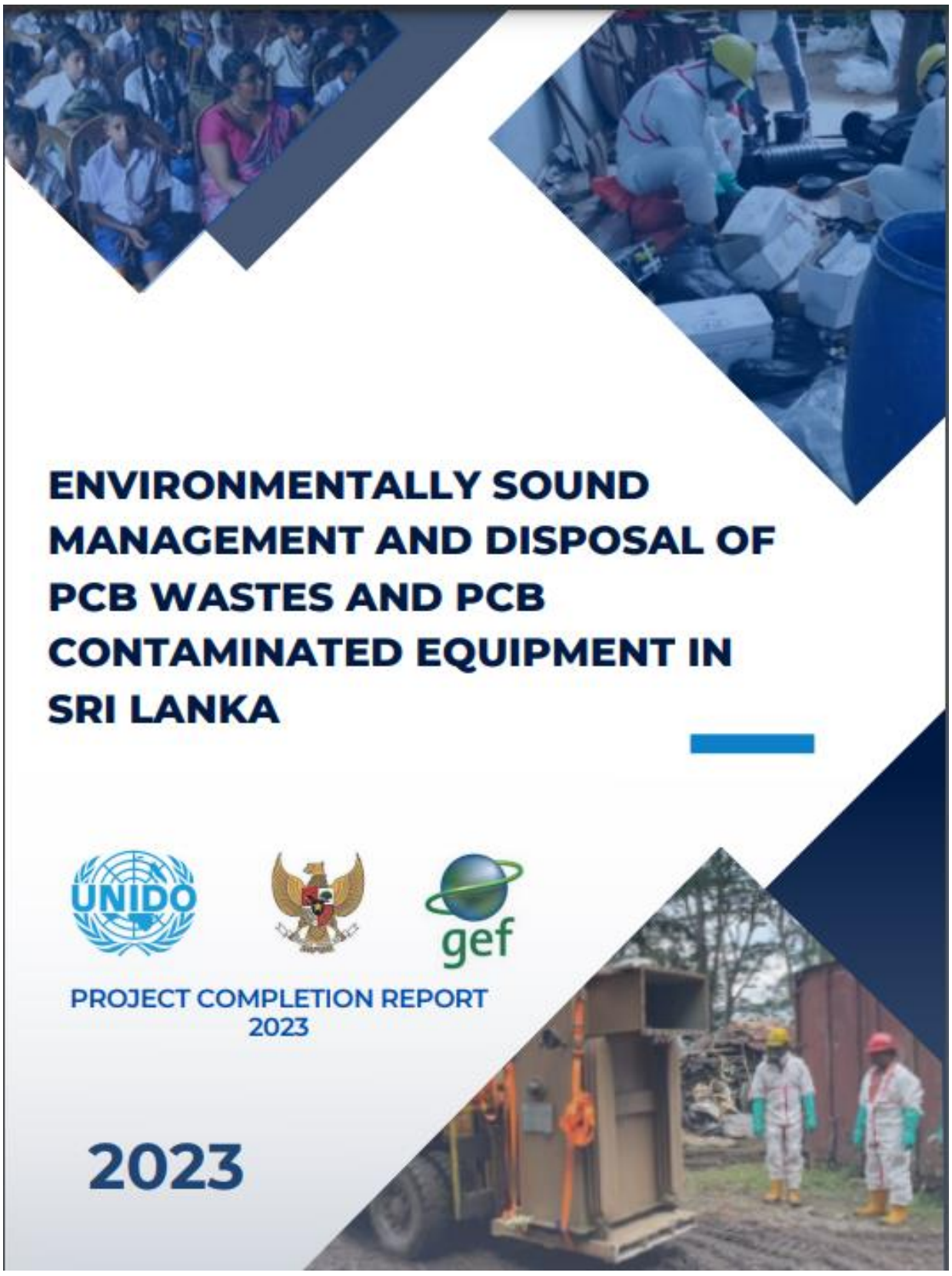
ENVIRONMENTALLY SOUND MANAGEMENT AND DISPOSAL OF PCB WASTES AND PCB CONTAMINATED EQUIPMENT IN SRI LANKA
UNIDO
gef
PROJECT COMPLETION REPORT
2023
2023

PROJECT COMPLETION REPORT

Prepared for the
United Nations Industrial Development Organization
(UNIDO)

January, 2024
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Environmentally Sound Management and Disposal of PCB Wastes and PCB contaminated Equipment in Sri Lanka

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Abbreviation and Acronyms

BAT	*Best Available Techniques*
BEP	*Best Environmental Practices*
CEA	*Central Environmental Authority*
CEB	*Ceylon Electricity Board*
CES	*Center for Environmental Studies*
CISIR	*Ceylon Institute of Scientific and Industrial Research*
ESM	*Environmentally Sound Management*
GEF	*Global Environment Facility*
IA	*Implementing Agency*
IDB	*Industrial Development Board*
ISID	*Inclusive and Sustainable Industrial Development*
ITI	*Industrial Technology Institute*
LECO	*Lanka Electricity Corporation*
LTL	*Lanka Transformers Ltd*
MERE	*Ministry of Environment and Renewable Energy*
MOE	*Ministry of Environment*
MPE	*Ministry of Power and Energy*
MTE	*Mid-term Evaluation*
NEA	*National Environmental Act*
NEPS	*National Environment Policy and Strategies*
NGO	*Non-Government Organization*
NIOSH	*National Institute of Occupational Safety and Health*
NIP	*National Implementation Plan*
NPC	*National Project Coordinator*
NPD	*National Project Director*
NPM	*National Project Manager*
OSHE	*Occupational Safety and Health Environment*
PBTS	*Persistent Bioaccumulative Toxic Chemicals*
PCBs	*Polychlorinated Biphenyls*
PIR	*Project Implementation Report*
PMU	*Project Management Unit*
POPs	*Persistent Organic Pollutants*
ppm	*Parts per million*
PSC	*Project Steering Committee*
PTPV	*People to People Volunteer*
SC	*Stockholm Convention*

PROJECT PROFILE

Project Title:	Environmentally sound management and disposal of PCB wastes and PCB contaminated equipment in Sri Lanka
GEF ID:	5314
UNIDO ID:	150050
GEF Replenishment Cycle:	*GEF-5*
Country(ies):	Sri Lanka
Region:	*SA - Southeast Asia*
GEF Focal Area:	*Persistent Organic Pollutants (POPs)*
Integrated Approach Pilot (IAP) Programs[1]:	*Not Applicable*
Stand-alone / Child Project:	*Not applicable*
Implementing Department/Division:	*ENV / IPM*
Co-Implementing Agency:	*Not applicable*
Executing Agency(ies):	Then Ministry of Environment (MOE), Ministry of Power and Energy (MPE), Ceylon Electricity Board (CEB), Lanka Electricity Company (LECO), Central Environmental Authority (CEA), Industrial Technology Institute (ITI)
Project Type:	*Full-Sized Project (FSP)*
Project Duration:	*60 Months*
Extension(s):	*3*
GEF Project Financing:	US $4,725,000
Agency Fee:	US $448,875
Co-financing Amount:	US $18,989,752
Date of CEO Endorsement/Approval:	2/25/2015
UNIDO Approval Date:	3/18/2015
Actual Implementation Start:	5/04/2015
Cumulative disbursement as of 30 June	US $3,277,421

[1] Only for **GEF-6 projects**, if applicable

2022:	
Mid-term Review (MTR) Date:	3/30/2019
Original Project Completion Date:	6/30/2021
Project Completion Date as reported in FY21:	6/30/2022
Current SAP Completion Date:	6/30/2023
Expected Project Completion Date:	12/31/2023
Expected Terminal Evaluation (TE) Date:	2/29/2024
Expected Financial Closure Date:	8/31/2024
UNIDO Project Manager:	Carmela CENTENO

EXECUTIVE SUMMARY

The "Environmentally sound management and disposal of PCB wastes and PCB contaminated equipment in Sri Lanka" is a GEF-funded Project that aims to help *the* Sri Lankan Government address PCB problems.

As early as 2006, various initiatives on PCB management have already been conducted headed by the Ministry of Environment of Sri Lanka. The institutional infrastructure in Sri Lanka is ready to implement a sound management of PCBs in the country but the sticking point lies on how to put together the various initiatives and the existing infrastructures to ensure an efficient and well-informed network on the management of PCBs. It was also noted that during that time, the level of awareness was very low as well as the level of resources allocated for information campaigns on PCBs. The enforcement mechanisms (lack of technical capability) were also weak and there was a lack of sustained commitment from other government functionaries and there was a need for increased private sector participation.

This GEF project was formulated to build capacity in Sri Lanka to introduce and implement an environmentally- sound management of PCB waste stockpiles and PCB-containing equipment. Prior to the implementation of the project, Sri Lanka had no regulation on PCB; PCB equipment is not currently managed in compliance with the Stockholm Convention and has very limited experience in the disposal of PCB-contaminated equipment and oil.

Hence the project was designed having four components with various outputs that complement each other and bring synergy to the fulfillment of the project objectives. The PSC was composed of UNIDO, Government Partners, the private sector, NGOs, and other relevant institutions.

Component 1 focused on institutional capacity building and awareness raising in strengthening the technical and analytical capacities of relevant stakeholders and conducted a widely-covered inventory with the aim of establishing the database on PCB owners. Component 2 on the other hand is about the formulation of guidelines and policies relevant to PCBs. Two major regulations were crafted to support the initiatives in the management of PCBs. Component 3 pertains to the disposal of PCBs and the establishment of an ESM system in selected PCB owner sites for demonstration including labeling, registration, and packaging of PCB wastes and PCB-contaminated equipment. The project has received $4,725,000 from GEF and targeted $18,989,752 co-finance from project partners but the actual amount received as co-financing amounted to USD 288,772.55 (LKR 93,019,439).

