerous goods, along with other liabilities and costs).
Output 1.5: Socio-economic and mitigation measures assessed Activity 1.5.1: Public health and economic impact assessment report Activity 1.5.2: Worker health and safety assessment report	➢ Reports prepared ➢ Report prepared analyzing public health impacts ➢ Report prepared analyzing worker safety impacts	➢ Copy of assessment reports	➢ Lack of political and popular support for PCB management measures compromises their chance for success
Output 1.6: Comprehensive data management in operation Activity 1.6.1: Procurement of data management software to meet Convention reporting requirements	➢ Data management system created and implemented ➢ Data management software procured ➢ Training program developed	➢ Copy of software specifications ➢ Activity implementation report; copy of training materials ➢ Activity implementation report; copies of database formats and	

Interventions	Objectively Verifiable Indicators	Sources of Verification	Assumptions and Risks
Activity 1.6.2: Training in use of data management software Activity 1.6.3: Ongoing data entry and management in support of Convention reporting requirements	and held ➢ Number of items in database	data items	
Outcome 2: Environmentally sound management of PCB-containing electrical equipment	ESM of PCBs is implemented		Coordination of project activities with on-going and future investment projects will not be achieved
Output 2.1: Detailed inventory developed Activity 2.1.1: Stakeholder workshop to introduce PCB reporting requirements Activity 2.1.2: Stakeholder capacity building to identify and label PCB-containing equipment Activity 2.1.3: Provide inventory monitoring kits and other monitoring supplies Activity 2.1.4: Inventory survey of PCB use in energy sector Activity 2.1.5: Inventory survey of PCB use in non-energy sectors Activity 2.1.6: Initial inventory completion	➢ Detailed inventory developed ➢ Stakeholder workshop held; Number of attendees ➢ Information materials developed and provided to stakeholders; Number of stakeholders contacted and provided with information and technical support ➢ Amount of monitoring kits and other monitoring equipment/supplies provided ➢ Completed energy sector inventory list; Number items listed ➢ Completed non-energy sector inventory list; Number items listed ➢ Completed inventory list; Number items listed	➢ Inventory report ➢ Activity implementation report; copies of training materials, list of attendees ➢ Activity implementation report ➢ Activity implementation report; list of monitoring equipment/supplies provided ➢ Activity implementation report ➢ Activity implementation report ➢ Inventory report	➢ Stakeholders unwilling to share information

Interventions	Objectively Verifiable Indicators	Sources of Verification	Assumptions and Risks
Output 2.2: Environmentally sound management of PCB-containing equipment in use, including handling, maintenance, and repair in place Activity 2.2.1: Develop and introduce guidelines for environmentally sound management of PCB-containing equipment Activity 2.2.2: Create and equip dedicated environmentally sound maintenance capacity for PCB containing transformers Activity 2.2.3: Decontamination of oil for transformers to remain in use	➢ ESM system, operational guidelines, work instructions for all stakeholders in place; leaking equipment repaired or replaced and safely disposed of ➢ Guidelines developed ➢ Maintenance facility created; Number of pieces of equipment maintained in environmentally sound manner ➢ Amount of PCB oil decontaminated	➢ List and specifications of equipment maintained or disposed of in environmentally sound manner; copy of guidelines ➢ Copy of guidelines ➢ List and specifications of equipment maintained in environmentally sound manner ➢ Activity implementation report	➢ Higher cost of ESM for PCB containing equipment causes stakeholders to abandon ESM practices
Output 2.3: Disposal of PCB containing equipment and waste using BAT/BEP implemented Activity 2.3.1: Develop and introduce guidelines for environmentally sound disposal of PCB-containing equipment and oil Activity 2.3.2: Retire targeted PCB containing equipment in electricity sector Activity 2.3.3: Introduce mobile technology to decontaminate PCB containing equipment	➢ Minimum of 1000 tons of PCB-containing oil, equipment, and other PCB contaminated wastes disposed of ➢ Guidelines developed ➢ Amount of PCB containing equipment retired ➢ Mobile decontamination technology introduced	➢ List of PCB containing materials disposed of ➢ Copy of guidelines ➢ List of retired equipment ➢ Activity implementation report; technology specifications	➢ Excessive contamination of the environment during transportation/handling of the PCB-contaminated equipment. ➢ Technical staff, participating in the project implementation, and, in particular, contacting with PCB-contaminated equipment will be excessively exposed to PCB harmful influence. ➢ Increase in equipment prices may reduce stakeholder incentive and ability to replace PCB containing equipment before mandatory deadlines ➢ Increased transportation and disposal costs

