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INDEPENDENT TERMINAL EVALUATION

Environmentally Sound Management and Final Disposal of PCBs in
Serbia

UNIDO Project ID: 100313

GEF ID: 4877



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Acronyms and abbreviations

BAT	Best available techniques
BEP	Best environmental practices
EPA	Environmental Protection Agency
EPS	Electric Power Serbia
ESM	Environmentally Sound Management
EU	European Union
FSP	Full-size Project
FTM	Faculty of Technology and Metallurgy
GDP	Gross Domestic Product
GEF	Global Environment Facility
HQ	Headquarter
IA	Implementing Agency
IE	International Expert
ISID	Inclusive and Sustainable Industrial Development
ISS	Institute for Standardization of Serbia
LFA	Logical Framework Approach
M&E	Monitoring and Evaluation
MoEP	Ministry of Environmental Protection
MTE/R	Mid-term Evaluation/Review
NCPC	National Cleaner Production Centre
NE	National Expert
NEA	National Executing Agency
NGO	Non-governmental Organization
NIP	National Implementation Plan
NPM	National Project Manager
NPD	National Project Director
PAD	Project Allotment Document
PCBs	Polychlorinated biphenyls
PIF	Project Identification Form
PIR	Project Implementation Report

Glossary of evaluation terms

Term	Definition
Baseline	The situation, prior to an intervention, against which progress can be assessed.
Effect	Intended or unintended change due directly or indirectly to an intervention.
Effectiveness	The extent to which the objectives of a development intervention were or are expected to be achieved.
Impact	Positive and negative, primary and secondary, intended and non-intended, directly and indirectly, long term effects produced by a development intervention.
Indicator	Quantitative or qualitative factor or variable that provides a simple and reliable means to measure achievement, to reflect the changes connected to an intervention, or to help assess the performance of a development actor. Means by which a change will be measured.
Intervention	An external action to assist a national effort to achieve specific development goals.
Lessons learned	Generalizations based on evaluation experiences that abstract from specific to broader circumstances.
Logframe (logical framework approach)	Management tool used to guide the planning, implementation and evaluation of an intervention. System based on MBO (management by objectives) also called RBM (results-based management) principles.
Outcome	The achieved or likely short-term and medium-term effects of an intervention's outputs.
Outputs	The products, capital goods and services which result from a development intervention; may also include changes resulting from the intervention which are relevant to the achievement of outcomes.
Recommendations	Proposals aimed at enhancing the effectiveness, quality, or efficiency of a development intervention; at redesigning the

	objectives; and/or at the reallocation of resources. Recommendations should be linked to conclusions.
Relevance	<p>The extent to which the objectives of a development intervention are consistent with beneficiaries' requirements, country needs, global priorities and partners' and donor's policies.</p> <p>Note: Retrospectively, the question of relevance often becomes a question as to whether the objectives of an intervention or its design are still appropriate given changed circumstances.</p>
Results-Based Management (RBM)	A management strategy focusing on performance and achievement of outputs, outcomes and impacts.
Review	<p>An assessment of the performance of an intervention, periodically or on an ad hoc basis.</p> <p>Note: Frequently "evaluation" is used for a more comprehensive and/or more in-depth assessment than "review". Reviews tend to emphasize operational aspects. Sometimes the terms "review" and "evaluation" are used as synonyms.</p>
Risks	Factors, normally outside the scope of an intervention, which may affect the achievement of an intervention's objectives.
Sustainability	The continuation of benefits from an intervention, after the development assistance has been completed. The probability of continued long-term benefits. The resilience to risk of the net benefit flows over time.
Target group	The specific individuals or organizations for whose benefit an intervention is undertaken.
Theory of change	Theory of change or programme theory is similar to a logic model, but includes key assumptions behind the causal relationships and sometimes the major factors (internal and external to the intervention) likely to influence the outcomes.

Executive summary

Introduction

The terminal evaluation of the UNIDO-GEF project “Environmentally Sound Management and Final Disposal of PCBs”, GEF ID: 4877, UNIDO ID: 100313 was conducted between 01 August and 31 December 2022, by an international evaluation consultant, Ms. Suman Lederer. This TE was a part of a Cluster evaluation of 8 UNIDO PCB projects, which was carried out by three international evaluation consultants. It covers all the components as well as the full duration of the project, from February 2015 till 30 November 2022.

Project design and relevance

The objective of the project is similar to other UNIDO PCB projects and includes technical components such as legal framework, capacity building, awareness raising, PCB inventory, and assessment of contaminated sites. The project's approach is considered appropriate and technically feasible, and the project document has a logical framework with specific and measurable indicators. However, the outcomes described in the document only describe the deliverables the project will achieve, that is, outputs. Project is considered to be highly relevant and aligned with country strategies and priorities.

The overall rating for project design is **‘satisfactory’**.

Project’s achieved results and effectiveness

The project successfully achieved four Outcomes and over-achieved Outcome 4. Suggestions for updating the existing legal framework related to PCB-management have been submitted to the MoEP. A training workshop has been conducted on PCB-management guidelines, protocols, and procedures. More than 1,000 transformers have been sampled, and a database has been prepared. 647.94 MT of oils and equipment have been disposed of, which is 224% more than the target of 200 MT. Preliminary site investigation and risk assessment have been carried out for three contaminated sites, and detailed site investigation for one site, but the pilot remediation could not be completed due to lack of investor interest.

Overall project objective is assessed to be **achieved**.

The overall rating for effectiveness is **‘highly satisfactory’**.

Progress towards impact

All Outputs and Outcomes have been achieved; and continuation is assessed to be realistic. 647.94 MT of PCBs have been eliminated within the framework of the project, thus already contributing to aimed impact.

Efficiency

The project was approved by the GEF in December 2014, with a duration of 48 months. The contract was signed between UNIDO and the national executing agency in July 2015, and the project began in April 2016. The project completion date was supposed to be April 2020, but it has been extended until November 2023, resulting in a delay of 3.5 years, amongst others, due to

the adverse impact of COVID-19 pandemic. Three changes of Project Manager at UNIDO HQ have occurred without negatively affecting project implementation. As of January 31, 2023, USD 1.6 million has been spent, leaving USD 500,000. Partnering institutions have spent co-finance amounting to over USD 9 million.

The overall rating for efficiency is **'satisfactory'**.

Likelihood of sustainability of project results

The risks related to the project results - financial, socio-political, institutional, governance, and environmental - are considered low except for the high environmental risk associated with the improper disposal of old wooden railway crossties. The project has eliminated an additional quantity of 447.94 MT of PCBs beyond the foreseen quantity and plans to eliminate another 110 MT in the extension time in 2023. Guidelines and other guidance documents have been prepared, and there is sufficient human and technical capacity in the country to continue, upscale, and replicate the project results even at the international level.

Sustainability of project results is considered to be **'likely'**.

Cross-cutting issues

Regarding gender mainstreaming, during the training programmes, PCB issues were discussed and their impacts, especially on women and youth, were emphasized. Both genders are represented in the stakeholder institutions and the NPMU. Both women, and men, are expected to benefit from project results. No issues on the participation of any one gender were pointed out to the evaluation; project has prepared special brochure on the effects of PCBs on pregnant women. No issues regarding procurement were identified.

	Evaluation criteria	Rating
A	Progress toward impact	S
B	Project design	S
	• Overall design	S
	• Logframe	S
C	Project performance	
	• Relevance	HS
	• Coherence	HS
	• Effectiveness	HS
	• Efficiency	S
	• Sustainability of benefits	L
D	Cross-cutting performance criteria	
	• Gender mainstreaming	HS
	• M&E:	
	- M&E design	S
	- M&E implementation	
	• Results-based Management (RBM)	S
E	Performance of partners	
	• UNIDO	S

	Evaluation criteria	Rating
	<ul style="list-style-type: none"> National counterparts 	HS
	<ul style="list-style-type: none"> Donor 	S
F	Overall assessment	HS

Main Recommendations

The **PMU** should:

- Provide support in preparing for, and/or commence with, the disposal of railway crossties, during the remaining duration of the project;
- Bring up the issue of the old wooden railway crossties to the MoEP, and provide support to the MoEP to prepare project proposals for their disposal, beyond the (extended) time duration of this project;
- Carry out a visit to the transformer maintenance and repair workshops of the Serbian Railways, EPS, HBIS and HIP to ensure adherence to ESM of (potential) PCBs;
- Provide information to Institute Nikola Tesla about participation in tenders for PCB-disposal with mobile facility.

UNIDO should:

- Disseminate results and information from this project to other PCB projects;
- Disseminate the brochure on effects of PCBs on pregnant women to other PCB and POPs projects.

Lessons learned

- The availability of a national institution, the Faculty of Technology and Metallurgy, which is capable of taking up the role of the National Executing Agency, is seen as being conducive to project implementation in the country. One advantage noticed in the implementing modality of this project is that the Faculty is a Legal Entity and can make its own contracts, has a separate bank account, a Legal Department as well as an Accounting Department.
- National human and technical expertise, including certified laboratory and personnel, have proven to be highly conducive to achieving the Outputs, Outcomes and Project Objective.

Good Practices

- In-country Institute Nikola Tesla has produced the mobile PCB-decontamination unit itself, and was a member of the consortium which won the tender for PCB-disposal in the country.
- Taking the gender aspect into consideration, a special brochure was prepared for pregnant women about the effects of PCBs on pregnant women.

Evaluation objectives, methodology and process

1.1 Objectives

Findings of the terminal evaluation (TE) of the UNIDO-GEF project “Environmentally Sound Management and Final Disposal of PCBs”, GEF ID: 4877, UNIDO ID: 100313, are presented in this report. The terminal evaluation was conducted between 01 August and 31 December 2022, by an international evaluation consultant, Ms. Suman Lederer.

This TE was a part of a Cluster evaluation of 8 UNIDO PCB projects, which was carried out by 3 international evaluation consultants. It was conducted in line with the GEF¹ evaluation policy, the UNIDO² evaluation policy and as mentioned in the project document. It was guided by the Terms of Reference (TOR) for the PCB Cluster Evaluation, provided in Annex V. It covers all the components as well as the full duration of the project, from February 2015 till 30 November 2022.

According to the TOR, the TE had the following objectives:

- i. Assess the projects` performance in terms of relevance, effectiveness, efficiency, sustainability, coherence, and progress to impact; and
- ii. Develop a series of findings, lessons and recommendations for enhancing the design and implementation of ongoing projects by UNIDO.
- iii. Contribute to organizational learning by UNIDO and its counterparts while being forward-looking, thus also guiding the development of new similar projects.

The TE assessed the project based on the evaluation criteria of relevance, coherence, effectiveness, efficiency, likelihood of sustainability, project management as well as cross-cutting issues such as gender. Detailed questions are provided in the evaluation framework matrix in Annex III.

Intended users of the TE are the project manager (PM) and project management team (PMT), project partners, government of the Republic of Serbia, other organizations/institutions in Serbia cooperating with UNIDO, the GEF, and UNIDO management and staff at UNIDO Headquarters (HQ).