All project activities were implemented and all targets were met. Major accomplishments of the project include the development of training manuals for the utility and welding sectors which were used by the Inventory Teams. Thirty-three workshops were conducted for the inventory, curriculum development, and welders' awareness. Inventory and sampling plans were successfully undertaken and the database through a mobile app that shows the location of all the transformers through georeferencing was also developed.

The National Policy on SWM and the National Chemical Management Policy are the two policies that were crafted to ensure the continued implementation of the activities pertaining to PCBs. The ESM System was developed, established, and operationalized during project implementation. Temporary storage facilities were strengthened and utilized and a suitable treatment facility was identified and used for the treatment and eventual disposal of the PCBs. Low and highly contaminated PCB oil was disposed of with a total of 193.72T. Around 400T (in weight) transformers were retrofilled and 124.74T oil was obtained from retrofilling. To support these ongoing activities, a long-term strategic plan for the phase-out or treatment of PCB-contaminated equipment was also developed and implemented.

With regard to impact monitoring and evaluation, monitoring activities were undertaken through regular meetings and the submission of reports. PSC meetings were held to give regular updates and other meetings were called as necessary.

The accomplishments of this project have already made progress and show great potential for Sri Lanka to eventually address PCB issues and problems. The presence of capable players and their available resources makes the project highly sustainable. It is for the government to ensure and continue to enforce the laws and to continue to be vigilant in monitoring and maintaining its role in coalescing these institutions. Undoubtedly, with the results and benefits of the project already recognizable, and if Sri Lanka will continue these undertakings, then they can surely be PCB-free by 2028.

I. PROJECT DESCRIPTION

A. Rationale

Sri Lanka's National Environment Policy and Strategies (NEPS) of 2003 is the country's general framework of environment policy. The NEPS deals with the preservation of land, water, atmosphere, and biological diversity. It also includes environmental strategies for the key economic sectors, namely forestry and wildlife, agriculture and mining, fisheries, tourism, energy and transport, health, and urban development.

Sri Lanka signed the Convention on 5 December 2001 and ratified it on 22 December 2005. The Ministry of Environment (MOE), serves as the national focal point for the Stockholm Convention (SC) and the national executing partner of the project The SC involves the inventory and phasing-out of Sri Lanka's POPs and the incorporation of environmentally sound management of hazardous chemicals and waste.

One priority problem that was identified in the National Implementation Plan (NIP) of Sri Lanka is the management of *polychlorinated biphenyls* (PCBs). Sri Lanka never produced PCBs but there are several problems related to PCB management, These include (i) Lack of adequate legislation to control imports; (ii) Environmental impacts and baseline levels not adequately studied; (iii) Lack of sufficient resources for identification and analysis; (iv) Lack of acceptable treatment, disposal, and storage systems for PCB contaminated oil and equipment; (v) Contaminated sites yet to be identified; and, (vi) Cross-contamination of non-PCB oil with PCB oil.

Solving PCB problems was never an easy task for the Sri Lankan Government. They were constrained to address those due to the following: (i) low level of awareness and low level of resources allocated for information campaigns; (ii) weak enforcement mechanisms (lack of technical capability to detect and regulate PCBs in use and releases to the environment, and to control PCB imports); (iii) lack of sustained commitment from other government functionaries; and, need for increased private sector participation (e.g. unwillingness of PCB owners to pay for proper PCB treatment).

Inventories of PCBs were already conducted in 2006 which revealed that there were around 1,060 contaminated transformers and around 1,000T of PCBs, PCB-containing equipment, and wastes in the country. Another inventory in 2012, revealed that there were around 2210 transformers that were manufactured before 1986, 48% of which were found to be contaminated transformers. Since the contaminated transformers cannot be easily tracked back, it became necessary to redo the analysis when the PCB Inventory was carried out.

According to the NIP inventory, the transformers in Sri Lanka came from over 20 countries and covered many models produced for Generation, Transmission, and Distribution. There were around 18,500 transformers in the electricity and industrial sector and only a few pure PCB transformers were identified. It was discovered as well that non-PCB transformers have also a high degree of cross-contamination and not only the transformers manufactured before 1986.

The contamination is assumed to have occurred during maintenance activities or the negligent use of PCB-contaminated oil.

The Ceylon Electricity Board (CEB) and Lanka Electricity Corporation (LECO) are the major transformer owners in Sri Lanka. CEB in Piliyandala provides the maintenance services while Lanka Transformers Ltd (LTL) handles the repairs. The Industrial Development Board (IDB), mandated for managing scrap from the public sector, acts as an intermediate that procures decommissioned transformers.

At the start of the project, it was learned that there are around 2,500 phased-out transformers owned by the Ceylon Electricity Board (CEB) in Sri Lanka, partially stored at LTL and LECO sites, and partially stored on site. Transformers were usually resold for scraping through IDB. Scraping is done by IDB by selling the copper and the oil. The self- and cross-contamination among welders and families are high due to a lack of awareness of the ill effects of PCBs.

Table 1. Uses of Oil and Copper from Transformers

Scraping of Transformers by Selling Copper and Oil		
Item	***Buyer***	***Uses***
copper	small-scale recyclers	recycling and used in manufacturing welding transformers, battery charging, motor winding
oil	welders, garage owners, and people	used as a coolant oil in welding plants and other domestic purposes

This kind of situation has already triggered actions on the part of the Government of Sri Lanka however, awareness of the small-scale recyclers and the public in general still needs to be enhanced as well as finding interim storage for safeguarding and proper disposal system was needed to be put in place.

Major Players in Sri Lanka Responsible for the Implementation of the Action Plan on PCB Management include but are not limited to the following:

The Ministry of Environment – the focal point for the Stockholm Convention in Sri Lanka and is responsible for the preparation of the NIP and solicits other institutions for its implementation.

> The National Coordinating Committee established by the ministry will coordinate and monitor as well as be responsible for updating the NIP

The Central Environmental Authority (CEA) under National Environmental Act no.47 of 1980 and its amendments NEA no.56 of 1988 and no. 53 of 2000. CEA is under the responsibility of MOE.

It is responsible for the issuance of clearances and for maintaining the environmental standards by the National Environmental Act of 1980 and its amendments.

Ministry of Power and Energy (MPE) - the main body responsible for the management of the Energy Sector It is the key organization instrumental in the formulation of policy on the energy sector. The entities described below are institutes affiliated with the MPE:

i) The Ceylon Electricity Board (CEB) is empowered to generate electric energy, transmit the same, and distribute it to reach all categories of consumers. It provides energy to more than 90% of Sri Lanka. To carry out its role, the CEB has acquired a large base of physical assets, including generating stations, substation complexes, transmission lines, and distribution networks located in all parts of the country. With this mandate, CEB is the largest owner of the decommissioned transformers (probably containing PCBs).

ii) Lanka Electricity Company (Pvt) Ltd (LECO) is the body that distributes electricity in areas, which were previously served by Local Authorities (Municipal Councils etc.). LECO receives electricity from CEB at 11 kV and distributes it in LECO franchise areas. LECO serves about 11% of the customers in the country.

iii) LTL Transformers (PVT) Ltd is a joint venture of Ceylon Electricity Board the Power Utility of Sri Lanka and European Investors was originally a transformer repair and maintenance facility. With an existing Technical Collaboration Agreement with ABB AS of Norway, the company's transformer production line was developed and is currently a state-of-the-art production facility. They manufacture high-quality transformers conforming to international standards and meeting the entire Sri Lankan requirements while about 50% of their productions are exported. LECO still does transformer repair and maintenance and has preventive measures in place to ensure that PCB transformers are properly managed.

The Industrial Development Board (IDB) - the prime State Organization established for the Promotion and Development of Industries in Sri Lanka under the Ministry of Traditional Industries and Small Enterprise Development. IDB's services include Identification of Business Opportunities, Quality, and Productivity Improvement, Project feasibility studies and reports, etc., and currently the only institution mandated for scrap (including transformers) management in the country.

The Government-owned Industrial Technology Institute (ITI) under the Ministry of Technology Research is the successor to the Ceylon Institute of Scientific and Industrial Research (CISIR), which is in charge of the technical and scientific support to industry, technology transfers, training, environmental monitoring and remediation, research and development.

Generally, Sri Lanka's institutional infrastructure already can implement a sound management of PCBs in the country. However, the major challenge was how to put together these initiatives and the existing infrastructures to ensure an efficient and well-informed network on the management of PCBs.

PROJECT DESCRIPTION

B. Objectives and Scope

Project Objective: The project will build capacity in Sri Lanka to introduce and implement an environmentally- sound management of PCB waste stockpiles and PCB-containing equipment.

Baseline:	Target:
• A regulation on PCB is missing. • PCB equipment is not currently managed in compliance with the Stockholm Convention. • Co-financing is leveraged by relevant stakeholders at the CEO Endorsement stage. • Limited experience in the disposal of PCB-contaminated equipment and oil by cement kiln incineration	• A PCB regulation compliant with the SC convention is adopted and enforced. • Committed cofinancing utilized for the intended purpose. • 1000 t of PCB-contaminated equipment disposed of in an environmentally safe manner.