Interventions	Objectively Verifiable Indicators	Sources of Verification	Assumptions and Risks
Activity 2.3.4: Strengthen capacity created to collect, package, transport, and/or store PCB contaminated wastes Activity 2.3.5: Evaluate soil contamination risks and recommend leakage treatment approaches Activity 2.3.6: Incentive program Activity 2.3.7: Treat PCB contaminated wastes	➢ Amount of PCB containing wastes collected ➢ Evaluation report ➢ Incentive program implemented including variety of measures to encourage ESM of POPs containing materials ➢ Amount of PCB contaminated wastes created	➢ Activity implementation report ➢ Copy of evaluation report	➢ PCB contaminated equipment and wastes are illegally diverted and reused or disposed of illegally, thus increasing the pollution of the environment and creating new "hot spot". ➢ Volume of contaminated oils less than initially estimated may decrease the economic viability of dedicated treatment facility
Output 2.4: Environmental monitoring system for PCBs established Activity 2.4.1: Review of stakeholder PCB management systems Activity 2.4.2: Workplace safety monitoring Activity 2.4.3: Environmental site monitoring	➢ Number of inspections ➢ Stakeholder PCB management system plans submitted and reviewed ➢ Number of inspections of PCB owner/user sites ➢ Number of inspections of potentially at-risk sites	➢ Inspection reports ➢ Copies of stakeholder materials submitted and evaluations thereof ➢	
Outcome 3: Project management and monitoring and evaluation			Changes in project input prices and exchange rates may increase project costs
Output 3.1: Project management structure established Activity 3.1.1: Establish Project Implementation Unit (PIU) and appoint project leadership staff at MNE	Project Implementation Unit established; Project Steering Committee established with representatives from national and local stakeholder agencies; Project expert team established; Training workshop held on project management; MIS established	➢ Progress reports; TORs for project experts; Training materials ➢ List of PIU staff	

Interventions	Objectively Verifiable Indicators	Sources of Verification	Assumptions and Risks
Activity 3.1.2: Establish Project Steering Committee (PSC) Activity 3.1.3: Recruit Chief Technical Advisor (CTA), National Project Coordinator (NPC), policy and technical experts in POPs waste management, evaluation, and program development Activity 3.1.4: Hold project management training for project management staff Activity 3.1.5: Work with stakeholder project participants to establish PIUs within organization and sign project participation contracts Activity 3.1.6: Establish project management information system (MIS), including a project website to disseminate information to stakeholders	➢ PIU established and staffed ➢ PSC established ➢ CTA recruited ➢ Project management training held ➢ Stakeholder PIUs established and staffed ➢ MIS established	➢ List of PSC members ➢ CTA TOR and CV; copy of appointment notice ➢ Copy of training materials; training report ➢ Contact list for stakeholder PIUs ➢ MIS specifications and user instructions	
Output 3.2: Project results monitored and reported Activity 3.2.1: Prepare and hold Inception Workshop Activity 3.2.2: Measure impact indicator Activity 3.2.3: Carry out annual project financial audits Activity 3.2.4: Prepare Annual Project Reports and Project Implementation Reviews	➢ Detailed work plans prepared; Data and information collected for MIS; Technical and political guidance received from Steering Committee; Problems identified and corrected as result of progress reports and field visits; MIS established; Project information, experience and lessons disseminated through website	➢ Monitoring reports ➢ Inception report ➢ Progress reports	➢ Delays in project implementation and low quality performance

Interventions	Objectively Verifiable Indicators	Sources of Verification	Assumptions and Risks
Activity 3.2.5: Hold annual tripartite review meetings Activity 3.2.6: Carry out mid-term external evaluation Activity 3.2.7: Carry out final external evaluation Activity 3.2.8: Complete Project Terminal Report	➢ Inception Workshop held ➢ Updated impact indicators ➢ Financial audit completed ➢ Annual reports and PIRs completed ➢ Annual TPR meetings held ➢ Mid-term evaluation completed ➢ Final external evaluation held ➢ Project Terminal Report completed	➢ Copy of audit reports ➢ Copies of annual reports and PIRs ➢ TPR meeting notes ➢ Copy of mid-term evaluation report ➢ Copy of final external evaluation report ➢ Copy of Project terminal report	