1.2 Methodology and process

The TE was carried out between 01 August and 31 December 2022 and covers the duration of the project from its commencement in February 2015 – 30 November 2022. The findings of the TE are based on document review and interviews with project stakeholders. The evaluator made efforts to speak with as many stakeholders as possible, inter alia, representatives of MoEP, the consortium for the disposal of PCBs, PCB-owner enterprises, and experts.

The evaluation followed the evaluation criteria mentioned in the TOR, relevance, effectiveness and efficiency, likelihood of sustainability of project results and cross-cutting issues. The

¹ GEF. (2019) The GEF Evaluation Policy (Independent Evaluation Office, June 2019 Draft).

² UNIDO. (2018). Director General’s Bulletin: Evaluation Policy (UNIDO/DGB/2018/08).

evaluation parameters have been operationalized into an evaluation matrix which is provided in Annex III.

Being a part of the PCB Cluster Evaluation, an evaluation mission to Serbia was not conducted and evaluation meetings were conducted remotely, via Zoom. Evaluation questionnaires had been prepared, for different types of stakeholders, that is, for representatives of the Ministry, for PCB owners, for members of the consortium and for national experts. Interviews were semi-structured; during the stakeholder meetings, depending on the response and information received, the evaluator asked additional questions to clarify further points and receive further necessary information, which has been validated to the extent possible, via document review, stakeholder meetings and site visits. Findings, conclusions and recommendations are based on qualitative analysis of data received.

1.3 Information sources and availability of information

For assessing the project, the TE referred to the following sources:

- **Document review:** a comprehensive desk review of the documents provided to the evaluation, inter alia, inception report, Project Information Reports (PIRs), meeting reports, feasibility studies, expert reports, other output documents. A detailed list of documents consulted is provided in Annex II. All the documents were provided by the UNIDO PM and PMT in a timely manner;
- **MTE report:** Several activities, foreseen in the project document, were completed by the time of the MTE, and are covered in a comprehensive MTE report. Therefore, the MTE report was also referred to as a key source of information during the terminal evaluation;
- **Interviews:** Semi-structured interviews with, amongst others, representatives of MoEP, the consortium for the disposal of PCBs, PCB-owner enterprises, and national experts, former UNIDO PM, National Project Management Unit (NPMU). Annex I provides a list of persons consulted/interviewed, via Zoom;
- **Site visit:** During the inception phase of the cluster evaluation, an evaluation mission to the Republic of Serbia was tentatively foreseen; however, due to the uncertain situation with respect to COVID-19 restrictions, and as all foreseen meetings with key stakeholders could take place remotely, an evaluation mission to the country did not take place.

2. Country and project background

2.1 Fact sheet

Project Title	Environmentally Sound Management and Final Disposal of PCBs
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UNIDO SAP ID / GEF ID	100313 / 4877
Region / Country	Europe and Central Asia / Republic of Serbia
Project approved for implementation by GEF	22 December 2014
Project implementation start date (First PAD issuance date)	01 February 2015
Expected implementation end date (as per CEO endorsement document)	January 2019
Revised expected implementation end date (if applicable)	31 December 2022 (4 extensions); extended till 19 November 2023.
Donor(s)	GEF
EA/MSP/FSP	Full-size project (FSP)
GEF project grant (excluding PPG, in USD)	2,100,000
GEF PPG (if applicable, in USD)	75,000
UNIDO co-financing (in USD)	40,000 cash + in-kind
Total co-financing at CEO endorsement (in USD)	9,129,630 cash + in-kind
Total project cost (excluding PPG and agency support cost, in USD; i.e., GEF project grant + total co-financing at CEO endorsement)	11,304,630 cash + in-kind
Mid-term evaluation	April – June 2019
Terminal evaluation	01 August – 31 December 2022

Source: project document, TOR.

2.2 Project Background

National Implementation Plan

The Republic of Serbia became a Signatory to the Stockholm Convention on Persistent Organic Pollutants (POPs) on 2 May 2002, ratified it in July 2009 and it entered into force on 29 October 2009. The Secretariat of the Stockholm Convention received the National Implementation Plan (NIP) from the Republic of Serbia in June 2010. According to the Serbian NIP, it has not produced any PCB-based fluids, but imported for electrical equipment and devices for different applications, for example, closed-type equipment, such as transformers and condensers, as well as open systems. The amount of PCB-based fluids imported is unknown.

Project background

[Progress report 4 rev 1] All PCB-containing transformers were produced in Serbia by the company Minel-Trafo. Approximately 600 tons of pure PCB oil was used in the transformers produced between 1976 – 1986, for the production of low voltage distribution transformers. Major owner of transformers in Serbia is the Electric Power Company of Serbia (EPS), which contains over 90% of all the transformers. Amongst other owners is also Serbian Railways, which the evaluation met.

[Presentation PMU, 3 April 2018] Production of PCB-containing equipment stopped in 1985/86. However, repair and maintenance workshops have handled PCB contaminated fluids as any other insulating fluid. This has resulted in (cross) contamination of transformers which were previously not contaminated. It is assumed that cross-contamination is a likely reason for the large number of PCB-contaminated transformers, than the ones produced. The evaluation was shown the etiquettes which have been prepared to label the transformers, which will also contain a unique identification number, which is to be assigned by the EPA.

[MTE report, 2019] Around 1,500 tons pure PCBs were exported in the period between 2002 – 2017. Moreover, an EU project on PCBs was implemented in the Republic of Serbia between 2015 – 2018. Inventory at energy generation sites and voltage levels of 110/35 kV, 35/20 kV and 35/10 kV was completed and decontamination was also carried out within the framework of the project [Progress report 2 rev 1].

2.3 Project Description

Project received GEF CEO endorsement on 22 December 2014; implementation at UNIDO commenced in February 2015. Planned project duration was 4 years. Total project budget is USD 11,304,630, which includes USD 2.1 million GEF funds and USD 9,129,630 co-financing (cash and in-kind).

According to the project document (Request for CEO endorsement 12/03/2014), the main project objective is to protect human health and the environment by reducing and eliminating the releases of and exposure to PCBs through establishment of an environmentally sound PCB management system and final disposal of 200 tons of PCB equipment.

Main project technical components, expected outcomes and outputs, besides project management, and monitoring and evaluation (M&E), are as follows:

Component 1: Legal framework
Outcome 1: Legal, regulatory and policy framework for sound PCB management established and enforced
Outputs:
1.1 Existing legal acts updated based on the available Gap Analysis Evaluation Report
1.2 Technical guidelines, protocols and procedures prepared and improved for ESM of PCB-containing electrical equipment, waste and contaminated sites
Component 2: Institutional capacities and awareness raising
Outcome 2: Institutional capacities and awareness improved for sound PCB management
Outputs:
2.1 PCB management roles in different government institutions defined
2.2 Monitoring and enforcement institutions trained and active
2.3 Analytical capacities improved for PCB sampling, analysis and monitoring
2.4 Awareness and knowledge on POPs/PCBs issue among different target groups improved
2.5 Sustainable incentive mechanism developed for sound PCB management
Component 3: Refining PCB inventory
Outcome 3: Detailed inventory of PCB containing equipment and waste carried out
Outputs:
3.1 Sampling of in-service equipment, waste and stockpiles completed
3.2 PCB presence determined by screening and laboratory analysis

3.3 Database prepared and maintained for PCB- containing equipment, waste, stockpiles and contaminated sites
3.4 Detailed inventory developed of PCB-containing equipment and wastes in the demonstration areas, countrywide estimations and prioritization of transformers for disposal
Component 4: Decontamination of 200 tons of PCB-containing equipment and waste
Outcome 4: Pilot quantities of 200 tons of PCB-containing equipment and waste disposed of in an environmentally sound manner
Outputs:
4.1 BAT/BEP disposal options and technologies applicable to the disposal strategy validated
4.2 PCB treatment service provider selected
4.3 Permits for the storage operation/technology treatment installation obtained
4.4 Monitoring system established in the interim storage/treatment facility
4.5 200 tons of PCB-containing equipment and waste disposed
Component 5: National assessment of contaminated sites
Outcome 5: Public private partnership (PPP) policy integrated into national assessment scheme for PCBs contaminated sites
Outputs:
5.1 PCB contaminated sites investigated
5.2 Criteria defined for prioritization of PCB contaminated sites within the PPP framework
5.3 Risk assessment for a pilot site completed
5.4 Finalization of pilot remediation agreement under PPP scheme
5.5 National strategy for PCB contaminated sites developed

Source: project document.

Project stakeholders:

Main project stakeholders, according to the project document, are:

UNIDO: is the Implementing Agency (IA) and responsible for general management of the project and monitoring and reporting.

MoEP: Ministry of Environmental Protection, formerly, the Ministry of Agriculture and Environmental Protection, also the national focal point for the Stockholm Convention in Serbia.

FTM: The Faculty of Technology and Metallurgy of the University of Belgrade was designated as the National Executing Agency (NEA), responsible for the day-to-day project execution and monitoring.

INT: Electrical Engineering Institute Nikola Tesla – has an accredited laboratory for PCB testing in mineral insulating oils and relevant proficiency tests, large database on PCB analysis and other oil analysis in the field of power transformers testing and diagnostics; and a member of the consortium for PCB-disposal, using the mobile unit, developed by the Institute.

PCB holders: EPS – Electric Power Serbia, Serbian Railways, HBIS and HIP participated in the project for the implementation of ESM, inventory and for PCB-disposal.

Project Steering Committee (PSC): Was established during the preparatory phase [MTE report]. Members are as follows:

Ministry of Environmental Protection (MoEP), various Departments, National Cleaner Production Centre of Serbia, Environmental Protection Agency, Provincial Secretariat for Urban Development, Construction and Environmental Protection, Serbian Railways, company now responsible for the project is Infrastructure of Serbian Railways, Belgrade (new company formed by the Government of the Republic of Serbia), Serbian Chamber of Commerce, Office for Cooperation with Civil Society, Ministry of Finance, Electric Power Serbia (EPS), Ministry of Mining and Energy.