Indicators			
• Availability of a PCB regulation and national PCB phase-out plan.	• Tons of PCB-contaminated equipment were disposed of in an environmentally safe manner.	• Amount of incremental investment achieved.	• Increased Level of awareness and technical capability of institutional and private stakeholders

PROJECT DESCRIPTION

C. Components

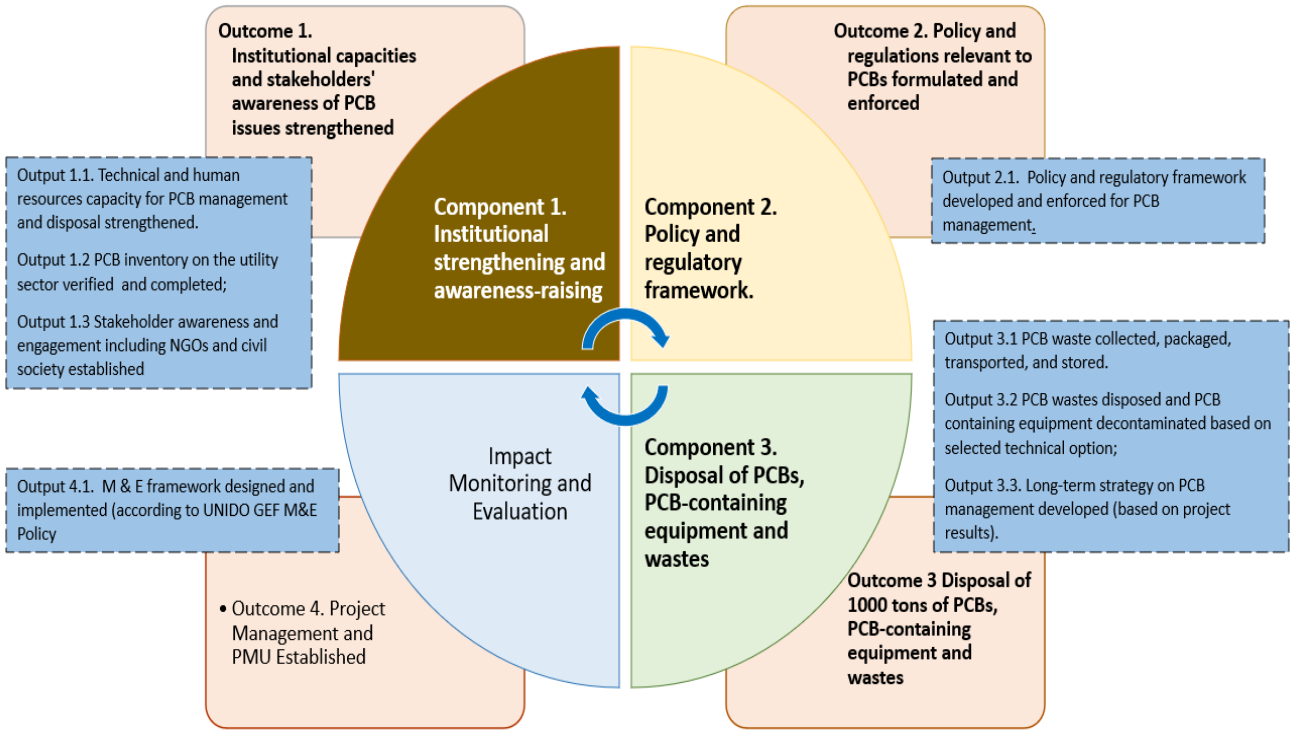


Figure 1. Project Components

The four components were designed to have outputs that complement each other and bring synergy to the fulfillment of the project objectives. The PSC was composed of UNIDO, Government Partners, the private sector, NGOs, and other relevant institutions.

The interconnectedness of the output activities brought synergy not only towards the accomplishment of the desired outcomes but also among these agencies and organizations which was necessary to have a more holistic approach to achieve a PCB-free country in 2028.

Component 1 addresses institutional capacity building and awareness raising. Technical and analytical capacities of relevant stakeholders were strengthened to provide good foundation in addressing PCB issues. An in-depth and a more widely-covered inventory were also conducted with the aim of establishing a database on PCB owners. Capacity building and awareness raising were directed to government officials at all levels, managers and workers at state-owned utilities and private entities. The activities on this component were done in partnership with NGOs and people's organizations.

Component 2 is about the formulation of guidelines and policies relevant to PCBs. Two major regulations were crafted to support the initiatives in the management of PCBs. It aimed to encourage PCB owners to declare and dispose of their PCB stockpiles as well as to avoid spread of contamination and wrong practices that can lead to undesirable health impacts to the community. These regulations were disseminated to relevant stakeholders and enforced which can already assure of project sustainability.

Component 3 pertains to the disposal of PCBs and the establishment of an ESM system in selected PCB owner sites for demonstration including labelling, registration and packaging of PCB wastes and PCB-contaminated equipment. The project was able to secure and support the safeguarding of PCB-contaminated transformers, through safe transport, storage, "cleaning', retrofilling and eventually sent for disposal facility which has the right technology.

PROJECT DESCRIPTION

D. Implementation Arrangements

The involvement of the different stakeholders in PCB management was already noticeable even prior to project implementation in Sri Lanka. These stakeholders then were identified to contribute to the success of the project which are the following:

- Ministry of Environment
- Ministry of Power and Energy (MPE) as national executing partner,
- Ceylon Electricity Board (CEB),
- Lanka Electricity Company (LECO),
- Lanka Transformers Limited (LTL),
- Central Environmental Authority (CEA),
- People to People Volunteers (PTPV).

CEB, LECO, and LTL are the three main agencies that deal directly and handle all transformers, and capacitors, which may be contaminated with PCBs.

Supporting government institutions were the Department of Labour and Ministry of Health which were consulted on the issues related to their mandate like Labour Standards, OSHE, etc. while the National Institute of Occupational Safety and Health (NIOSH), got involved in the awareness among workers on the hazards ways by which they can be protected in the workplace.

The MOE is the executing partner who handles the coordination activities and ensures the timely implementation of the project activities. The Central Environmental Authority on the other hand guaranteed that a policy framework is developed to address PCB issues in the country.

The People to People Volunteers (PTPV) which has also been part of the project since its inception supported the project and helped out in the cleaning and temporary storage of the PCBs.

The private sector (PCB owners) played an important role in the disposal of stockpiles as well as their co-financing contributions to attain the objectives of the project. Transformer service providers, relevant industry associations, NGOs, women's organizations, media, and the academe were also mobilized and included in the PCB disposal plan and public awareness-raising activities.

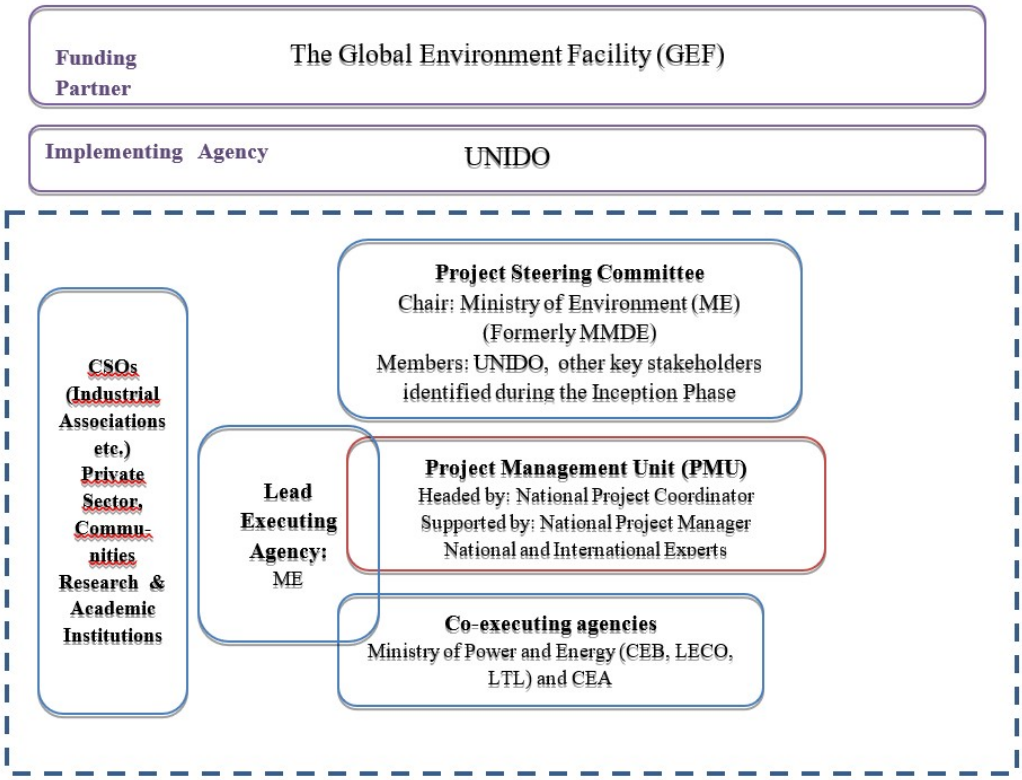


Figure 2. The project implementation structure.

This GEF project is implemented by UNIDO. A project officer was appointed by UNIDO to oversee the implementation of the project, assisted by a support staff and supervised by a senior staff engaged and who also managed the coordination of UNIDO's Stockholm Convention Programme.

The UNIDO Regional Office in India and the UNIDO Focal Point in Sri Lanka also played a significant role in the implementation and monitoring of the project. UNIDO country-level monitoring was provided as part of the in-kind contribution of the organization to the project.