Annex 2: List of documents consulted

1. Project document
2. Midterm evaluation report
3. Progress reports (7 in total)
4. PIR reports for FYI 2014, 2015 and 2016
5. Inventory reports
6. Report of legal expert
7. Reports of MIRECO
8. Powerpoint presentation of NPC
9. Minutes of PSC meetings
10. Inception report
11. Report of workshops (awareness raising and training)
12. Copies of brochures and other awareness raising materials
13. Financial reports
14. Report of DMU fire accident

Annex 3: List of persons interviewed

No	Name	Position	Email
1	Mr. Tsengel Tsegmid	State Secretary, MOET	tsengel@mne.gov.mn
2	Ms. T. Myagmarsuren	National Consultant on regulatory framework development and training	myagaat124@yahoo.com
3	Ms. Ch. Munkhtuya	National Consultant on PCB database and training	munkhtuya_78@yahoo.com
4	Mrs. R. Ariunbileg	National Project Coordinator	r_ariunbileg@yahoo.com
5	Mr. B. Purevdorj	National consultant on PCB inventory	purevdorj.b@gmail.com
6	Mr. Nyamsambuu Bojin	Executive Director , NPTG	nyamsambuu@transco.mn
7	Mr. E. Bat-Orshikh	Project head engineer, PCB project team, NPTG	oorshikh@gmail.com
8	Mr. L. Sodovsuren	PCB project team, technician, NPTG	
9	Dr. L. Jargalsaikhan	NPD, NCMC, MOET	Jargalsaikhan@mne.gov.mn
10	Dr. M. Bayarjargal	Head of Laboratory, ICCT	m_bayargl@yahoo.com
11	Ms. J. Gerel	Department of strategic policy and planning, Ministry of Energy	gerel@energy.gov.mn
12	Ms. N. Enkhtaivan	Border Inspection Unit, SSIA	Enkhtaivan.natsagdorj@gmail.com
13	Ms. A. Oyun	Specialist on waste management, MOET	
14	Badam Delgerbayar	Project manager, BAT/BEP GEF funded project	eco_ub@yahoo.com
15	AJANI, Adegboyega*	UNIDO, PM	A.AJANI@unido.org

Annex 4: Rating of outputs and outcomes

LOGICAL FRAMEWORK			RATING on Output
OUTPUT	**INDICATOR**	**Results and comments**	
Output 1.1: Regulatory standards developed Activity 1.1.1: Develop national standards regulating PCB content in equipment and oil Activity 1.1.2: Legislate national standards regulating PCB content in equipment and oil Activity 1.1.3: Implement national standards regulating PCB content in equipment and oil Activity 1.1.4: Develop and implement regulations for PCB content in imported equipment and products Activity 1.1.5: Add PCBs to occupational hazards list Activity 1.1.6: Support development of implementing regulations under Chemical Management Law to ensure PCB management compatibility with Stockholm Convention	• Number of new PCB related regulations adopted; • Number enforcement measures undertaken • National standards drafted • National standards adopted • Number of enforcement measures • Regulations developed and implemented • PCBs added to occupational hazards list • Implementing regulations developed	• New regulation on PCB's environmentally sound management was approved by joint Order from Ministry of Environment and Tourism & Ministry of Health 11 January 2012. • Amended law on PCB approved by Government in October 2012 • National standards for identification of PCBs in water, soil and insulating fluids using GC were approved by the National Standardization Authority in 2014. • Two new legislations relating to POPs and chemicals management were approved in Mongolia as part of national efforts and strategies to domesticate/implement the provisions of the Stockholm Convention on POPs. • Amendment to the national occupational hazard list to include PCB requirements in workplace approved in 2016. • Requirements for improving PCBs standards have now been included in the Government Action Plan.	Highly Satisfactory
Output 1.2: Institutional capacity to implement PCBs related issues developed Activity 1.2.1: Develop system and capacity to determine PCB content in imported equipment and products Activity 1.2.2: Establish and train special unit to address PCB issues under National Chemical Management Committee Activity 1.2.3: Establish training programs for new and existing MOET staff on PCB issues Activity 1.2.4: Policy workshops and awareness raising program Activity 1.2.5: Develop and introduce PCB materials for professional training institutes Activity 1.2.6: Targeted public	• New technical guidelines; number of people trained (environmental inspectorates, specialists, NGOs) • Regulations developed; training program held; testing equipment provided • Special unit established • Training program developed and held • Workshops held • Information materials developed and introduced • Awareness levels increased	• Technical guidelines introduced to the PCB decontamination unit as part of the contract by the contractor in 2011. • Project office and national experts acquired necessary knowledge and skills needed for PCB management and inventory. • 12 national and regional Workshops targeting various stakeholders have been held - 1200 participants including custom and SSIA officers (Government officers: 580; electrical sector: 573; Private sector: 47) • 3 specific regional workshops for customs and SSIA officers in: 18 June 2012, Sukhbaatar, Selenge province; 22 June 2012, Ulaanbaatar; 10 October 2012, Zamiin-Uud, Dornogobi province • Policy Workshop for the staff of the	Satisfactory