3. Theory of Change

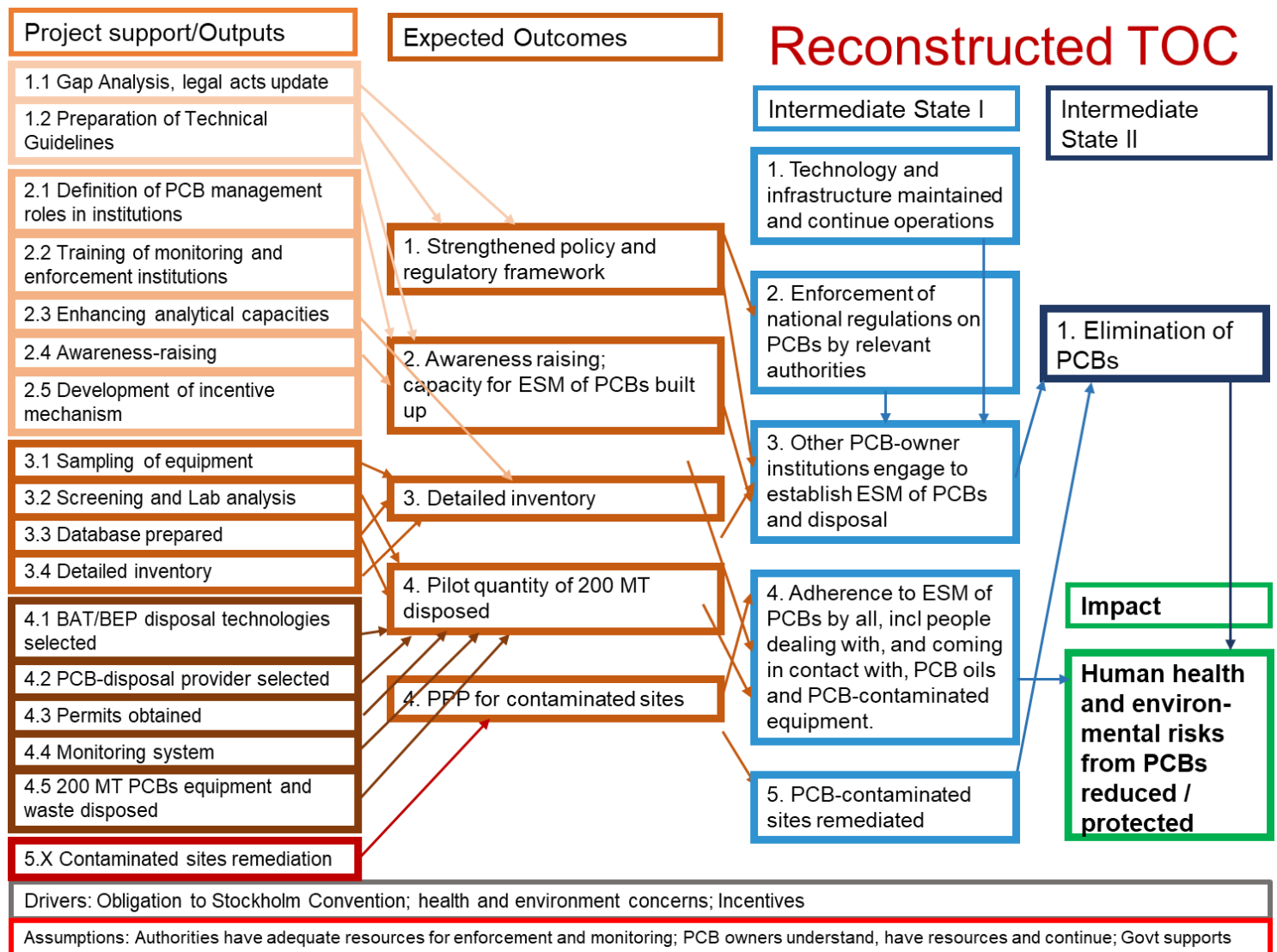
As a theory of change (TOC) was not a requirement at the time of project formulation, a TOC is not included in the project document. A TOC was reconstructed during the MTE, and updated during the TE, to understand the logic chain of the project as well as the series of results that are expected to lead to the expected impacts. It illustrates, in a simplified manner, how the project intends to (contribute to) achieving impact, that is, the pathway to impact, and which assumptions and drivers (need to) come to work, in order for the project results to contribute to achieving impact. The TOC illustrates the project support – Outputs, expected Outcomes³, Intermediate State I, Intermediate State II and the expected Impact.

³ Note of the evaluation: Outputs and Outcomes might be defined differently in different International Organizations. For the purpose of this evaluation, in the TOC, the terms – Outputs and Outcomes – are as defined in the Glossary of terms of the evaluation report.

Drivers are obligation to Stockholm Convention, health and environment concerns and incentives. For the achievement of the Expected Outcomes, Intermediate State I and Intermediate State II, it is important that the Assumptions hold true, that is, authorities have adequate resources for enforcement and monitoring; PCB-owners understand, have resources and continue; and Government provides support.

Intermediate State I is outside the control of the project. It falls under the responsibility of the country and key in-country stakeholder institutions, to maintain technology and continue operations, enforce national regulations on PCBs, establish ESM of PCBs at other institutions and continue disposal, adhere to ESM of PCB and that the contaminated sites are remediated.

At the time of the TE, all the Outputs except Output 5.4, were achieved, Output 5.4 is nonetheless considered to be completed for the project (this is elaborated under Output 5.4 in sub-section 4.1 Project's achieved results and overall effectiveness).



4. Project's contribution to Development Results – Effectiveness and Likelihood of Impact

4.1 Project's achieved results and overall effectiveness

Achievement of activities and outputs detailed below follows the order of Outputs as presented in the project logical framework:

Achievement of Outputs:

Output 1.1: Existing legal acts updated based on the available Gap Analysis Evaluation Report

A gap analysis report was prepared by a National Expert in 2016, and adopted by the PSC in 2017, according to which existing regulations already include to a great extent PCB-management related legislative and institutional framework. The Ministry of Environmental Protection was provided with the recommendations and suggested amendments for adoption, and as confirmed by the MoEP, in the process of being amended by sub-legal Acts.

On the one hand, the project can only support the preparation of draft amendments; it is up to the Government/relevant Ministry to adopt it. In this sense, this Output can be seen as **completed**, although the existing legal acts have not really been updated and adopted, at the time of the terminal evaluation.

Output 1.2: Technical guidelines, protocols and procedures prepared and improved for ESM of PCB-containing electrical equipment, waste and contaminated sites

This Output has been **achieved**. Already before the mid-term evaluation took place in 2019, technical guidelines, protocols and standard operating procedures had been prepared in Serbian and English languages for the ESM of PCB-containing electrical equipment, waste and contaminated sites by 3 NEs and with inputs from an International Expert (IE), together with the Technical Specialist of the PMU and presented to stakeholders in a workshop/roundtable discussion in October 2017. Moreover, manuals for sampling and PCB analysis, and for safe handling of PCBs have been prepared. Further, booklet-versions of the technical guidelines have also been prepared, making them easier to carry in the pocket and refer to, when necessary.

Output 2.1: PCB management roles in different government institutions defined

Roles and responsibilities of ministries, governmental agencies and other authorities with respect to PCB management within the pertinent legislative framework has been researched in a detailed manner and prepared by a national expert, including relevant Provisions in the Stockholm Convention, the corresponding National Legislations and the responsible national authorities, and was completed in October 2016. It was then presented to stakeholders during the 3rd PSC meeting in February 2017 and at the Inception Workshop in March 2017, in order to present and clarify the roles and responsibilities of different stakeholders. This Output is deemed to be **achieved**.

Output 2.2: Monitoring and enforcement institutions trained and active

Training workshop was conducted in October 2017 for participants from the MoEP, Serbian Environmental Protection Agency (SEPA), NEs, two Faculties of the University of Belgrade, Electrical Engineering Institute Nikola Tesla (Laboratory), Institute for Standardization of Serbia, private sector, NGOs, International Organization. Topics covered in the workshop included PCB management guidelines, protocols and procedures developed, upgraded and adapted in accordance with international standards, practices and toolkits for safe PCB management; gender-sensitized occupational health and safety measures while handling PCB-containing equipment and waste; revision of Rulebook on PCB and database of PCB-containing equipment and waste, including format for data collection – inventory forms and codification system; and ESM of PCBs. Furthermore, inspection officers were trained on carrying out site inspections for detection of PCBs also took place. This Output is assessed to be **achieved**.

Output 2.3: Analytical capacities improved for PCB sampling, analysis and monitoring

This Output is considered to be **completed**. Two laboratories, Electrical Engineering Institute Nikola Tesla⁴ and Institute of Public Health, are already accredited for PCBs and oils. Therefore, Electrical Engineering Institute Nikola Tesla conducted 5 training sessions at the Electric Power Serbia (EPS) for transferring knowledge on application of proper techniques and practices in equipment sampling and analysis, for which 300 test kits were used. 81 persons participated in the five sessions, including 32 technical staff of 15 companies who are involved in transformer maintenance, overhaul and repair. The 5 sessions were conducted in 5 different cities for wider geographical coverage.

In addition to the above, Tauw⁵ conducted a three-day training on ‘Sustainable management of hazardous waste contaminated sites’, for introducing sustainable management of contaminated sites. During this training, ‘Guidelines for sustainable management of contaminated sites in the Former Yugoslav Republic of Macedonia’ was provided to the 26 participants of the workshop. Topics included – assessing contaminated sites; remediation of contaminated sites; and standard operating procedures.

Output 2.4: Awareness and knowledge on POPs/PCBs issue among different target groups improved

Project has established a website with information on Stockholm Convention, POPs chemicals, PCBs, health impact of PCBs – www.pcbsserbia.rs [accessed on

⁴ <http://www.ieent.org>

⁵ <https://www.tauw.com/> Tauw BV in the Netherlands, an Environmental Engineering Consultancy.

20.10.2022]. Several brochures and leaflets were prepared in Serbian language (and some in English language), one especially made for women who are pregnant or planning to be pregnant. According to the MTE report, the prepared leaflets were disseminated by the MoEP, amongst others, at the EcoFair2017 in Belgrade from 4-6 October 2017. Other awareness-raising activities are also reported to have taken place, for example, workshop on 'raising awareness and knowledge on health and environmental hazards posed by PCBs and health impacts linked to physiological and social differences between men and women' in April 2018; interview by the NPM about hazardous waste, waste oils and PCB waste/oils published in April 2018 by the BBC News in Serbian. Moreover, In addition to the subjects on 'hazardous materials and environmental engineering' which are already taught at the University of Belgrade, in the Faculty of Technology and Metallurgy, a training on site assessment was conducted in December 2018. This output is considered to be **achieved**.

Output 2.5: Sustainable incentive mechanism developed for sound PCB management

In consultation with the MoEP and the EPA, an NE drafted two reports:

- International legislative and national frameworks of economic instruments and other incentive measures in the field of PCB management
- Proposals of economic instruments and other incentive measures in the field of PCB management.

The documents provide an overview of economic instruments and other incentive measures in PCB management with regards to international obligations of the Republic of Serbia, in the field of waste management and chemicals, harmonization with EU requirements for the disposal of PCBs, as well as existing national financial and economic policy instruments in environmental protection, including waste management. A few economic instruments exist already in the Republic of Serbia which have the potential to support the achievement of the environmental goals, including waste management. However, mainly pollution charges (treatment and disposal of waste) are included in the economic instruments. Products containing hazardous substances such as PCBs are not specified with any prescribed charges. The reports also cover other possible financial mechanisms for PCB management. Recommendations in the report for the country include a mix of co-financing as incentives and regulatory instruments and the use of economic principles in environmental decision making. This output is deemed to be **achieved**.