The Ministry of Environment (MOE) as mentioned was the main executing partner. Co-executing agencies include the Ministry of Power and Energy, including all its affiliates, and the Central Environmental Authority.

A Project Management Unit (PMU) was established within the Ministry. A National Project Director (NPD) from the MOE was appointed and chaired the Project Steering Committee. A National Project Coordinator (NPC), also from the Ministry, was assigned by the NPD to oversee the activities of the project with the National Project Manager (NPM) who was recruited to manage and execute the day-to-day tasks required by the project. International and national experts were recruited based on project requirements.

PROJECT DESCRIPTION

E. Cost and Financing Arrangements

The project has received USD 4,725,000 from GEF and USD 18,989,752 co-finance from project partners.

*Table 2. Sources of Co-Financing for the Project**

Sources of Co-financing	Name of Co-financier (source)	Type of Co-financing	Co-financing Amount ($)
National Government	Ministry of Power and Energy	Cash	1,549,860
National Government	Ministry of Power and Energy	In-Kind	92,708
National Government	Ministry of Mahawell Development and Environment	In-Kind	179,028
National Government	Ceylon Electricity Board	Cash	12,685,567
National Government	Ceylon Electricity Board	In-Kind	3,171,392
National Government	Central Environment Authority	In-Kind	142,662
National Government	Lanka Electricity Company	In-Kind	95,130
National Government	Industrial Technology Institute (ITI)	In-Kind	177,667
Private Sector	LTL Transformers (Pvt) Limited	Cash	54,971
Private Sector	LTL Transformers (Pvt) Limited	In-Kind	340,694
Private Sector	INSEE Ecocycle	Cash	201,093
Private Sector	INSEE Ecocycle	In-Kind	59,129
GEF Agency	UNIDO[2]	Grant	89,850
GEF Agency	UNIDO	In-Kind	150,000
Total Co-financing			18,989,752

*As stated in the project document.

II. PROJECT IMPLEMENTATION ACHIEVEMENT AND PERFORMANCE PER COMPONENT

The project's major achievements are discussed in this section for each of the components. It also includes the component's implementation performance which describes how these accomplishments were achieved and the steps undertaken to meet the targeted outputs for the different components.

Component 1 - Achievements

Component 1 Institutional strengthening and awareness-raising
Outcome 1. Institutional capacities and stakeholders' awareness of PCB issues strengthened

Output 1.1. Technical and human resources capacity for PCB management and disposal strengthened.	Achievements: Training manuals were produced for the Utility and Welding Sectors which were used by the Inventory Teams.
Output 1.2 PCB inventory on the utility sector verified and completed	Achievements: Inventory and sampling plans were successfully undertaken and the database was prepared. Three inventories completed (Utility, Welding, and Industrial Sector Inventories)
Output 1.3 Stakeholder awareness and engagement including NGOs and civil society established	A total of 33 workshops were conducted for the inventory, curriculum development, and welders' awareness

All targeted activities on this component were successfully achieved. During the early months of project implementation, the activities focused on the capacity building of teams who were involved in the inventories undertaken.

Output 1.1. Technical and human resources capacity for PCB management and disposal strengthened.

Various capacity-building activities were conducted as part of the project's awareness and training program. The pieces of training covered, specifically for the welding and utility sectors, sample testing, cleaning, retrofitting, transport, and operation on PCB Management. To support the sampling activities, two laboratories were strengthened and capacitated.

All other activities implemented related to the project were found to be an opportunity to raise awareness of the different stakeholders about PCBs. The table below reflects the number of participants for each of the activities conducted during the implementation of the project.

Table 3. Number of Participants for Each Project Activity

Event/Activity	Male	Female	Total
Component 1			
Awareness Raising for the General Public	660	440	1100
Awareness Raising for the Staff/Officials	498	116	614
Component 2			
Chemical Policy development	60	31	91
Waste Policy Development	12	7	19
Component 3			
PCB Activities with CEB	120	3	123
PCB Activities with PTPV	83	10	93
PCB Activities with INSEE	30	2	32

Aside from the training materials used for the training and workshops, **Training Manuals and Inventory Manuals** were also developed and produced specifically for the Utility and Welding Sectors. These manuals were then used by the Inventory teams.

People To People Volunteer (PTPV) who was assigned to help out in the "cleaning" and temporary storage of PCBs acquired the necessary vehicle and equipment as part of their strengthening activities. They also built the storage facility to accommodate the number of existing transformers that were inventoried and identified for disposal.

All targeted capability-building activities were done and supported by the project except for INSEE which was in charge of the transportation and disposal of PCBs and export of identified highly concentrated PCBs. Their capacitation was done through a foreign collaboration with Suez PCB Decontamination.

Output 1.2 PCB inventory on the utility sector verified and completed

Inventories were conducted for both the utility and the welding sectors. The inventory for the utility sector was done by CEB while the inventory for the welding sector and the bulk transformers were conducted by PTPV. The testing of samples was done by ITI Laboratory under the Ministry of Science, Technology and Research. Though CEB has its own capability to test PCBs, once it is around or more than 50 ppm, the sample was sent to ITI for GCMS analysis. It is planned that the Tea Industry Transformers shall also be included as part of the long-term strategy as a continued effort of the initiative in PCB management.

Table 4. Inventory Results

No. of Transformers	
Utility Sector	32,729
Welding Sector	10,212
Bulk User Transformers	1,376 (were visited)

It is planned, that all of the collected data will be put in a database and shall be transferred to the CEB Office for sustainability and also to help CEB in monitoring transformers in operation and other units that need to be added in the future.

Output 1.3 Stakeholder awareness and engagement including NGOs and civil society established

The awareness-raising and training programs have gone across all possible stakeholders including the general public, authorities & government officials, research institutions & universities, PCB owners, and waste managers. They were informed on the environmental, toxicology, technological, and managerial aspects related to PCB management. Other events like poster-making contests, exhibitions, and open lectures were also conducted.

Figure 3. Awareness Raising Activities

Several workshops were conducted not only to ensure awareness but also to make them aware of the responsibilities that go with the management of PCBs.

Table 5. Project Workshops Conducted

No. of Workshops	Type of Workshop	No. of Participants
6	Inventory Workshops	319
4	Curriculum Development Workshops	151
23	Welder's Awareness Raising Workshops	1139

To increase awareness among the students enrolled in institutions and universities, a curriculum was developed on Persistent Bioaccumulate Toxins (PBT) which were then adopted by universities, and vocational and training institutions. Based on a study conducted regarding the use of the curriculum, it was revealed that 78% of the universities and 50% of the Vocational institutions included PBT in their syllabi.

This PBT was further developed and turned into a book, POPs included, by the University of Peradeniya. The book is ready to be printed/published as it was already approved by the Publication Committee on Environment.

Figure 4. Poster Making Contest

A.1. Component 1 - Implementation Performance

All activities of **Component 1**, which refers to Institutional strengthening and awareness raising on PCB issues of all relevant stakeholders, were implemented. To guarantee that stakeholders were aware of the issues of PCBs, several workshops were undertaken for each of the major relevant sectors. Manuals were also prepared to guide specifically the welding and the utility sectors on sample testing, "cleaning", retro filling, and transport operations.

An inventory design and sampling plan were also developed to ensure a thorough inventory both for the low and highly-contaminated equipment. All analytical tasks and sampling activities were

carried out by contracting and upgrading laboratories. For CEB, the inventory was conducted through an online database that enables the entering of data through a mobile app developed by the IT unit of the CEB. It shows the location of all the transformers belonging to CEB through georeferencing. The transformers being processed by CEB (around 33,000 transformers) were short-listed through the tires developed by the project team. The short-listed transformers were tested for PCB using the test kits provided by the project while the transformers near to 50PPM margin, were tested using GCMS technology of the Industrial Training Institute (ITI). The created online database shall also help CEB in the management of their transformers in the future which could already account for the sustainability of the project.

The PTPV who was assigned to do the inventory of the welding sector has tested 3,371 welding transformers, 1,374 of which were found to be contaminated with PCB. Just like the CEB, they have also created an online database that enables the entering of data through a mobile app that can show the GPS locations of all welding transformers in Sri Lanka. In like manner, this system has enabled PTPV to monitor the progress of cleaning, retrofitting, and transport operations carried out by PTPV.

To gain a wider awareness-raising program as well as to ensure continued awareness of PCBs, different information materials were developed including a video, leaflets, and a curriculum that was included in syllabi, adopted, and utilized in universities, training institutions, and schools. Several pieces of merchandise were also distributed during project activities, especially in schools and exhibitions.