awareness raising		Cabinet Secretariat of Mongolia, 12 February 2011, Khurel Togoot, Ulaanbaatar • Short cognitive video developed and broadcasted on national TV channels • Brochures for awareness raising on PCBs developed and distributed at workshops • A textbook on POPs and PCBs for curricula of higher educational institutions developed	
Output 1.3: Strengthened laboratory capacity for PCBs monitoring Activity 1.3.1: Upgrade laboratory facilities to monitor PCBs Activity 1.3.2: Adopt standard methodology for PCB monitoring Activity 1.3.3: Technical training in PCB monitoring	• Laboratory capacity strengthened, Number of staff trained • New equipment items purchased and installed • Standard methodology adopted • Number of individuals trained	• ICCT laboratory well equipped (GC/MS) for PCB analysis ($ 250,000) • 3 laboratory staff of ICCT trained Russia and Italy, • Laboratory fully operational in conformity with international standards (IEC 61619) • National standards for PCB analyses in insulating fluid and soil: MNS CEI EN 61619:2012 and MNS ISO 10382: 2012 approved by the national standardization authority. • Over 600 PCB analyses carried out by the laboratory.	Highly satisfactory
Output 1.4: Increased stakeholder capacity for PCB management Activity 1.4.1: Targeted technical training Activity 1.4.2: Develop and establish technical certification program Activity 1.4.3: Stakeholder awareness raising	• Number of training workshops, Number of onsite training programs, Number of individuals trained • Certification program established; Number of individuals tested, Number of individuals certified • Stakeholder awareness levels increased	• 20 training workshops and study tours undertaken • More than 1000 persons trained (government officers, electrical sector workers and private sector) • No evidence of certification program. • Policy Workshop for the staff of the Cabinet Secretariat of Mongolia, 12 February 2011, Khurel Togoot, Ulaanbaatar	Moderately satisfactory
Output 1.5: Socio-economic and mitigation measures assessed Activity 1.5.1: Public health and economic impact assessment report Activity 1.5.2: Worker health and safety assessment report	• Reports prepared • Report prepared analyzing public health impacts • Report prepared analyzing • worker safety impacts	• Socio-economic assessment of POPs chemicals in Mongolia conducted by an international consultant during April-July 2014. • As a follow up, public education and awareness raising activities intensified by the National Chemicals Management Office to reduce risks of exposure to PCBs and other hazardous chemicals/wastes (see act	Satisfactory