Output 3.1: Sampling of in-service equipment, waste and stockpiles completed

According to the MTE report, in the time period between 2002-2017, around 1,500 tons of pure PCBs were exported. Further, from 2015-2018, an EU project on PCBs was implemented in the country, during which inventory at energy generation sites and voltage levels of 110/35 kV, 35/20 kV and 35/10 kV was completed and decontamination was also carried out. In the preparatory phase of this project, 307

units were tested in the non-energy sector – Industry, Waterworks, Agricultural holdings; 56 units from these were found to be contaminated. Moreover, sampling of more than 1,000 transformers was carried out by the Institute Nikola Tesla between March and December 2018, and 462 transformers by the Serbian Railways, with 92 and 18 PCB-contaminated transformers respectively. This output is considered to be **completed** for the project.

Output 3.2: PCB presence determined by screening and laboratory analysis

After carrying out a tender process by the UNIDO, the Institute Nikola Tesla was selected as a provider out of 5 bidders in 2017 for sampling and laboratory analysis, as well as for conducting training on the sampling of insulating liquids from electrical transformers and use of test-kits for PCB-content determination. Altogether, 1057 samples were collected from transformers in different places – schools, low-voltage distribution transformers, less than 35 kV, and transformers in non-energy sector (industry). 165 samples were tested in the laboratory using Dexsil L 2000 DX, and 143 samples were positive and selected for GC-ECD analysis. This output has been **achieved**.

Output 3.3: Database prepared and maintained for PCB-containing equipment, waste, stockpiles and contaminated sites

Out of 3 local offers, one provider was selected. The format of the database, in MS Excel format, was prepared, and after presentation, approved by the PSC in September 2017. Information about around 1,100 inventoried transformers has been entered in the database as individual EXCEL files. This output has been **achieved**.

Output 3.4: Detailed inventory developed of PCB-containing equipment and wastes in the demonstration areas, countrywide estimations and prioritization of transformers for disposal

Based on the inventory data as well as the electrical energy system in Serbia, the NPMU has estimated ‘6-8% of contamination with high degree of confidence’ and has made the following estimations [Report Output 3.4, November 2019]:

- Total number of low PCB contaminated transformers: 3900
- Number of stationary contaminated units: 2570
- Number of pole mounted units: 1330
- Total weight of low PCB contaminated oil: 1233 tons
- Total weight of low PCB contaminated equipment: 4932 tons.

This output has been **completed**.

Output 4.1: BAT/BEP disposal options and technologies applicable to the disposal strategy validated

A 'Management plan for PCB-contaminated equipment in the Republic of Serbia' was prepared by two national experts in 2018, about the different prospects for ESM final disposal of PCBs in the country. It entails, amongst others, information about BAT/BEP technologies for PCB treatment, and an Action Plan for the reduction and elimination of PCBs in the Republic of Serbia.

A 'Techno-Economic Analysis of Different Scenarios for the Elimination of PCBs in the Republic of Serbia' has been prepared for the selection of one option for the elimination of PCBs in the country. Criteria which were taken into consideration for the selection of an option included – development of technology and experience, treatment efficiency, unit configuration, life-cycle management, ability to treat different waste types, investment and operating costs, and operation and ecological risks, generation of waste, operating parameters and configuration (stationary or mobile); different disposal methods/technologies and scenarios were analysed, and concluded that the scenario 'decontamination of equipment and treatment of oil in the country, and cellulose material to be sent for incineration abroad (dehalogenation)', was the scenario with several advantages for the stakeholders and the country, such as, amongst others, avoiding cross-border transportation of contaminated equipment, taking contaminated transformers into operation after decontamination of equipment and oil, and recovering valuable materials which can be re-used (for example, copper and oil). This output has been **achieved**.

Output 4.2: PCB treatment service provider selected

A technical vendor workshop was conducted in May 2019, with the participation of technology providers and national stakeholders; the national PCB-management plan and inventory were presented. After a public bidding tender procedure by UNIDO procurement, in mid-2019, and technical and financial evaluation of three received bids in October 2019, the consortium led by MITECO – MITECO, Institute Nikola Testa, SETCAR and Valorec, Jurcic Transport and Dunca Expeditii SA – was selected as the PCB-treatment service provider. This output has been **achieved**.

Output 4.3: Permits for the storage operation/technology treatment installation obtained

All necessary permits were requested from potential bidders of the bidding process under Output 4.2. The following members of the consortium have acquired the following permits:

- MITECO⁶: Permit for storage of non-hazardous and hazardous waste - Serbia
- MITECO: Integral permit for collection and transportation of hazardous waste - Serbia

⁶ "MITECO Knezevac is one of the first and the leading company in Serbia and the region that is involved in disposal of industrial and hazardous waste." www.miteco.rs

- EEI Nikola Tesla: Permit for treatment of hazardous waste in a mobile plant - Serbia
- SETCAR: Environment permit - Romania
- SETCAR: Integrated Environment Permit – Romania
- VALOREC: Process and regulatory requirements – Switzerland
- JURCIC TRANSPORT: Transportation of waste – Serbia
- DUNCA EXPEDITII SA: Transportation of waste – Romania.

This output has been **achieved**.

Output 4.4: Monitoring system established in the interim storage/treatment facility

According to the MITECO, which was leading the consortium which won the public bidding process as service provider under Output 4.2, establishing a baseline of the existing status of PCB-contamination was deemed to be necessary (soil, air and groundwater in the surroundings), before commencing the decontamination activities of PCBs and waste-containing PCBs. Challenges are reported to have been faced due to the outbreak of the COVID-19 pandemic – restriction of movement of persons foreseen to carry out the sampling and analysis, sending samples to the Czech Republic and receiving international experts and laboratory persons to do the testing. Therefore, project made efforts to do everything within the country, with the best possible options and expertise available. An interim storage was established at MITECO for disassembling equipment. This output has been **completed**.

Output 4.5: 200 tons of PCB-containing equipment and waste disposed

5 locations were selected for the decontamination and dismantling and packaging of equipment in the country, namely, HBIS Smederevo, HIP Petrohemija, Water and Sewer Nis, Water & Sewer Krusevac and MITECO, which is the owner of the hazardous waste storage facility.

The service providers are reported to have the appropriate expertise to handle all phases of the decontamination process, starting with draining of the oil from the transformers (without leakage), storage of the PCB-contaminated oil in appropriate drums (of 200L each) and transportation in an environmentally sound manner, as well as reporting to the relevant authorities.

Pure PCB-oil and PCB-solid waste were exported to Switzerland, for disposal in Valorec, a member of the consortium. Drained transformers and capacitors were stored temporarily at MITECO for disposal at SETCAR in Romania.

Oils and equipment with low PCB-contamination were treated by the mobile facility provided by Institute Nikola Tesla, in an environmentally sound manner, with its own

licensed patented technology, in line with BEP and BAT principles, to a value below 50 ppm (50 mg/kg). All leftover waste was picked up by authorized waste operator. Decontaminated and drained transformers were transported to MITECO's temporary storage for dismantling.

Quantities decontaminated are shown in the following table:

Category	Quantity disposed, tons
A	93.700
B	66.490 (equipment to be finally tested on PCB conc. is included)
C	63.692
TOTAL	223.882
% of contracted	64.5

Source: Report Output 4.5

The following table – Scenario A – shows the quantity of pure-PCB from 2 sites:

Table: Summary of overall „pure PCB“ waste taken over from HBIS and HIP Petrohemija sites

		Contractual	Performed
Item No.	Activity	Quantity, kg	Quantity, kg
2	Export of “pure PCB” equipment		
2.1	Export of “pure PCB” transformers	101085	115860
2.2	Export of PCB capacitors	12960	15620
TOTAL		114045	131480

Source: Report Output 4.5

The following table – scenario B – shows the quantity of decontaminated low-PCB equipment: to service, performed at HBIS site

		Contractual	Performed

Item No.	Activity	Quantity, kg	Quantity, kg
3	Decontamination of “low PCB” containing transformers to be returned to service		
3.1	Decontamination of item No. 2 from Table 3	41000	41000
3.2	Decontamination of items No. 4, 13, 21 and 24, from Table 3	12500	8000
3.3	Decontamination of all items excluding No. 2, 4, 13, 21 and 24, from Table 3	61535	62930
TOTAL		115035	111930

Source: Report Output 4.5

The following table – scenario C – shows the quantity of low-PCB equipment for final disposal:

		Contractual	Performed
Item No.	Activity	Quantity, kg	Quantity, kg
4	Decontamination of “low PCB” containing transformers to PCB concentration below 10 ppm and their final disposal		
4.1, 4.4	Decontamination and final disposal of item No. 7 from Table 4	73000	71820
4.2, 4.5	Decontamination and final disposal of items No. 1 and 2 from Table 4	3960	710
4.3, 4.6	Decontamination and final disposal of all items from Table 4 excluding items No. 1, 2 and 7	41492	1260
TOTAL		118452	73790

Source: Report Output 4.5

Summarizing the figures in the above tables, the total quantity of decontaminated oil and equipment, and disposal of PCB-waste and equipment amounted to: 317200 kg/317.2 tons (sum of 131480 kg, 111930 kg, 73790 kg).

During 2021, additional quantities were decontaminated/disposed off:

Scenario B	90740 kg
Scenario C	240000 kg
Total	330740 kg

That is, a total of **647,940 kg / 647.94 tons** was decontaminated/disposed off, against the initially foreseen quantity of 200 tons; project exceeded its foreseen indicator by 224%.

Further, during the terminal evaluation, an additional quantity of 110 tons of PCB waste and equipment was reported to be awaiting approval for disposal.

This output has been **(over-)achieved**.

Output 5.1: PCB contaminated sites investigated

398 contaminated and potentially contaminated sites have been identified in the Republic of Serbia contaminated with different substances and due to different reasons [EPA, MoEP, 2016]. 3 sites were identified with higher levels of PCB contamination, as follows:

- Radijator Ltd, Zrenjanin: contaminated with PCB, total hydrocarbons, heavy metals and asbestos, as well as surrounding areas;
- Factory of non-ferrous metals, Prokuplje: contaminated with heavy metals, PCBs and PAH; and
- Chemical industry Zupa Ltd, Krusevac: contaminated with Mercury, PCBs, Xanthate, asbestos.

The preliminary site investigation for the above 3 sites was conducted in October 2018 on soil, air, vegetation and water. Based on the reports, one site, Radijator Zrenjanin⁷, was selected for the secondary site investigation, which was conducted in April 2019 by VINCA, with the support of Tauw. According to the report R002-

⁷ "The site was used by the metal industrial company Radiator LTD to produce metal boilers and heaters since 1932. The site has been subjected to many changes and events that may have impacted the soil and groundwater in the past 87 years. One of such events is a raging fire that took place in 2008. From oral information the remains of the burned parts of the factory were dumped in a trench direct south of the on-site railroad South of the concrete platform with the scrap metal crushing tower. Elevated PCB concentrations were found here in the top and subsoil". Report R002-1267560BFF-V01-lhl-NL 19 March 2019.