Table 6. Number of Distributed IEC Materials and Merchandise

DISTRIBUTED IEC MATERIALS AND MERCHANDISE		
Event	**Number of IEC Materials Distributed**	**Recipient**
IEC Video	3	General Public
Articles Published	5	Local Papers
T-Shirts	1,000	Schools
Hats	500	Schools
Bags	4,000	Schools
Exercise books	100,000	Schools
Leaflets	7,500	General Public
Website	1	General Public

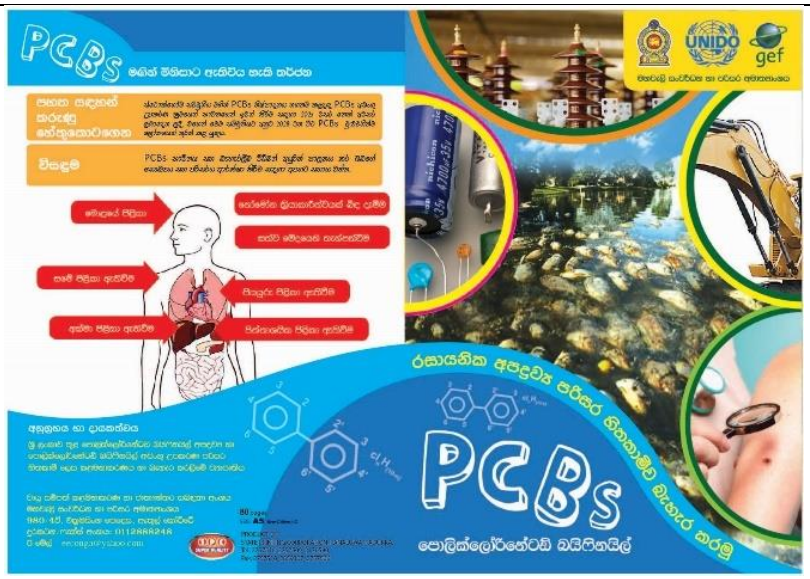


Figure 5. Sample Leaflet Distributed

A Special book was prepared by the University of Peradeniya for Persistent Bioaccumulated Toxins (PBTs) including POPs and was published since it has gained the approval of the Publication Committee of the Ministry of Environment.

Figure 6. School and University Curriculum Development

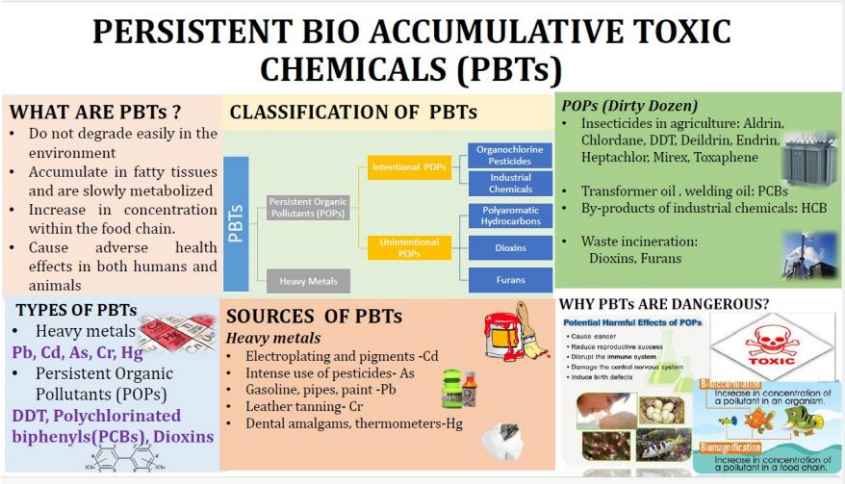


Figure 7. PBT Information Material

PROJECT IMPLEMENTATION ACHIEVEMENT AND PERFORMANCE PER COMPONENT

B. Component 2 - Achievements

Component 2. Policy and Regulatory Framework
Outcome 2. Policy and regulations relevant to PCBs formulated and enforced

Output 2.1. Policy and regulatory framework developed and enforced for PCB management.	Achievements: Two National Policies have been developed, the National Policy on SWM (approved and enforced); and the National Chemical Management Policy (submitted)

In coming up with the necessary legislation, a gap analysis was conducted with consultations through a series of workshops. A policy framework was also developed and finally, two legislations were developed, and submitted and one has already been approved and is currently being enforced.

Output 2.1. Policy and regulatory framework developed and enforced for PCB management

National Policy on Solid Waste Management. Cabinet approval for the SWM Policy was received in 2020. The policy focused on the management of all forms of waste namely solid, liquid, and gaseous waste.

National Chemical Management Policy. This policy on the other hand is currently undergoing cabinet approval. The amendments, as recommended by the cabinet were already included and addressed. It is foreseen that based on these legislations, it is imminent that privately owned PCBs have to be disposed of by the owners themselves.

Environmentally sound and safe management of PCB-contaminated oil/ equipment/wastes, to reduce the risks posed to workers involved in transformer repair and maintenance, storage, transport, recycling, and final disposal operations is one priority of the project while dealing with PCBs. Thus, the technical guidelines for handling PCB-contaminated oil, equipment, and waste, were also formulated. The guidelines included safe handling operations compliant with national standards as prescribed by labor authorities.

B.1. Component 2 – Implementation Performance

Policy and Regulatory Framework development and enforcement was the main focus of **Component 2**. It was meant to examine, identify the gaps, and develop or strengthen the regulations pertaining to PCB management. Before project implementation, the only national regulation concerning PCBs was Sri Lanka's inclusion of PCBs in the waste legislation (schedule VIII) but there was no legislation concerning the management of equipment containing PCBs, though mentioned in the NIP that it was one of their priorities. Thus, a series of activities were conducted to achieve this goal including the conduct of workshops, for the analysis of legislation gaps, and the development of the PCB regulation framework. These undertakings led to the drafting of the National Policy on Waste Management and the National Chemical Management Policy. As a result, PCBs have also been prohibited in Sri Lanka.

These two national laws have ensured that Sri Lanka is currently safer from the importation of PCB due to the Gazette notification 2044/40 dated November 9, 2021, issued by the Import and Export Control Department. Through these laws, the concept of Extended Producer Responsibility was also introduced in which owners of PCB-containing equipment shall already be responsible for their management in the future.

In addition, the project assisted in reviewing the curricula of universities, technical colleges, and schools to ensure the management of all Persistent Bioaccumulated Toxins (PBTs) including PCBs. A survey was carried out for the adaptation of curricula by respective sectors. Accordingly, it was found that nearly 78 percent of universities and 50 percent of vocational training colleges incorporated the materials developed by the project. However, the response of schools was poor due to a lack of practical application and laboratory experiments.

PROJECT IMPLEMENTATION ACHIEVEMENTS AND PERFORMANCE PER COMPONENT

C. Component 3 – Achievements

Component 3. Disposal of PCBs, PCB-containing equipment and wastes
Outcome 3 Disposal of 1000 tons of PCBs, PCB-containing equipment and wastes

Output 3.1 PCB waste collected, packaged, transported, and stored.	Achievements: The ESM System was developed, established, and operationalized during project implementation. Temporary storage facilities for PCBs were strengthened

	and utilized at the same time and were already cleared prior to the end of the project.
Output 3.2 PCB wastes disposed and PCB containing equipment decontaminated based on selected technical option.	Achievements: A suitable treatment facility was identified and used for the treatment and eventual disposal of the PCBs. Low and highly contaminated PCB oil was disposed of with a total of 193.72T. Around 400T (in weight) transformers were retrofilled and 124.74T oil was obtained from retrofilling.
Output 3.3. Long-term strategy on PCB management developed (based on project results).	Achievements: A long-term strategic plan for the phase-out or treatment of PCB-contaminated equipment was developed.

Output 3.1 PCB waste collected, packaged, transported, and stored.

All targeted activities of this component were either 100% achieved or will continue even after project implementation. An ESM for PCBs was established and operationalized. Guidance procedures were developed, a storage facility established, disposal treatment facility identified and strengthened, tons of PCBs were treated and disposed of, and lastly, the national plan for the treatment or phase-out was already adopted.

Output 3.2 PCB wastes disposed and PCB containing equipment decontaminated based on selected technical option.

Major players took part in the “cleaning”, retro filling, and eventual disposal of the PCB and PCB-contaminated equipment in Sri Lanka. CEB and the PTPV focused on retrofilling both the low and high PCB contaminated equipment while INSEE Ecocycle (previously HOLCIM Geocycle) was assigned with the disposal of both the contaminated liquid chemicals and solid waste materials.

INSEE Ecocycle was the first to introduce the concept of co-processing to Sri Lanka. It has now become the premier waste management solutions provider for many industries in Sri Lanka. It is

also the major project partner that provided PCB-free oil and is in charge of the disposal of PCB-contaminated oil and equipment. Its' facility is compliant with the SC BAT/BEP criteria and was able to provide the needed services to "clean" and dispose of PCB-contaminated equipment and PCBs respectively. The tables below show the summary of the actual inventory found during project implementation and the PCB equipment treated as reported by the NPM.

Table 7. Actual Inventory Found During Project Implementation

MATERIAL	STATUS/SOURCE	WEIGHT IN TONS
Low-Level PCB Contaminated Mineral Oil	CEB	135,716
High-Level PCB Contaminated Mineral Oil Transformers	CEB	6.883
Askarel Transformers - 14.916 Mt	CEB	14.916
Low-Level PCB Contaminated Mineral Oil (Welding sector) - 91.285 Mt	PTPV	91.285
Low-Level PCB Contaminated Mineral Oil (LECO) - 2.58 Mt	PTPV	2.58

Table 8. Weight (T) of Materials Disposed/Retrofilled

MATERIAL	STATUS/SOURCE	WEIGHT IN TONS
LOW contaminated PCB Oil Disposed	CEB	122.08
	PTPV	47.42
HIGH contaminated PCB oil Disposed	TDC Veolia	21.48
Transformer "cleaned" and retro filled	cleaned	406.86
Weight of oil obtained from retrofilling	INSEE Ecocycle	124.82
Weight of 6 capacitors to be disposed	CEB pending	0.25

Output 3.3. Long-term strategy on PCB management developed (based on project results).

A Long Term Strategy for PCB Management in Sri Lanka was developed and finalized. The document focuses on the different strategies that will be employed to achieve Sri Lanka's Vision and Mission which is to have a PCB-free country for Sri Lankan future generations and to develop a long-term strategy to eliminate PCB waste materials before the year 2028.