Output 1.6: Comprehensive data management in operation Activity 1.6.1: Procurement of data management software to meet Convention reporting requirements Activity 1.6.2: Training in use of data management software Activity 1.6.3: Ongoing data entry and management in support of Convention reporting requirements	• Data management system created and implemented • Data management software procured • Training program developed and held • Number of items in database	• Database developed and implemented • Database uploaded on MOET website then uploaded on seperate webpage created by project • Integrated management of the data generated enabled information exchange and experience sharing with other POPs and hazardous chemicals management projects. • From 2012 to 2014 database regularly updated by database expert • As from 2016 database updated by NPTG, the mobile treatment unit operator	Satisfactory
Output 2.1: Detailed inventory developed Activity 2.1.1: Stakeholder workshop to introduce PCB reporting requirements Activity 2.1.2: Stakeholder capacity building to identify and label PCB containing equipment Activity 2.1.3: Provide inventory monitoring kits and other monitoring supplies Activity 2.1.4: Inventory survey of PCB use in energy sector Activity 2.1.5: Inventory survey of PCB use in non-energy sectors Activity 2.1.6: Initial inventory completion	➢ Detailed inventory developed ➢ Stakeholder workshop held; Number of attendees ➢ Information materials developed and provided to stakeholders; Number of stakeholders contacted and provided with information and technical support ➢ Amount of monitoring kits and other monitoring equipment/supplies provided ➢ Completed energy sector inventory list; Number items listed ➢ Completed non-energy sector inventory list; Number items listed ➢ Completed inventory list; Number items listed	• 90% of electrical equipment belong to the two state owned national transmission and distribution companies. • Private companies, which were created after 1990 when Mongolia departed from the Soviet communist model and became a democracy with multi parties election, owned electrical equipment which were new and PCB free. • PCB inventory was completed in 2014 and it covered the 21 provinces of Mongolia. • 1920 tons of equipment with PCB contamination of over 20 ppm identified: 763 tons over 50 ppm and 1257 tons in the range 20-50 ppm). • All the equipment properly labeled: green label: less than 50 ppm; yellow label: when in doubt to be checked by laboratory analysis; red label: above 50 ppm). • Monitoring of inventorized sites and equipment done in consultation with two state owned companies to ensure safe guarding, handling PCBs-containing oils and equipment and reduce risk of exposure pending delivery and operation of the decontamination mobile unit.	Satisfactory

Output 2.2: Environmentally sound management of PCB containing equipment in use, including handling, maintenance, and repair in place Activity 2.2.1: Develop and introduce guidelines for environmentally sound management of PCB-containing equipment Activity 2.2.2: Create and equip dedicated environmentally sound maintenance capacity for PCB containing transformers Activity 2.2.3: Decontamination of oil for transformers to remain in use	• ESM system, operational guidelines, work instructions for all stakeholders in place; leaking equipment repaired or replaced and safely disposed of • Guidelines developed • Maintenance facility created; Number of pieces of equipment maintained in environmentally sound manner • Amount of PCB oil decontaminated	• Building to host the PCB decontamination mobile unit was provided as part of national co-funding by upgrading a transformer maintenance facility of NPTG. The selected technology was commissioned in December 2012. • Storage transformer facility built according to international norms provided by Mongolian government as co-funding • Draft guidelines on environmentally sound management of PCBs-containing equipment prepared and adopted in Mongolian language. • The facility for the decontamination mobile unit have been continually maintained in order to ensure that it is in good condition for the installation, commissioning and operation of the new decontamination mobile unit that is now under procurement.	Highly satisfactory
Output 2.3: Disposal of PCB containing equipment and waste using BAT/BEP implemented Activity 2.3.1: Develop and introduce guidelines for environmentally sound disposal of PCB-containing equipment and oil Activity 2.3.2: Retire targeted PCB containing equipment in electricity sector Activity 2.3.3: Introduce mobile technology to decontaminate PCB containing equipment Activity 2.3.4: Strengthen capacity created to collect, package, transport, and/or store PCB contaminated wastes Activity 2.3.5: Evaluate soil contamination risks and recommend leakage treatment approaches Activity 2.3.6: Incentive program Activity 2.3.7: Treat PCB contaminated wastes	➢ Minimum of 1000 tons of PCB-containing oil, equipment, and other PCB contaminated wastes disposed of ➢ Guidelines developed ➢ Amount of PCB containing equipment retired ➢ Mobile decontamination technology introduced ➢ Amount of PCB containing wastes collected ➢ Evaluation report ➢ Incentive program implemented including variety of measures to encourage ESM of POPs containing materials ➢ Amount of PCB contaminated wastes created	• After an international bidding exercise with three companies participating, the Sea Marconi company from Italy was selected to provide the PCB mobile treatment unit (MTU) running on a non-combustion technology for a total cost of US$ 1.07 M that included the cost for the patent for the technology, the mobile treatment unit, the training of the staff that would operate the MTU, the chemicals for treating 1,000 tonnes of PCB contaminated equipment. • One of the technical requirement of the national counterparts was that the technology should not only decontaminate the transformer oil but it would have to regenerate it such that it can be re-used for a further 10 to 15 years. • The MTU was commissioned in December 2012 and hosted at the premises of NPTG. • Prior to the commissioning, 3 staff of NPTG were trained for 3 months at Sea Marconi in Italy to operate the MTU. • From Dec 2012 to Nov 2014, 733 tons of PCB containing equipment have been decontaminated for most of the cases in situ.	Highly satisfactory