1267560BFF-V01-lhl-NL by Tauw, “it is the only site with proven PCB contamination in the soil, is accessible and has a high groundwater table which makes it feasible to include the groundwater in the conceptual site model”. This output has been **achieved**.

Output 5.2: Criteria defined for prioritization of PCB contaminated sites within the PPP framework

Four different options, grouping criteria which could be used to defined problem areas for soil contamination, were considered, namely, risk score, size, size and type of operations, size and management characteristics; following established methodologies, a list of criteria was prepared, in collaboration with an NE, IE, Serbian EPA and the PMU. The above-mentioned site selection took place based on the criteria, which was presented to and confirmed by the PSC. This output has been **achieved**.

Output 5.3: Risk assessment for a pilot site completed

In January 2019, Tauw was contracted to carry out this work, and prepared the following reports on works carried out:

- A comparison of the Serbian related legislation with the best practice [May 2019], within which the relevant environmental protection regulations were assessed, for example, Law on Environmental Protection, on Soil Conservation, Chemicals, on Waste Management, on Environmental Impact Assessment, on Waters, Public Health and Ministries;
- Best practice of Tier 1⁸, 2⁹ and 3¹⁰ risk assessment as part of sustainable management of contaminated sites [June 2019], which entails the explanations for Tier 1, 2 and 3 risk assessments, when are they to be used, data requirements, Risk-Based Corrective Action Approach (RBCA) toolkit, Risc Integrated Software for Clean-ups (RISC5);
- Case study Risk Assessment – Risk assessment of PCBs-contaminated sites in Serbia [August 2019], which includes information about the works carried out on CSM Radiator site Zrenjanin.

Moreover, Tauw conducted a training on 26 August 2019, at the Faculty of Technology and Metallurgy, University of Belgrade, for 24 participants, about the review of legal framework, best practice risk assessment, and case study – risk assessment. This output has been **achieved**.

The following explanation of Tier 1, 2 and 3 may vary at the international level.

⁸ A qualitative or preliminary environmental risk assessment based on general site assessment information.

⁹ A semi-quantitative environmental risk assessment based on more site-specific data.

¹⁰ A quantitative environmental risk assessment based on numerical or highly detailed fate and transport and/or exposure models and site-specific conditions.

Output 5.4: Finalization of pilot remediation agreement under PPP scheme

As reported by the PMU, in september 2021, the PCB selected site “Radijator” Zrenjanin (publicly owned entity) was sold to privately owned company ‘Mat Real Estate’, which then completed site clean-up and remediation according to the relevant information on the site pollution, the relevant Laws and Regulations and the Contract between the parties, funding the activity itself, including removal of PCB-waste and contaminated concrete, as well as soil remediation, which was completed in early 2023. The site usage is reported to be foreseen for industrial manufacturing of agricultural machinery. As the activity was completed only in early 2023, reports were under preparation and could not be provided to the evaluation; an article from a local newspaper was provided to the evaluator: <https://listzrenjanin.com/novi-vlasnik-radijatora-nasledio-opasan-otpad-lokacija-kontaminirana/>

Therefore, this Output has been **achieved**.

Output 5.5: National strategy for PCB contaminated sites developed.

Already before the MTE, a Management Plan was prepared by an IE, for PCB-contaminated soil. The Serbian EPA was reported to be using it as a template for the Management Plans for contaminated sites, contaminated with all pollutants, in the Republic of Serbia.

The draft version of the document, in Serbian, was named “National Strategy for PCBs contaminated sites in Republic Serbia” (April 2018), and includes an overview of the current situation, including legislatives, database of contaminated sites, limits for PCBs, results of previous studies of PCBs content in the environment, PCBs waste and PCBs in water; objectives of the strategy and implementation; assessment of the impact of the strategy; coherence with other government’s strategies, monitoring of implementation of the strategy and strategy process development. This output has been **achieved**.

Outputs	Target / Indicators	Comments	Rating
Output 1.1: Existing legal acts updated based on the available Gap Analysis Evaluation Report	Ø Number of environment policies, strategies, laws, regulation approved/enacted (1); Ø Number of stakeholders involved in the regulatory preparation with gender segregation information (3); Ø Number of round table discussions and participants (male/female) (1)	Gap analysis report prepared, existing regulations include to a great extent PCB-management related framework, recommendations provided to the MoEP, in the process of being amended by sub-legal Acts.	S
Output 1.2: Technical guidelines, protocols and procedures prepared and improved for ESM of PCB-containing electrical equipment, waste and contaminated sites	Ø PCB management guidelines, protocols and procedures developed, upgraded and adapted in accordance with international standards, practices and toolkits for safe PCB management (3); Ø Gender-sensitized occupational health and safety measures while handling PCB-containing equipment and waste defined (1); Ø Number of round table discussions on guideline (1) improvement/development Ø Number of participants (male/female) (20/10);	Technical guidelines, protocols and SOPs prepared in Serbian and English, manual for sampling and PCB-analysis prepared, as well as booklet version of technical guidelines.	HS
Output 2.1: PCB management roles in different government institutions defined	Ø Number of governmental institutions with their roles and responsibilities defined (3); Ø Number of training (1); Ø Number of participants from governmental institutions (male/female) (20/10); Ø Project management structure established and staffed for securing sustainability of the ESM practices (1)	Roles and responsibilities of ministries, governmental agencies and other authorities with respect to PCB management within the pertinent legislative framework researched and prepared, including relevant Provisions in the Stockholm Convention, the	HS

		corresponding National Legislations and the responsible national authorities.	
Output 2.2: Monitoring and enforcement institutions trained and active	<p>Ø Number of training with gender dimensions (1)</p> <p>Ø Number of inspectors trained to carry out site inspections (male/female) (20/10);</p> <p>Ø Two hundred quick PCB screening test kits delivered to the inspectorate;</p> <p>Ø Number of custom officers trained and equipped for PCB detection(male/female) (20/10);</p> <p>Ø One hundred quick PCB screening test kits delivered to the custom departments;</p> <p>Ø Number of technical and managerial personnel of PCB equipment owners trained on inventory (male/female) (20/10);</p> <p>Ø Number of managerial and technical personnel of transformer maintenance facilities and PCB owners trained (male/female) (25/5);</p>	<p>Training workshop conducted in October 2017 for participants from the MoEP, Serbian Environmental Protection Agency (SEPA), NEs, two Faculties of the University of Belgrade, Electrical Engineering Institute Nikola Tesla (Laboratory), Institute for Standardization of Serbia, private sector, NGOs, International Organization.</p>	S

	<p>Ø Two hundred quick PCB screening test kits delivered to the transformers maintenance workshops;</p> <p>Ø Number of companies adopting best practices and new waste management procedures (3)</p>		
Output 2.3: Analytical capacities improved for PCB sampling, analysis and monitoring	<p>Ø Number of trained laboratory personnel (male/female) (20/10);</p> <p>Ø Number of internationally recognized standards related to POPs/PCB measurements in environmental media and food adopted as national ones (1);</p> <p>Ø One field test equipment with 200</p>	Two laboratories already accredited for PCBs and oils, Electrical Engineering Institute Nikola Tesla conducted 5 training sessions at the Electric Power Serbia (EPS) for transferring knowledge on application of proper techniques and practices in equipment sampling and analysis, for which 300 test kits used, 81 persons	HS

	screening reagents for detection of POPs purchased	participated in five sessions, including 32 technical staff of 15 companies involved in transformer maintenance, overhaul and repair. 5 sessions conducted in 5 different cities for wider geographical coverage.	
Output 2.4: Awareness and knowledge on POPs/PCBs issue among different target groups improved	<p>Ø Number of gender-sensitive awareness propagation materials (brochures, web page, web site) prepared and published (3);</p> <p>Ø Number of awareness raising campaigns, workshops, and roundtable discussions on PCB risks and regulatory requirements among authorities, workers, media, NGOs, vulnerable groups conducted (3);</p> <p>Ø Number of participants trained from different target groups (NGOs, media, industry workers, women associations) (male/female) (20/10);</p> <p>Ø Number of interviews in the media presenting the PCB issue (1);</p> <p>Ø Number of curricula for sound chemical management (POPs and especially PCBs) strengthened (1)</p>	Project established a website with information on Stockholm Convention, POPs chemicals, PCBs, health impact of PCBs. Several brochures and leaflets prepared in Serbian language (and some in English language), one especially for women who are pregnant or planning to be pregnant.	S
Output 2.5: Sustainable incentive mechanism developed for sound PCB management	<p>Ø Programme for sustainable financial mechanism developed and agreed (1);</p> <p>Ø Incentive mechanism for sustainable PCB management approved (1)</p>	Two reports prepared: <ul style="list-style-type: none"> • International legislative and national frameworks of economic instruments and other incentive measures in the field of PCB management 	S

		• Proposals of economic instruments and other incentive measures in the field of PCB management.	
Output 3.1: Sampling of in-service equipment, waste and stockpiles completed	Ø Number of transformers selected, sampled, screened, verified and labelled (2000)	Sampling of more than 1,000 transformers carried out by the Institute Nikola Tesla between March and December 2018, and 462 transformers by the Serbian Railways, with 92 and 18 PCB-contaminated transformers respectively.	S
Output 3.2: PCB presence determined by screening and laboratory analysis			
Output 3.3: Database prepared and maintained for PCBcontaining equipment, waste, stockpiles and contaminated sites	Ø PCB database developed and used for disposal prioritization and reporting requirements of the Stockholm Convention (1);	Database prepared, and information about around 1,100 transformers entered in the database.	S

<p>Output 3.4: Detailed inventory developed of PCB-containing equipment and wastes in the demonstration areas, countrywide estimations and prioritization of transformers for disposal</p>	<p>Ø Report on valid estimations on PCB quantities by extrapolation based on representative sample performed (1); Ø Priority list for phasing-out of the PCB containing equipment prepared (1)</p>	<p>Based on the inventory data as well as the electrical energy system in Serbia, the NPMU estimated '6-8% of contamination with high degree of confidence' and made estimations of contaminated units and quantities.</p>	<p>HS</p>
<p>Output 4.1: BAT/BEP disposal options and technologies applicable to the disposal strategy validated</p>	<p>Ø Study with elaborated country needs, nature and quantity of wastes, costbenefit analyses, economic and market conditions prepared in order to optimize the grants provided for the project (1); Ø A list of criteria for the selection of disposal/ destruction options identified which will include cost-benefit analysis as well as comparison of different scenarios for final disposal and destruction(1); Ø National PCB Management Plan adopted (1)</p>	<p>A 'Management plan for PCB-contaminated equipment in the Republic of Serbia' prepared; Criteria established; A 'Techno-Economic Analysis of Different Scenarios for the Elimination of PCBs in the Republic of Serbia' prepared.</p>	<p>HS</p>
<p>Output 4.2: PCB treatment service provider selected</p>	<p>Ø PCB treatment service operator selected (1)</p>	<p>After a public bidding tender procedure by UNIDO procurement, in mid-2019, and technical and financial evaluation of three received bids in October 2019, the consortium led by MITECO – MITECO, Institute Nikola Testa, SETCAR and</p>	<p>HS</p>