Based on the SWOT analysis conducted for the Long Term Strategy, the following goals were established which are aimed to be achieved before the year 2028:

- Goal 1: Formulating a national action committee to implement the long-term PCB waste management strategy
- Goal 2: Preparation of an action plan to implement the proposed long-term strategy for PCB waste management
- Goal 3: Research and development

C.1. Component 3 – Implementation Performance

For Component 3, the project aimed to put up a functional system for the ESM management of PCB and to process at least 1000 tons of PCB equipment either disposed or treated. Prior to the implementation of the project, it was already established that the initiatives to achieve this goal was already existing in Sri Lanka. However, putting these initiatives together was its biggest challenge. Thus, the approach dealt more with strengthening the coordination among the major stakeholders and re-establishing as well as emphasizing the roles of each and defining their roles in the PCB management process.

The approach started with awareness raising among the stakeholders involved and proper training in handling and packaging of PCBs and PCB-contaminated transformers specifically for CEB and PTPV staff/employees. Inventory and sampling for the welding sector were taken care of by CEB and the utility sector by PTPV. These were followed by strengthening of the existing identified storage facilities and eventually the proper transport to INSEE for proper disposal. INSEE Ecocycle has a proven track record of being the approved facility for hazardous material disposal in Sri Lanka.

INSEE was contracted to provide PCB disposal services consisting of the provision of brand-new transformer mineral oil and treatment and/or disposal of PCB-containing oil from Sri Lanka. It consisted of four major scopes as shown below:

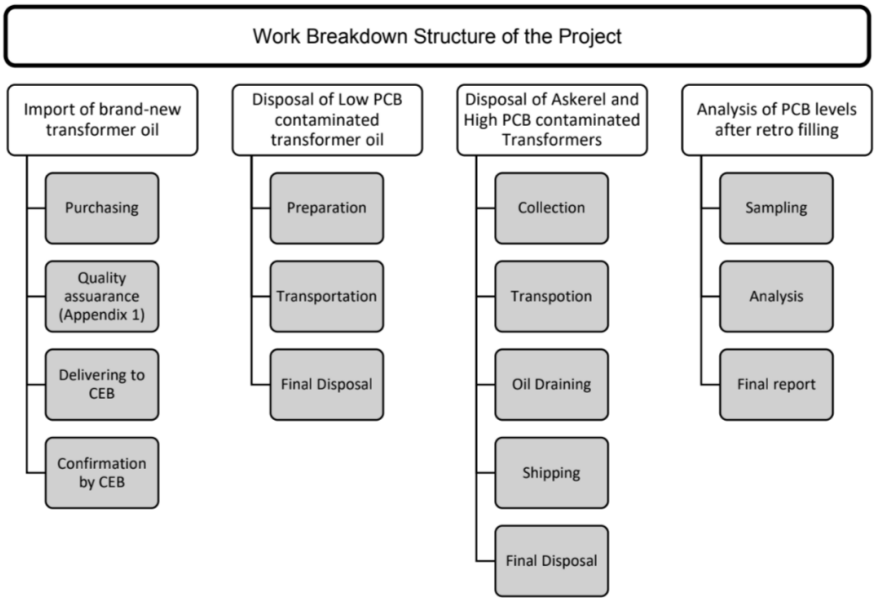


Figure 8. Work Breakdown Structure of INSEE

INSEE had undertaken the necessary steps to ensure that all precautions and requirements were adhered to while trying to meet the timeline of the project.

> *• Materials collection: Site visits completed and All the risks identified related to the transportation of PCB materials from CEB locations*
> *• Oil draining: Pieces of training have been conducted to the INSEE Ecocycle staff for the draining operation of High PCB transformer oil & equipment was made ready for the operation*
> *• Packaging: Secondary containments and packaging materials were prepared for the export guidelines related to PCB transportation.*
> *• Shipping: Shipping lines have been selected and shipping arrangements were conducted.*

Based on the report gathered from INSEE, the following table shows the summary of PCB treatment system operation, including the volume of oil-treated (estimated to be 234,000 kg), Askarel transformers, and other PCB-containing material NOT treated in Sri Lanka (sent to another country for final disposal), the volume of byproducts generated and disposed of, volume and type of PCB wastes.

Table 9. Summary of Disposal System Operation in Sri Lanka by INSEE

Deliverable	Description
Brand new transformer oil supply to CEB	➢ INSEE Ecocycle supplied 139,878 Kg (100% completion of supply) of brand-new transformer oil to CEB locations
Collection & disposal of Low PCB-contaminated transformer oil from CEB locations	➢ INSEE Ecocycle collected 125,180Kg of Low PCB contaminated transformer oil from the CEB locations ➢ Co-processing of collected oil from CEB was completed.
Collection & disposal of Low PCB-contaminated transformer oil from PTPV	➢ INSEE Ecocycle collected 47,420Kg of Low PCB contaminated transformer oil from PTPV.
Exportation of Askeral transformers to Belgium	➢ INSEE exported 22,078Kg of High PCB concentrated transformer oil, transformers, auxiliary equipment, and related waste to PCB decontamination in Belgium for final disposal. ➢ Thermal destruction certificates were provided as proof of destruction
Analytical testing of retro-filled oil for PCB concentration after 60 days	➢ INSEE collected 120 samples from CEB and 50 samples from PTPV ➢ All in all, 170 samples were tested by the Industrial Technology Institute.

Activity	Kg	MT
Total of new transformer oil supplied	139,878 Kg	139.8T
Total of collected & disposed of Low PCB-contaminated transformer oil	172,240Kg	172.24T
Total of exported Askeral transformers to Belgium	22,078Kg	22T
Total retro-filled oil tested for PCB concentration after 60 days	170 samples	

Figure 9. Sample Destruction Certificate

PROJECT IMPLEMENTATION ACHIEVEMENT AND PERFORMANCE PER COMPONENT

Component 4 – Achievements

The impact monitoring and evaluation, Component 4 of the project, consisted more of the monitoring activities which were undertaken through regular meetings and submission of reports. A total of twenty-two PSC meetings were held in which regular updates as to the achievements and issues of the project were discussed. Aside from the PSC meetings, other meetings were called as necessary like the meetings with CEB and discuss the issues that were affecting project implementation. Important decisions were made and arrived at among the members of the PSC and other project constituents during these meetings.

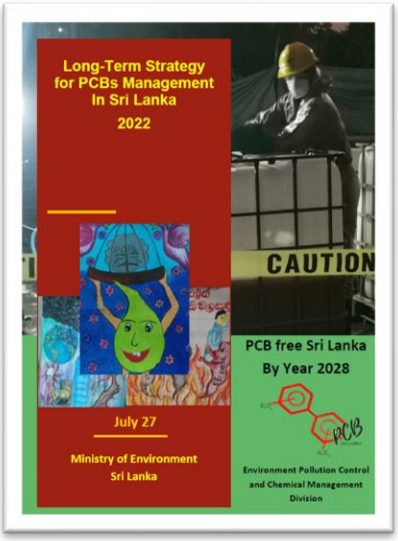
Table 10. PSC Meetings Conducted

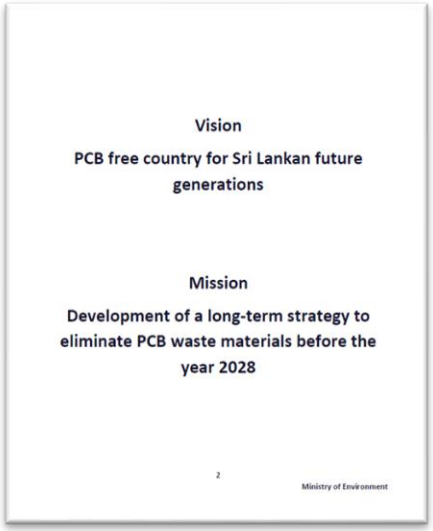
PSC Meeting	Date Held	PSC Meeting	Date Held
1st PSC	July 20, 2016	12th PSC	December 12, 2018
2nd PSC	September 8, 2016	13th PSC	February 20, 2019
3rd PSC	November 29, 2016	14th PSC	July 23, 2019
4th PSC	December 20, 2016	15th PSC	December 19, 2019
5th PSC	February 23, 2017	16th PSC	July 28, 2020
6th PSC	April 6, 2017	17th PSC	December 10, 2020

7th PSC	June 12, 2017	18th PSC	July 1, 2021
8th PSC	November 11, 2017	19th PSC	October 19, 2021
9th PSC	December 29, 2017	20th PSC	April 27, 2022
10th PSC	April 11, 2018	21st PSC	July 7, 2022
11th PSC	September 10, 2018	22nd PSC	May 16, 2023

Project implementation reports or the PIRs were also submitted annually to UNIDO and copied to all project partners. A mid-term evaluation was also carried out and the Final Evaluation shall be done prior to the end of the project implementation.

Major results of the Mid-Term Review indicated that the project management structure was already in place and a very high sense of ownership among government partners was already seen during the evaluation period. All in all, the general recommendation was to expedite the remaining activities of the project and sustainability is very attainable especially if there will be continued cooperation and active participation of all stakeholders. Financial support and planning for future activities, which was already answered through the development of the Long Term Strategy for PCBs.