		• In Nov 2014, the MTU was totally destroyed by a fire while treating a 40 ton transformer at the Power Plant No 3 at Ulaanbaatar. • Due to confusion between Sea Marconi and NPTG, the equipment was not insured. • After inquiry, NPTG was found to be responsible of the fire accident. • After high level discussions during tripartite meeting (UNIDO, national counterparts and Sea Marconi) in Ulaanbataar three days after the fire accident, it was unanimously agreed to continue with the implementation with the purchase of a new mobile treatment unit. • During another tripartite meeting in Vienna in June 2015, Sea Marconi agreed to provide the project with a new treatment unit at a reduced cost of US$ 270,000: with NPTG providing $ 120,000 and the project $150,000. • It took time for Sea Marconi to construct a second unit, which was delivered in Feb 2017. From March 2017 to November 2017, the NPTG succeeded in treating a further 269 tonnes of PCB contaminated equipment to reach a total of 1,002 tonnes.	
Output 2.4: Environmental monitoring system for PCBs established Activity 2.4.1: Review of stakeholder PCB management systems Activity 2.4.2: Workplace safety monitoring Activity 2.4.3: Environmental site monitoring	• Number of inspections Stakeholder PCB management system plans submitted and reviewed • Number of inspections of PCB owner/user sites • Number of inspections of potentially at-risk sites	• Monitoring activities carried out by the National Chemicals Management Council Office. However, inspection or monitoring reports not available • The ICCT laboratory undertook more than 600 PCB analyses. However there is no indication whether some of these analyses corresponded to the monitoring of potentially at-risk sites.	Moderately satisfactory
Output 3.1: Project management structure established Activity 3.1.1: Establish Project Implementation Unit (PIU) and appoint project leadership staff at MOET Activity 3.1.2: Establish Project Steering Committee (PSC)	➢ Project Implementation Unit established; Project Steering Committee established with representatives from national and local stakeholder agencies; Project expert team established; Training	• PIU established and the office located at the National Chemicals Management Council, MOET. • NPC recruited assisted by recruited three experts (legal, inventory and management system) • PSC established by a Decree of the MOET, July 2010 recruited. • PIU functional and effective and worked in close consultation with	Satisfactory

Activity 3.1.3: Recruit Chief Technical Advisor (CTA), National Project Coordinator (NPC), policy and technical experts in POPs waste management, evaluation, and program development Activity 3.1.4: Hold project management training for project management staff Activity 3.1.5: Work with stakeholder project participants to establish PIUs within organization and sign project participation contracts Activity 3.1.6: Establish project management information system (MIS), including a project website to disseminate information to stakeholders	workshop held on project management; MIS established ➢ PIU established and staffed ➢ PSC established ➢ CTA recruited ➢ Project management training held ➢ Stakeholder PIUs established and staffed ➢ MIS established	the National Project Director, who was Secretary of the National Chemicals Management Office. • A CTA was not recruited, how an international expert was recruited to provide training to national stakeholders on the use of the Dexsil test kit for PCB analysis. • Sea Marconi also provided expertise for safe handling, packing, transport, storage and disposal of PCB contaminated equipment	
Output 3.2: Project results monitored and reported Activity 3.2.1: Prepare and hold Inception Workshop Activity 3.2.2: Measure impact indicator Activity 3.2.3: Carry out annual project financial audits Activity 3.2.4: Prepare Annual Project Reports and Project Implementation Reviews Activity 3.2.5: Hold annual tripartite review meetings Activity 3.2.6: Carry out mid-term external evaluation Activity 3.2.7: Carry out final external evaluation Activity 3.2.8: Complete Project Terminal Report	➢ Detailed work plans prepared; Data and information collected for MIS; Technical and political guidance received from Steering Committee; Problems identified and corrected as result of progress reports and field visits; MIS established; Project information, experience and lessons disseminated through website ➢ Inception Workshop held ➢ Updated impact indicators ➢ Financial audit completed ➢ Annual reports and PIRs Completed ➢ Annual TPR meetings held ➢ Mid-term evaluation Completed	• Inception workshop held on 25 September 2009 • Project team contributed to monitor project progress and indicators • PSC meetings held, work plans discussed and revised with the assistance of UNIDO • Progress, annual and PIR reports timely submitted • Project not audited • Midterm evaluation undertaken in September – November 2012, report completed March 2013 • Terminal evaluation undertaken October – December 2017 • Project terminal report under preparation	Satisfactory