		Valorec, Jurcic Transport and Dunca Expeditii SA – selected.	
Output 4.3: Permits for the storage operation/ technology treatment installation obtained	<p>Ø Number of permits for the PCB disposal activities obtained (1);</p> <p>Ø A facility for the PCB treatment operations upgraded (1)</p> <p>Ø Amount of incremental investment (USD 400,000)</p>	All necessary permits were requested from potential bidders of the bidding process	HS
Output 4.4: Monitoring system established in the interim storage/ treatment facility	<p>Ø A monitoring system in the interim storage/treatment facility installed (1)</p>	The consortium, led by MITECO, established a baseline of the existing status of PCB-contamination was deemed to be necessary (soil, air and groundwater in the surroundings), before commencing the decontamination, and established an interim storage for disassembling equipment.	S
Output 4.5: 200 tons of PCB-containing equipment and waste disposed	<p>Ø Number of phased out and replacement plans for PCB identified inservice equipment prepared in cooperation with the stakeholders (3);</p> <p>Ø Number of companies adopting best practices (3);</p> <p>Ø Number of new businesses (1);</p> <p>Ø 200 tons of PCB-containing equipment and waste</p>	A total of 647,940 kg / 647.94 tons decontaminated/disposed off, against the initially foreseen quantity of 200 tons; project exceeded its foreseen indicator by 224%.	HS

	<p>disposed/destroyed in an environmentally sound manner;</p> <p>ØNumber of equipment recycled and reused (150 tons);</p> <p>ØRevenue values and the quantities of the saved raw materials (USD);</p> <p>Ø Savings in energy loss as a difference in the energy efficiency between the new and the old transformers calculated, and quantities of CO2 emissions prevented (tons)</p>		
Output 5.1: PCB contaminated sites investigated	<p>Ø Number of possible PCB contaminated sites identified (5);</p> <p>ØSite investigation conducted (1)</p>	398 contaminated and potentially contaminated sites have been identified in the Republic of Serbia contaminated with different substances and due to different reasons, 3 sites were identified with higher levels of PCB contamination, preliminary site investigation carried out for 3 sites, detailed site investigation carried out for 1 site.	HS
Output 5.2: Criteria defined for prioritization of PCB contaminated sites within the PPP framework	<p>ØA list of criteria for priority setting defined (1);</p> <p>Ø PCB contaminated site prioritized (1);</p>	Four different options, grouping criteria to define problem areas for soil contamination considered.	HS

Output 5.3: Risk assessment for a pilot site completed	<ul style="list-style-type: none"> Ø Expert on risk assessment study identified and selected (male/female) (1/1); Ø A gender-sensitized report on the risk to the environment and human health assessed (1); 	Tauw contracted to carry out this activity, and prepared reports.	HS
Output 5.4: Finalization of pilot remediation agreement under PPP scheme	<ul style="list-style-type: none"> Ø Disposal, remediation technologies for PCB-contaminated site identified and evaluated (3); Ø Technology selection screening matrix developed (1); Ø Technology for the pilot remediation demonstration selected (1); Ø ToR for site clean up operation articulating PPP modality agreed; 	Site “Radijator” Zrenjanin sold by owner to private company, which has reportedly completed site clean-up and remediation.	HS
Output 5.5: National strategy for PCB contaminated sites developed	<ul style="list-style-type: none"> Ø Expert on strategy development identified and selected (male/female) (1/1); Ø Strategy for PCB contaminated sites developed and approved (1); 	A Management Plan prepared by an IE, for PCB-contaminated soil. The Serbian EPA reported to be using it as a template for the Management Plans for contaminated sites, contaminated with all pollutants, in the Republic of Serbia.	S

Component	Outputs	Rating	Weighted Rating
Component 1	Output 1.1	S	HS
	Output 1.2	HS	
Component 2	Output 2.1	HS	S
	Output 2.2	S	
	Output 2.3	HS	
	Output 2.4	S	
	Output 2.5	S	
Component 3	Output 3.1	S	S
	Output 3.2	S	
	Output 3.3	S	
	Output 3.4	HS	
Component 4	Output 4.1	HS	HS
	Output 4.2	HS	
	Output 4.3	HS	
	Output 4.4	S	
	Output 4.5	HS	
Component 5	Output 5.1	HS	HS
	Output 5.2	HS	
	Output 5.3	HS	
	Output 5.4	HS	
	Output 5.5	S	
Overall			HS

Achievement of Outcomes:

Assessment of achievement of Outcomes, and likelihood of impact, based on the logframe of the project, is as follows:

Outcome 1: Legal, regulatory and policy framework for sound PCB management established and enforced

A gap analysis report has been prepared, according to which national regulations already entail, to a great extent, PCB-management related legislative and institutional framework. Recommended amendments have been provided to the MoEP. Technical guidelines, protocols and standard operating procedures have also been prepared, in Serbian and English languages for the ESM of PCB-containing electrical equipment, waste and contaminated sites. However, existing legal framework has not (strictly speaking) been updated.

Therefore, this Outcome, as formulated in the project document, is not (yet) achieved. Nonetheless, taking into account that all the corresponding activities, which the project can carry out, have been achieved, Outcome 1 can be deemed to be **completed**

for the project, and it remains upto the country to approve the updates to the existing legislation.

Outcome 2: Institutional capacities and awareness improved for sound PCB management

PCB management roles in different government institutions has been researched and presented to the relevant stakeholders; training workshop has been conducted on PCB management guidelines, protocols and procedures and occupational health and safety measures, and inspection officers trained on conducting site inspections; two laboratories were already accredited for PCB testing, and one of them has conducted 5 training sessions for 81 persons, including technical staff of 15 companies, for transferring knowledge on equipment sampling and analysis; awareness-raising workshops have taken place; and documents prepared on proposals of economic instruments and other incentive measures in PCB management.

Therefore, this Outcome is considered to be **achieved**.

Outcome 3: Detailed inventory of PCB-containing equipment and waste carried out

Sampling of over 1,000 transformers has been carried out, and 462 transformers by the Serbian Railways. A database, in EXCEL format, has been prepared, and information about the aforementioned transformers entered in it as individual files. Based on inventory data, the NPMU has estimated the quantity of low PCB-contaminated oil to be 1,233 tons, and low PCB-contaminated equipment to be 4,932 tons.

This Outcome is considered to be **achieved**.

Outcome 4: Pilot quantities of 200 tons of PCB-containing equipment and waste disposed of in an environmentally sound manner

A techno-economic analysis of different options was carried out; PCB treatment service provider selected – the consortium consisting of MITECO, Institute Nikola Tesla, SETCAR and Valorec, which possessed the necessary permits to carry out all related works and established a baseline of the existing status of PCB-contamination (soil, air and groundwater) in the surroundings of the decontamination activities; altogether 647.94 tons of oils and equipment have been decontaminated/disposed off, surpassing the project target of 200 tons.

This Outcome is considered to be **(over-)achieved**.

Outcome 5: Public private partnership (PPP) policy integrated into national assessment scheme for PCBs contaminated sites

Preliminary site investigation was carried out on 3 selected sites, and risk assessment and detailed site investigation on one of them, which was then sold by the owner to a private company which has then reportedly carried out contaminated waste disposal

and soil remediation. A 'National Strategy for PCBs contaminated sites in the Republic of Serbia' has been prepared.

This Outcome has been **achieved**, as a contaminated site has been sold to a private company, which has then carried out site remediation.

Overall project objective: is "to protect human health and the environment by reducing and eliminating the releases of and exposure to PCBs through the establishment of an environmentally-sound PCB management system and final disposal of 200 tons of PCB equipment.", and based on the afore-mentioned achievement of Outcomes, is assessed to be **achieved** as foreseen in the project document.

Overall effectiveness is assessed to be '**Highly Satisfactory**'.

Project Development Objective	Comments	Rating
The project objective is to protect human health and the environment by reducing and eliminating the releases of and exposure to PCBs through establishment of an environmentally sound PCB management system and final disposal of 200 tons of PCB equipment	A total of 647,940 kg / 647.94 tons decontaminated/disposed off, against the initially foreseen quantity of 200 tons; project exceeded its foreseen indicator by 224%.	HS
Outcomes	Comments	Rating
Outcome 1: Legal, regulatory and policy framework for sound PCB management established and enforced	A gap analysis report has been prepared, according to which national regulations already entail, to a great extent, PCB-management related legislative and institutional framework. Recommended amendments have been provided to the MoEP. Technical guidelines, protocols and standard operating procedures have also been prepared, in Serbian and English languages for the ESM of PCB-containing electrical equipment, waste and contaminated sites. However, existing legal framework has not (strictly speaking) been updated.	S

<p>Outcome 2: Institutional capacities and awareness improved for sound PCB management</p>	<p>PCB management roles in different government institutions has been researched and presented to the relevant stakeholders; training workshop has been conducted on PCB management guidelines, protocols and procedures and occupational health and safety measures, and inspection officers trained on conducting site inspections; two laboratories were already accredited for PCB testing, and one of them has conducted 5 training sessions for 81 persons, including technical staff of 15 companies.</p>	<p>HS</p>
<p>Outcome 3: Detailed inventory of PCB containing equipment and waste carried out</p>	<p>Sampling of over 1,000 transformers has been carried out, and 462 transformers by the Serbian Railways. A database, in EXCEL format, has been prepared, and information about the aforementioned transformers entered in it as individual files.</p>	<p>S</p>
<p>Outcome 4: Pilot quantities of 200 tons of PCB-containing equipment and waste disposed of in an environmentally sound manner</p>	<p>Altogether 647.94 tons of oils and equipment have been decontaminated/disposed off, surpassing the project target of 200 tons.</p>	<p>HS</p>
<p>Outcome 5: Public private partnership (PPP) policy integrated into national assessment scheme for PCBs contaminated sites</p>	<p>Preliminary site investigation was carried out on 3 selected sites, and risk assessment and detailed site investigation on one of them. However, due to lack of interest of any investor, the foreseen pilot remediation agreement under a PPP scheme could not be finalized. A 'National Strategy for PCBs contaminated sites in the Republic of Serbia' has been prepared.</p>	<p>HS</p>
<p>Overall</p>		<p>HS</p>

4.2 Progress towards impact

Likelihood of Impact:

Impact is defined as positive and negative, intended and non-intended, long-term effects produced by a development intervention. For the purposes of this terminal evaluation, the assessment of impact is based on likelihood of achievement of impact, as long-term impacts have not yet been achieved.