III. PROJECT IMPLEMENTATION PERFORMANCE

A. Project Design

The project design was properly tailored to meet the main goal of the project, which is to build capacity in Sri Lanka to introduce and implement an environmentally- sound management of PCB waste stockpiles and PCB-containing equipment. The project has four (4) Components to address the different issues surrounding the PCB problem in Sri Lanka. Each of the components has pre-identified outputs in which all activities to achieve these outputs were implemented. The lead

Executing Agency is the Ministry of Environment (MOE) which also chairs the Project Steering Committee (PSC). The PMU is headed by the National Project Coordinator (NPC) supported by the National Project Manager (NPM) and experts. The co-executing agencies are the Ministry of Power and Energy (CEB, LECO, LTL) and CEA

PROJECT IMPLEMENTATION PERFORMANCE

B. Organization and Management

No major changes or deviations were undertaken in the organization and management of the project during its implementation. Around thirty-five (35) representatives coming from the different sectors including the Government, Industrial, Peoples Organizations and Non-Government organizations (NGOs), Private institutions and the Academe became members of the PSC. UNIDO as the main implementer continued to oversee the project implementation about the overall progress of the project, budgets, expenditures, independent audits, and evaluation to ensure the proper use of GEF funds.

The Ministry of Mahaweli Development and Environment, the executing agency received a contract of four years to undertake all of the activities identified related to Components 1 and 2 of the project and UNIDO to directly implement Components 3 and 4. MOE has the mandate and resources to implement the activities stipulated in these components and were undertaken and delivered in coordination with the Chemicals and Wastes initiatives of the Government of Sri Lanka.

PROJECT IMPLEMENTATION PERFORMANCE

C. Cost and Financing

The total funding for the project is USD 23,714,752.00 with GEF funding of USD 4,725,000.00 and co-financing of USD 18,989,752.00. The cost breakdown per component is stated below:

Table 11. Project Cost Breakdown per Component

Project Component	Grant Amount ($USD)	Confirmed Co -financing ($USD)
1. Institutional strengthening and awareness-raising	550,000	2,000,000
2. Policy and regulatory framework	250,000	1,000,000
3. Disposal of PCBs, PCB-containing equipment and wastes	3,400,000	14,589,752
4. Impact Monitoring and Evaluation	300,000	500,000

Subtotal	4,500,000	18,809,752
Project management Cost (PMC)[2]	225,000	900,000
	4,725,000	18,989,752

The target co-financing support was achieved and even surpassed the target amount coming from the lead partner institutions – Ministry of Power and Energy, Industrial Technology Institute, Central Environment Authority, and LTL Transformers Limited. In total, the co-financing amounted to USD 288,772.55 (LKR 93,019,439.00).

Table 12. Amount of Co-Financing Delivered by Project Partners

Name of Co-financier (source)	**Cofinancing Amount ($) as indicated in the Project Document**	**Actual Amount Delivered** (USD 1 = LKR 322.12)
Ministry of Power and Energy	1,549,860	28,722.21 (LKR 9,252,000)
Ministry of Power and Energy	92,708	
Ministry of Mahaweli Dev't and Environment	179,028	
Ceylon Electricity Board	12,685,567	
Ceylon Electricity Board	3,171,392	
Central Environment Authority	142,663	61,880.15 (LKR 19,932,839)
Lanka Electricity Company	95,130	
Industrial Technology Institute (ITI)	177,667	35,700.97 (LKR 11,500,000)
LTL Transformers (Pvt) Limited	54,971	162,469.22 (LKR 52,334,600)
LTL Transformers (Pvt) Limited	340,694	
INSEE Ecocycle	201,093	
INSEE Ecocycle	59,129	
UNIDO	89,850	
UNIDO	150,000	
	18,989,752	**USD 288,772.55 (LKR 93,019,439)**

All procurement and financing concerns were handled by the Procurement and Finance Sections in UNIDO Headquarters including the hiring and payments of contractors and consultants. However, all decisions arrived at as to these engagements were in consultation with the project partners through the PMU and PSC.

PROJECT IMPLEMENTATION PERFORMANCE

D. Performance of Consultants, and Contractors

Project activities were supported mostly by firms that were engaged to help deliver the target outputs Both the government and private firms that were hired are listed in the table below:

Table 13. List of Consultants/Consulting Firms Engaged by the Project

NAME of CONSULTANT/FIRM	TASK/S	DETERMINED OUTPUT	DATE OF COMPLETION
Ministry of Mahaweli Development and Environment	To implement activities identified for Components 1 and 2	Reports of accomplishments of the various activities.	April 2022
Component 1			
EML Consultants	PCB regulations development	Development of a legal framework which resulted in the banning of PCB in Sri Lanka (Gazet Notification Number 2312/77)	January 2023
EML Consultants	Inventory and Training manuals	Manuals for the Utility and Welding Sectors (inventory and training manuals)	2022
Center for Environment Studies, University of Peradeniya	Curriculum development	School, Vocational training, and University curriculum were developed	2022
Component 2			
Ministry of Environment	Waste Management Policy	Policy Developed	2022
Ministry of Environment	Chemical Management Policy	Policy Developed	2023
Component 3			
CEB	Preparation of Utility Sector Inventory	Inventory List	2022
PTPV	Preparation of Welding sector inventory, Preparation of Bulk Transformer Inventory	Inventory List	2023

INSEE	Disposal of PCBs and PCB-contaminated equipment	Amount disposed	2023
Component 4			
Com PVT LTD	Web site Development	Availability of the PCB website	2018
Suman Laderer	Conduct of Mid-Term Evaluation	Mid-Term Evaluation Report	2018

All targeted deliverables were accomplished although some took longer which were then affected by the pandemic from the year 2020 to 2021.

PROJECT IMPLEMENTATION PERFORMANCE

E. Disbursement

As discussed, all procurement and disbursements were done by UNIDO. The timely payments based on the accomplishments and completion of tasks contributed greatly to the continuity of the implementation of the project. UNIDO consistently paid all engaged firms once their outputs were cleared and approved by the Project Manager in consultation with the PSC and PMU. The same goes through when there was a need to amend contracts due to some findings after activity implementation. During PSC meetings, issues are resolved and decisions are arrived at to avoid more delays.

As for the funding that goes to the executing partner, the MOE as the contracting partner for some activities, the funds are remitted to the Treasury hence, government auditing paths apply to the project. In procuring, the project has to follow several financial circulars issued by the government including Government Procurement Procedures. Auditing by both the Internal Audit Division of the Ministry and the Auditor General Department was carried out regularly. Therefore, the fund disbursement of the project was certified and truly spent for its purpose.

PROJECT IMPLEMENTATION PERFORMANCE

F. Performance of Funding, Executing, and Implementing Agencies

Global Environment Facility

GEF as the main donor for this project was regularly updated through the Project Implementation Reports (PIRs) which were submitted annually. Also, the donor was flexible in a way regarding the needs of the project allowing for some adjustments regarding the allocation of funds and project extensions especially during the Pandemic period.

United Nations Industrial Development Organization (UNIDO)

The project started in 2015 and was supposed to have been completed in 2020, but due to the Pandemic and all the issues and restrictions that it had brought with it, the project implementation in Sri Lanka was greatly affected. Despite the restrictions, UNIDO together with

the PMU, tried its best to deliver outputs, in the best possible manner. UNIDO has maintained its presence to monitor the developments to ensure that outstanding tasks are carried out and eventually delivered. It showed flexibility by supporting the needed changes and requested for the necessary project extensions, at no additional costs, to be able to achieve target activities.

The PM as well as the members of the Project team have visited the sites especially when confronted with issues that arose during project implementation. The PM also guided PSC meetings as well as the PMU.

The NPC and the NPM worked together with UNIDO to arrange all necessary coordination, meetings of the project, and the engagement of experts. They were also involved in the procurement of equipment provided to partners.

Ministry of Environment (MOE)

The main role of MOE is to oversee and support the project implementation being the Primary project partner apart from implementing the activities identified in Components 1 and 2. The MOE was very committed to seeing to it that Sri Lanka will be PCB-free in 2028. It has supported all PSC decisions and supported all activities of the other project partners.

IV. PROJECT RESULTS

There are pieces of evidence that impact indicators are already showing up and the project targets are already met and achieved. All major targets for each component were accomplished.

Table 14. Key Impact Indicator, Targets and Status

Key Impact Indicator	Targets	Status
A set of guidelines and regulatory instruments on the management of PCBs are prepared and adopted	One set of guidelines and regulations on the management of PCBs adopted and being utilized	100% ACHIEVED
		Copy of the guidelines being distributed amongst PCB users and copy of legal instrument (Decree, law)
PCB Treatment facility built, commissioned, permitted, and operational for the disposal of PCB-containing equipment and wastes	One (1) facility built	100% ACHIEVED
		Certificate of disposal for PCB wastes treated at the site, Site visits, testing reports, official permitting documents
	2,000 + 5%	100% ACHIEVED

A number of transformers being sampled and tested for PCB contamination. and registered in the created database		Laboratory reports and inventory registry submitted.
Amount of PCB-containing equipment and waste treated in PCB treatment facility	1000MT	100% ACHIEVED Hazardous waste manifested, PCB owners records, PCB Treatment facility certificate and records.

PROJECT RESULTS

A. ISID Impact Indicators – Environmentally Sustainable Industry (ENV)

ENV 2 – Tons of pollutants reduced or phased out

Like in other PCB projects, the very impact of this GEF Project is that these PCBs and contaminated equipment, which were disposed of properly will no longer pose any threat to the people of Sri Lanka. It has helped the country to put in place an environmentally sound management of PCBs. It has secured PCB-contaminated equipment in a sound yet practical way, by pulling all actors or major stakeholders together for the safety of the people of Sri Lanka and the environment.