	➢ Final external evaluation held ➢ Project Terminal Report completed		

Annex 5: National counterparts co-funding details

UNIDO/GEF Project "Capacity building for environmentally sound PCBs management and disposal in Mongolia GF/MON/09/001

Co-Funding Table

July 2009 - December 2017

#	Expense item	Unit	Unit cost	In-Cash (MNT	In-kind (MNT)
Ministry of Energy/National Power Transmission Grid Stock Company					
1	Replacement of oil containing breakers with gas breakers			10,651,714,130.00	
2	Building of PCB decontamination facility	1		461,415,600.00	
3	facility	1		343,188,960.00	
4	Oil regeneration unit in the PCB facility	1		8,000,000.00	
5	Salary of PCB project head engineer	1 person 72 months	1,500,000.00	108,000,000.00	
6	Salary of PCB project technology engineer	1 person 72 months	1,500,000.00	108,000,000.00	
7	Salary of PCB project technical worker	2 persons 72 months	1,125,000.00	162,000,000.00	
8	Computer	2	1,125,000.00	2,500,000.00	
9	Desk and chair set	4	1,190,000.00	4,760,000.00	
10	Printer set	1	850,000.00	850,000.00	
11	Petrol cost	2 vehicles 72 months	40,000.00	5,760,000.00	
12	Telephone and internet	72 months	30,000.00	2,160,000.00	
13	Stationery	72 months	20,000.00	1,440,000.00	
14	Training cost	4 persons	400,000.00	1,600,000.00	
15	Operational cost for DMU	3 years	5,400,000.00	16,200,000.00	
16	Contribution to the purchase of new DMU	1	240,000,000.00	240,000,000.00	
	Sub-Total			***12,117,588,690.00***	
Ministry of Environment and Tourism					
1	Renovation of PCB decontamination facility building			126,000,000.00	
2	PCB soil contamination project by the State Fund for Science and Technology			30,000,000.00	

3	Stationary			44,700.00	
4	Banner for training			45,000.00	
5	Water for training			54,000.00	
6	Training hall payment			500,000.00	
7	Office supply/Tea, coffee etc			35,110.00	
8	Customs bonded yard storage fee/DEXSIL and reagents			180,600.00	
9	Banner for training			20,000.00	
10	Stationary for training			60,150.00	
11	Office supply/Canon toners etc			114,920.00	
12	Canon copier servicing			291,600.00	
13	Oil sample delivery to Laborelec/UPS (USD82.80)			111,780.00	
14	Airport customs fee, declaration cost			61,600.00	
15	PC repair			15,000.00	
16	New office room repair			752,700.00	
17	Fax to provinces			4,400.00	
18	Customs clearance/GarudaTrans			9,880.00	
19	Travel cost to Erdenet for soil sample			229,500.00	
20	Antivirus for office PCs			258,800.00	
21	Discrepancy of payment for transport/AccuStandard Inc. (USD84.73+9+15)			154,178.94	
22	Stationary for training			344,300.00	
23	Transport cost for bus for training participants			230,000.00	
24	Payment for PCBs analysis to GEOS Ingenieurs Counseils SA (Euro324.50+9+20)			642,976.40	
25	Local transportation for the project office	78 months	50,000.00		3,900,000

26	Internet	78 months	20,000.00		1,560,000
27	Telephone	78 months	30,000.00		2,340,000
28	Project office room	1 room 78 months	500,000.00		39,000,000
29	PCB laboratory room	2 rooms 78 months	500,000.00		78,000,000
	Sub-Total			***160,161,195.34***	***124,800,000.00***
Ulaanbaatar Electricity Distribution Network Stock Company					
1	PCBs management training fee/Sea Marconi	7 persons 1 week		70,000,000.00	
	Sub-Total			***70,000,000.00***	
	GRAND TOTAL (MNT)			**12,347,749,885**	**124,800,000.00**
	GRAND TOTAL (US$)			**$6,859,861.05**	**$62,400.00**

Prepared by: **Project Team**

November 16, 2017