During the TE, altogether 647.94 tons of oils and equipment had been decontaminated/disposed off, surpassing the project target of 200 tons.

a) Behavioural change

Economic competitiveness: It was highlighted to the evaluation, that the consortium, which included the Institute Nikola Tesla, submitted the best value proposition during the international tender. The mobile PCB-decontamination and oil regeneration unit has been designed and produced by the in-country Institute Nikola Tesla, thus probably contributing to the consortium being able to be highly competitive in the international market, as pointed out by interviewed stakeholders. Should further quantities of PCBs be identified, being an in-country institute, competitive prices can be offered by the Institute for decontamination also in the future. Further, it enables the Institute Nikola Tesla to actually participate in international tenders for carrying out PCB-disposals in other countries or to even provide technical assistance to other countries to produce and use their own mobile PCB-disposal units.

Environmentally sound: Having participated in the project, and disposal of PCBs, the participating enterprises, two of the larger enterprises in the country, have contributed/are contributing to the environment, by disposing off around 648 MT of PCB-contaminated oils and equipment.

Socially inclusive: As reported to the evaluation, awareness has been created and enhanced at enterprises about PCBs, which in turn have confirmed informing employees at their respective institutions about safe handling of PCBs, thus benefiting persons working directly with transformers, in the repair and maintenance units of enterprises.

b) Broader adoption

As mentioned under Output 1.1, legislation on PCBs already existed in the country; nonetheless, a gap analysis was carried out, and suggestions provided to the MoEP for inclusion in the existing legislation, which were undergoing approval process for adoption at the time of the TE.

As mentioned under Output 4.5, after disposal of the foreseen 200 MT, the NPMT has discussed with, and enterprises have expressed their willingness to, dispose off further quantities of existing PCBs, and reaching around 648 MT during the TE, thus achieving 224% beyond the planned target. Thus, upscaling of project results has already taken place. Moreover, as the TE was informed, national stakeholders are planning the disposal of further identified quantities of PCBs, 110 MT, during the extended time period of the project in 2023.

a) Emergence of TOC intermediate states

Intermediate State	Findings	Rating
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I. Technology and infrastructure maintained and continue operations	The mobile unit has been produced by the Institute Nikola Tesla, that is, human and technical expertise exists in the country to maintain and continue operations.	HS
II. Enforcement of national regulations on PCBs by relevant authorities	PCB-related regulations exist in the country and as confirmed by the MoEP, institutions are aware of the legislations, and are in the process of complying with it.	S
III. Other PCB-owner institutions engage to establish ESM of PCBs and disposal	Project has over-achieved its target of 200 MT by 224%; moreover, further 110 MT of PCB-contaminated oil/equipment has been established and is awaiting disposal in the extended duration of the project in 2023.	HS
IV. Adherence to ESM of PCBs by all, incl people dealing with, and coming in contact with, PCB oils and PCB-contaminated equipment.	As confirmed by interviewed stakeholder institutions, they have transferred knowledge about PCBs to other relevant departments, including employees from repair and maintenance workshops. (This could not be evidenced by the evaluation, as no evaluation mission took place).	S
Drivers	All the drivers are considered to hold true.	
Obligation to Stockholm Convention	Regulation pertinent to PCBs exists in the country; all the interviewed stakeholders have emphasized their commitment to the disposal of PCBs; project has disposed off 647.94 MT of PCB-contaminated oil and equipment.	HS
Health and environment concerns	Interviewed stakeholders are aware of effects of PCBs; awareness-raising has been carried out; institutions have confirmed transferring information	S

	about PCBs within their respective institutions.	
Incentives	Project has paid for the PCB-disposal so far.	S
Assumptions		
i. Authorities have adequate resources for enforcement and monitoring;	At the time of the terminal evaluation, this was confirmed by the MoEP, although there was no documental evidence on this.	S
ii. PCB owners understand, have resources and continue	PCB-owner institutions have expressed their understanding for the issue of PCBs and willingness to dispose off; project has over-achieved its target, and further 110 MT is awaiting disposal.	HS
iii. Government provides support	The MoEP has confirmed providing support in terms of official letters and communication to the institutions, besides continuing its efforts for PCB-elimination to fulfil its obligations to the Stockholm Convention.	HS

The following assessment is based on the evaluation criteria, as mentioned in the TOR for the PCB Cluster Evaluation.

5. Project's quality and performance

5.1 Project Design and results framework/logframe

The project is similar to other PCB projects, in which UNIDO has several years of experience with several PCB projects. To achieve the project objective, "... 200 tons of PCB equipment ...", project's technical components entailed legal framework, capacity building, awareness raising, PCB inventory and additionally an assessment of contaminated sites, which are considered to be adequate to achieve the project objective.

The expected result-chain – outputs, outcomes – is clear and logical. However, the formulated Outcomes do not describe a change in target group's behaviour/performance or system/institutional performance; Outputs describe deliverables that the project will produce to achieve Outcomes.

As already mentioned in the MTE report, the applied project approach is considered to be sound and appropriate, the design technically feasible. The M&E plan specifies the M&E activity, responsible parties, budget and time frame for the activity; the M&E budget is considered to be adequate and consistent with the logframe. Critical risks have been identified, albeit not classified under financial, social-political, institutional, environmental and implementation aspects, with specific risk ratings – high, medium and low. Mitigation measures have been identified. The project document includes a logical framework, with specific and measurable indicators.

The project document does not include a Theory of Change (TOC), as this was not a requirement at the time of project formulation. A TOC was reconstructed by the MTE, which has slightly adapted during this TE, based on information provided in the project document and information received during the TE.

5.2 Relevance and Coherence

All the interviewed stakeholders have emphasized the high relevance of the project for the country and with respect to fulfilling the obligations under the Stockholm Convention. Project is coherent with policies and strategies of the Republic of Serbia.

The project is in line with Serbia's national priorities, as defined in the National Implementation Plan of the Republic of Serbia for the Stockholm Convention. Further, the National Waste Management Strategy, adopted in 2003 for the time period 2003 – 2008 and replaced in 2010 for the time period 2010 – 2019, addresses the issue of POPs management, regulating waste, hazardous waste and PCB waste management. The National Sustainable Development Strategy specifically mentions, amongst others, inadequate management of PCB-containing waste. The medium and long-term goals of the National Environment Protection Programme include the establishment of a register of contaminated sites, and the remediation and rehabilitation of these. It is considered to meet the needs of the target group.

The project is in line with UNIDO's Inclusive and Sustainable Industrial Development (ISID). UNIDO's Mission Statement (IDB.39/13/Rev.1) includes safeguarding the environment¹¹ and reiterates the flexible UNIDO approach¹² for ISID. One of the pillars of the ISID is Safeguarding the Environment - environmentally sustainable growth, via "...the promotion, adaptation and transfer of environmentally sound technologies...", under which UNIDO aims to "...assist countries in reaching compliance with the Stockholm Convention and aims at developing capacities in

¹¹ "UNIDO aspires to reduce poverty through sustainable industrial development. We want every country to have the opportunity to grow a flourishing productive sector, ... and to safeguard their environment".

¹² "Differentiate and adapt our approaches and methodologies according to the needs of countries at different stages of development".

developing countries to protect their populations and their environmental resources from POPs-related pollution”.

The project is also in line with the GEF Focal Area Strategy for Chemicals under GEF-5. The GEF’s goal in the POPs focal area is to protect human health and the environment by assisting countries to reduce and eliminate production, use and releases of POPs, and consequently contribute generally to capacity development for the sound management of chemicals. Under GEF-4, this goal was to be achieved by amongst others: strengthening capacities for National Implementation Plan (NIP) implementation, including assisting those countries that lag farthest behind to establish basic, foundational capacities for sound management of chemicals.

Project is also in alignment with the objectives of the Stockholm Convention.

5.3 Efficiency

(Including Financial Management and Co-financing)

Project was approved by the GEF in December 2014 and commenced implementation at UNIDO in February 2015 (first PAD issuance), with a project duration of 48 months. The MoEP signed a Memorandum of Understanding (MoU) with the Faculty of Technology and Metallurgy of the University of Belgrade in May 2015 to manage the project as the NPMU. UNIDO and the Faculty of Technology and Metallurgy signed a contract in July 2015, with the Faculty of Technology and Metallurgy¹³ as Contractor for a period of 48 months, starting in July 2015 for the implementation of the project, appointing the Faculty of Technology and Metallurgy, together with the National Cleaner Production Centre of Serbia, as the Project Management Unit (PMU). After appropriate selection process, members of the PMU commenced on the project. As the NPMU came on board in April 2016, April 2016 can be seen as the actual commencement of the project; in line with this, project end should have been in April 2020. With the foreseen extension till December 2023, project would be ending 5 years later than the submitted duration to the GEF; and 3.5 years later, taking the date of commencement of NPMU as start date of the project; both calculated without taking the repercussions of the COVID-19 pandemic (around 2 years) into consideration. At the same time, it needs to be mentioned that project has over-achieved its initially-foreseen target of disposal of 200 MT of PCBs by 224% in the extended time period.

Three changes of Project Manager (PM) have taken place at UNIDO HQ, once in the last quarter of 2016 and one in December 2022, all reported not to have any adverse effects on project implementation.

All the interviewed stakeholders emphasized the help and support from the PMU, which is well qualified and experienced to not only coordinate the project with

¹³ Faculty is a Legal Entity and can make its own contracts, has a separate bank account, a Legal Department as well as an Accounting Department

respect to project management tasks, but owing to their specialized educational background in Chemical Engineering and Environmental Engineering, as well as several years of technical experience, including within the framework of international projects, provide high quality technical advice to the different project activities, prepare the various technical TORs and review and provide advice on updating the drafted reports and documents. Output documents produced are considered to be of high quality. Committed co-finance, as mentioned in the project document, and reported figures on co-finance spent, are as follows:

Name of co-financing institution	Classification	Type of co-financing	Amount (USD)	Actual amount reported to have been spent (USD)
Ministry of Environmental Protection	National Government	in-kind	650,800	650,800
Electric Power Serbia	Government owned electric power company	in-kind	6,400,000	8,000,000
		cash	1,600,000	
Serbian Railways	Government owned railway transportation company	in-kind	187,000	438,000
		cash	251,830	
UNIDO	GEF Implementing Agency	cash	40,000	
Total			9,129,630	9,088,800

Source: Project document, official letters of co-finance spent by MoEP and Serbian Railways, NPMU.

Project has received GEF funding amounting to USD 2,100,000. At the time of the TE, reported project expenditure was USD 1.6 million, that is 76%.

During the last project extension, project was extended till 31 December 2022. An amount of USD 500,000 was still left; therefore, the evaluation was informed that a further extension has been requested and approved till November 2023. According to the PMU, further PCB-disposal activities are planned to be carried out during this time, including PCBs in wooden railway crossties, which is a very challenging issue in the country, as reported to the evaluation.