It has targeted to have a wider scope of inventory of the PCB wastes and equipment in the utility sector as well as to have a complete analysis of the rest of the transformers manufactured before 1986 comprising of around 2,034 transformers. Disposal of around 1000 tons of PCBs was targeted to be undertaken under the project as per the initial NIP inventory. The 1000T may have yet to be achieved but the assurance that this will be done is no longer a problem for the government of Sri Lanka. The system is already in place and definitely will stay until such time that Sri Lanka will be PCB-free.

Other environmental, health, and social impacts addressed by the project are as follows:

The **accidental releases of PCBS will no longer be a problem** for Sri Lanka since proper management and disposal are already in place. It has been known that PCBs are released through spills, leaks from electrical and other equipment, and improper disposal and storage. They have been detected in air, water, soil, and sediments and last a long time in the environment eventually finding their way into the food chain.

The **provision of knowledge and awareness about the harmful effects of PCBs** to all sectors and the people of Sri Lanka, in general, has contributed a lot to building the capacities of the key stakeholders in the country. The call for a PCB-Free Sri Lanka will no longer be impossible to achieve for future generations.

The **detrimental effects on human health will already be prevented**. PCBs have been known to be carcinogenic and have developmental, immunological, reproductive, and neurological effects on humans. Specifically, exposure to PCBs suppresses the immune system, thereby increasing the risk of acquiring several human diseases. Developmental exposure has been shown to affect endocrine and cognitive systems negatively. Measurable outcomes include reduced IQ and changed behavior.

PROJECT RESULTS

B. Outcome Indicators – Strengthening Knowledge and Institution

KASA 1 – Awareness and Knowledge

Raising awareness was somewhat of an easy task for the government of Sri Lanka. Not only did they already have the concerned institutions for PCB management before the implementation of the project, but they also had active major stakeholders who put their effort into addressing the problem of PCBs. As mentioned in the project documents, one major task of the project is how to put these efforts together to have a system that will be viable for Sri Lanka. They also have a very active and well-represented PSC including the academe which made it easier to widen and reach other stakeholders.

Figure 10. Awareness Raising Activity to Welders

One unique factor of this project in Sri Lanka is the active involvement of the community particularly in the welding sector. It was evident that through this project, there was a big change in the behavior among the welders. They are now aware of the dangers of PCB-contaminated oil and they are very cautious now when handling used oil. They are now cooperating with the Sri Lankan Government to address the issues regarding PCBs.

> *Prabath says, "Through this project, we were able to motivate all stakeholders, especially the local-level workers, towards sound PCB management by sharing knowledge and information." (Charles, Arthur, Sri Lankas welders learn of dangers of contaminated oil, 02/02/2021, UNIDO. Accessed 01/16/24)*

KASA 2 – Capacity Building

Sampling and inventory of PCB-contaminated equipment were greatly supported by the capacity building provided by the project. INSEE also provided technical support to project partners like CEB and trained them in handling hazardous waste. The inventory teams were also trained in identifying and taking samples, and the SOPs and were made aware of the processes involved in the transport and proper disposal of PCBs. INSEE capacity was also strengthened in exporting highly concentrated PCB through their foreign collaboration of Suez PCB decontamination. Test kits were also provided by the project to ensure continuity of the project activities.

PROJECT RESULTS

C. Output Indicators – Technical Cooperation

TCO 1 – Number of Capacity Building Activities Provided

Several capacity-building activities were undertaken to ensure that the project objectives were met. Also, capacity buildings were made available to the concerned stakeholders to ensure that the activities remained and continued even after the project life or project implementation.

Table 15. Awareness Raising Activities Conducted

Awareness Raising Activities	Male	Female	Total
Component 1			
Awareness workshops (GP and Officials	1158	556	1714
Exhibitions			4
Component 2			
Policy development			
Chemical Policy development	60	31	91
Waste Policy Development	12	7	19
Component 3			
CEB	120	3	123
PTPV	83	10	93
TRAININGS (PCB Inventory and Disposal and Exportation)			
CEB	80		
PTPV	10		
INSEE	30	2	32

TCO 2 - Value of Assets Provided

Though the project did not provide a whole facility for the storage and disposal of PCBs, the project did provide support to strengthen the existing facilities in Sri Lanka in order to comply with the proper treatment/cleaning and disposal of PCBs.

TCO 3 - Number of Toolkits and Guidance Produced

Technical guidelines for handling PCB-contaminated oil, equipment, and waste, were also formulated. The guidelines included safe handling operations compliant with national standards as prescribed by labor authorities. These guidelines were both given to the utility and the welding sector for their guidance.

PAO 1 - Number of Industrial Strategies and Industrial Policy Documents Prepared/Drafted

Two National Policies have been developed, the National Policy on SWM (approved and enforced); and the National Chemical Management Policy (approved). These national laws have also ensured that Sri Lanka is already safe from the importation of PCB and has also introduced the Extended Producer Responsibility in which owners of PCB-containing equipment shall be responsible for their management in the future.

V. KEY ISSUES FOR THE FUTURE

Everything seems to have been put in place for the proper management of PCBs in Sri Lanka. The data collected from the inventory and other information is already planned to be transferred to MOE, there is an existing facility that can process PCBs and PCB contaminated equipment. The existence of PTPV and CEB will ensure good practice in terms of PCB Management and so forth and so on.

Also, it is much worth mentioning that the PTPV has already started detecting PCBs in Tea Factories/Sector. PTPV can already investigate PCB contaminated equipment and ensure a PCB-free status in these Tea factories. This is indicative of a committed and long-term management of PCBs in Sri Lanka.

Hence, the only remaining issue is to ensure that these major stakeholders are committed until such time that the goal for Sri Lanka to be PCB-free is achieved. One way to ensure this is that it would remain a priority for the government of Sri Lanka.

VI. LESSONS LEARNED

Lessons learned in project implementation are always taken and noted to help improve work and serve as a basis in any decision-making process in the future. Through the lessons gathered from the implementation of projects, mistakes are avoided but in like manner, best practices are noted and could be applied in the implementation of other projects. In this PCB project in Sri Lanka, some good and successful activities, steps, or strategies are worth noting and simply mentioning them would help future project implementers.

Coordination and Team Members. The project manager, the coordinator, and the national project manager which comprises the PMU, served as the stirrer of the project. They ensured, despite the issues encountered and the delays met along the way, that the project activities were implemented in the best way possible in terms of timing and available resources. Sufficing to say that project activities are usually driven by the project manager from planning and regular meetings via the PSC, the updating of members, and the actual delivery of project activities are monitored by the national project manager. The PMU played an important role in the successful execution of activities but it always was a team effort, coming from all actors involved. The pandemic might have affected how things were implemented, but best efforts were made to accomplish the tasks that were doable and at hand during those times. Keeping records and ensuring everyone's upkeep with development has also contributed to the success of project activities undertaken.

Provision of Experts / Consultants. Whenever necessary, international and local consultants and firms were provided for the project. This approach helped in setting the directions and easier implementation of activities. It was always good to start with the baseline studies and determine the gaps not only to provide and see the right track in pursuing the project but also to avoid repeating what has already been done and maybe even avoiding other steps that already could contribute to a shorter time and wise use of the resources at hand.

Partners and PSC Composition. Not only finding the right partner but also completing all major stakeholders ensures successful implementation of project activities. As in the case of Sri Lanka, these partners were already identified and were invited to be involved and commit themselves to addressing the problem in PCBs. The government, not only partnered with the right institutions but also made themselves the lead and implementer of project activities. Partnering with CEB, PTPV, and INSEE was one of the best steps that the project had taken. This not only ensured that the problem shall be addressed but also ensured the sustainability of the project as they also achieved the purpose of each of these companies. Not to mention that this type of partnership also guarantees the right logistical support and technical support staff. Information dissemination, adoption and enforcement, and adoption of the laws and guidelines became handy since all of the keyline agencies or ministries were members of the PSC.

Lastly, the **involvement of the communities**, particularly the welding sector, has made this project unique. The welders are more aware now of the hazards in handling PCBs and they have become more vigilant in asking and at the same time helping the authorities in addressing PCB pollutants. *As Dr. Carmela Centeno, UNIDO project manager, said, "I am particularly proud of the work that the project has done to educate the welding sector – an often overlooked sector with regard to the use of possibly PCB-contaminated oil. The project has created a major impact in terms of ensuring that welders and their families are safe from the dangers of PCBs." (Charles, Arthur, Sri Lankas welders learn of dangers of contaminated oil, 02/02/2021, UNIDO. Accessed 01/16/24)*

VII. CONCLUSION

Overall Assessment

Accomplishments of this project are notable since it attempted and is already making progress in achieving one of the main goals of Sri Lanka, to have a free PCB country in 2028. The project was able to put together various institutions to make a collective effort to address the problem of PCBs. The previous and existing initiatives of these institutions were not put to waste but became valuable for the attainment of the project objectives. The project has also helped Sri Lanka to contribute to addressing environmental and social issues, particularly on good health and well-being (SDG 3) and consumption and production (SDG 9).

Sri Lanka is very keen on being a PCB-free country in 2028 and it is no longer impossible for it to achieve this. The project is highly sustainable with the presence of capable players and their available resources. A bigger obligation though is for the government not only to ensure enforcement of the laws but also to continue monitoring and maintaining its role as a partner and amalgamate these institutions. The results and benefits of the project are already recognizable, though its effects may not yet be felt, but one is definite that if Sri Lanka will continue this, then they are on the right path.