The total expenditure till 31 January 2022 is shown in the following table:

UNIDO budget execution:

Items of expenditure	2015	2016	2017	2018	2019	2020	2021	2022	Total expenditure
Contractual Services	503.075,0 0	281,52	16.981,5 5	169.747,4 6	323.567,3 7	-473,56	254.523,9 1	139.272,2 9	1.406.975,54
Equipment	0,00	0,00	4.357,00	0,00	0,00	0,00	627,29	0,00	4.984,29
International Meetings	0,00	0,00	0,00	2.265,97	0,00	0,00	0,00	0,00	2.265,97
Local travel	0,00	0,00	0,00	0,00	1.571,43	0,00	0,00	905,08	2.476,51
Nat. Consult./Staff	0,00	0,00	0,00	0,00	0,00	2.273,6 7	3.338,22	2.560,07	8.171,96
Other Direct Costs	997,81	0,00	0,00	-130,59	780,51	269,10	2.127,08	2.675,69	6.719,60
Premises	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Staff & Intern Consultants	0,00	0,00	2.967,38	10.718,00	38.842,99	1.679,7 5	4.349,28	86.481,71	145.039,11
Staff travel	0,00	0,00	0,00	0,00	0,00	0,00	0,00	29,50	29,50
Train/Fellowship/Study	0,00	0,00	0,00	0,00	0,00	0,00	0,00	22.927,13	22.927,13
Grand Total	504.072,8 1	281,52	24.305,9 3	182.600,8 4	364.762,3 0	3.748,9 6	264.965,7 8	254.851,4 7	1.599.589,61

Source: UNIDO Project Management database as of 31.01.2023.

5.4 Likelihood of sustainability of project results

Financial risks:

Financial risks are considered to be low. The two enterprises, HBIS and HIP, whose PCBs were disposed, have been existing since over 100 years and 50 years respectively. They are 2 of the largest enterprises in Serbia and have mentioned the training and roll-out of environmentally-sound management of PCB-oils and equipment throughout their enterprises. The Serbian Railways has also emphasized its commitment to PCB-disposal in transformers. Despite the disposal being a huge challenge financially, it has reiterated its commitment to PCB-disposal in old wooden railway crossties. It had spent over USD 400,000, cash and in-kind co-finance, as noted in the MTE¹⁴. Taking the above into consideration, financial risks are considered to be low.

Socio-political risks:

Socio-political risks are deemed to be low. The Republic of Serbia signed the Stockholm Convention in 2002, ratified it in 2009 and it entered into force in 2009. The Secretariat of the Stockholm Convention received the NIP in 2010. The MoEP is the main focal Agency for the NIP and other related projects, and has reiterated its commitment to the Stockholm Convention and to this project. All the key stakeholders in the project, including the MoEP, have confirmed their commitment to the project. Awareness-raising has been carried out, and enterprises have confirmed transferring information about PCBs to their staff, especially persons working in transformer repair and maintenance workshops.

Institutional framework and governance risks:

Institutional and governance risks are considered to be low. The National Waste Management Strategy was adopted in 2003 and replaced in 2010 with a new version, including a program for 2010 – 2019. It was aimed to comply with the EU standards, and represents one of the documents addressing the issues of POPs management. It regulates waste, hazardous waste and PCB waste management. To comply with the regulations under the Stockholm Convention, the Republic of Serbia had also updated the Law on Environmental Protection in 2009, as well as the Law on Chemicals in 2009, 2010, 2011, 2012 and 2015. Owing to the potential status of candidate for accession to the EU, Serbian national legislation was and is in the process of harmonization with the EU Legislations. Two rulebooks exist relating to PCB, PCB equipment and POPs waste management. The project has carried out a Gap Analysis of existing legislation and provided suggestions to the MoEP for updating the legislation related to PCBs.

Environmental risks:

¹⁴ Official figures of co-finance spent have been requested by the evaluation and are yet to be received.

Environmental risks within the project are considered to be low. However, should the old wooden railway crossties not be disposed off at the earliest, in an environmentally sound manner, and around 400 identified contaminated and potentially contaminated sites, including *Brownfield sites*, not treated, probability of environmental repercussions are considered to be high.

5.5 Gender mainstreaming

The project document makes a mention of gender dimensions under some of its outputs and activities, for example, gender-related indicators are mentioned in the logical framework matrix. Participation of both genders in the trainings and workshops organised by the project can be seen on the photos of the workshops, and/or the workshop/training reports. It was reported to the evaluation, that during the training programmes, PCB issues were discussed and their impacts, especially on women and youth, were emphasized.

Under Output 2.4, the awareness-raising activities were planned to be conducted in a gender-sensitive manner. This has been carried out, as some brochures have been prepared especially for pregnant women and/or women planning to have a baby, to inform them about the effects of PCBs on health.

Under Output 6.1, monitoring of project results includes reporting on gender dimension as well. Workshop reports have been prepared including gender-disaggregated data.

A gender analysis was planned to be carried out to assess if and how the project would impact men and women differently (Project document, p.43). No Gender Analysis Report was received by the evaluation. No detailed gender analysis has been carried out at the outset. The project document makes a mention of women and children who might be at greater risk owing to close proximity to PCB-contaminated areas.

Both genders are represented in the stakeholder institutions and the NPMU. Both women, and men, are expected to benefit from project results. No issues on the participation of any one gender were pointed out to the evaluation.

6. Performance of partners

6.1 UNIDO

Project team in the field

The MoEP is the National Executing Agency and the NPMU members are located at the Faculty of Technology and Metallurgy, both in the Republic of Serbia. The NPMU has been on board since April 2016. Members of the NPMU are well qualified and experienced to not only coordinate the project with respect to project management tasks, but owing to their specialized educational background in Chemical Engineering and Environmental Engineering, as well as several years of technical experience,

including within the framework of international projects, provide high quality technical advice to the different project activities, prepare the various technical TORs and review and provide advice on updating the drafted reports and documents. All the interviewed stakeholders emphasized good collaboration and communication with, and support from, the NPMU.

UNIDO HQ-based management

UNIDO has no field representation in the Republic of Serbia. However, this is not reported to have any negative consequences on project implementation. The NPMU is in regular contact with the UNIDO PM and is reported to receive responses and inputs from the PM in a timely manner.

At UNIDO HQ, a change in the PM has taken place thrice, the first one around the beginning of the project, the second one end of 2021, and the last one end of 2022, but this is also not reported to have any negative consequences on project implementation.

6.2 National counterparts

The MoEP is actively involved in the project in that it participates actively in the meetings and workshops of the project, is updated on project activities, and provides support via official communication/letters, as necessary.

Institute Nikola Tesla, which has manufactured the mobile PCB-disposal unit itself, is a member of the consortium, that won the tender for the PCB-disposal activity in Serbia. It has also carried out the testing of the oil samples in its own certified laboratory.

The Serbian Railways, HBIS and HIP have explained their active participation in all relevant meetings and workshops of the project. They have emphasized their strong commitment to PCB-disposal and both HBIS and HIP have carried out PCB-disposal via the project's mobile facility; the Serbian Railways has brought attention to the issue of PCBs in the old wooden railway crossties.

National experts were recruited for different activities and carried these out as required.

6.3 Donor

The project was approved by the GEF in December 2014. The GEF has received annual progress reports, the PIRs, in 2016, 2017, 2018, 2019, 2020, 2021 and 2022, which were also provided to the evaluation.

7. Factors facilitating or limiting the achievement of results

7.1 Project management

Overall project management is under the responsibility of UNIDO PM, who is based at UNIDO HQ in Vienna. UNIDO PM provides guidance, advice and support, and participates in decision making. Day-to-day management and coordination is carried out by the NPMU, which consists of three persons, based at the Faculty of Technology and Metallurgy. The NPMU coordinates project activities in consultation with the PM at UNIDO HQ, reports regularly to the PM as well as informs the MoEP about the project activities, and is reported to maintain good working relationship with all stakeholders. The project document entails a workplan, and the NPMU reports on all activities and Outputs mentioned in the logical framework of the project in the project document.

7.2 M&E, reporting, results-based management

The project document contains a Monitoring and evaluation plan – with the M&E activity, Responsible parties, Budget and Time frame. Day-to-day management of project execution and monitoring in the country is under the responsibility of the NPMU. Annual PIRs have been prepared and submitted to the GEF, based on the activities and outputs as mentioned in the logical framework; progress reports also follow the order of activities and outputs from the logframe.

Project has been extended four times, with the latest one extending the project till November 2023 and in view of leftover budget as well as further identified PCBs at HBIS/HIP, and the PCBs in old wooden crossties of the Serbian Railways, as adaptive management measure, in order to accommodate the additional PCBs in transformers and old wooden railways crossties.

Progress reports have been prepared regularly, and contain extensive information on activities under different Outputs.

An MTE was carried out from April-June 2019. The TE was carried out between August and December 2022. UNIDO has submitted PIRs each year from 2016 till 2022.

As over 20% of project budget was still left at the end of 2022, project has been extended till November 2023 to implement further activities, which include, amongst others, disposal of potential 100-250 MT PCBs.

The following PSC meetings have taken place [PSC Meeting Reports]:

	Date	Place	Institutions
1	18 November 2015	MoEP	Ministry of Agriculture and Environmental Protection (MoAEP), NCPC, EPA, Provincial Secretariat for

			Urban Development, Construction and Environmental Protection, Serbian Railways, Serbian Chamber of Commerce, Office for Cooperation with Civil Society
2	10 February 2017	MoEP	MoAEP, Office for Cooperation with NGOs, EPS, NPMU
3	27 February 2019	MoEP	MoEP, NCPC, Provincial Secretariat for Urban Planning and Environmental Protection of Vojvodina, EPS, Serbian Railways, Chamber of Commerce, Ministry of Finance, Chamber of Commerce of Green Serbia, NPMU
4	09 December 2019	MoEP	MoEP, NCPC, EPS, Serbian Railways, NPMU
5	10 November 2021	Webex	MoEP, NCPC, Secretariat for Urban Planning and Environmental Protection of the AP Vojvodina, Chamber of Commerce, EPS, NPMU
6	03 November 2022	MoEP, Zoom	MoEP, Serbian Railways, NCPC, Secretariat for Urban Planning and Environmental Protection of the AP Vojvodina, Chamber of Commerce (e-mail), EPS, Ministry of Energy and Mining, Ministry of Finance, NPMU

Source: PSC meeting reports.

7.3 Stakeholder engagement and communication

Stakeholder engagement

This has been elaborated under Sub-section 6.2: National Counterparts.

Communication

Communication between the PM and PMU, as well as between the PMU and participating organizations, sub-contractors, and other stakeholders is reported to be regular and effective. No issues regarding internal or external communication were reported to the evaluation.

External communication

A website has been created and is online www.pcbsserbia.rs. Awareness-raising activities have been carried out. Brochures, and special brochures for pregnant women, as well as women planning to have a baby, have been prepared and disseminated.

7.4 Overarching assessment and ratings table

Evaluation Criteria	Comments	Rating
A. Progress to impact	<i>Outputs and Outcomes have been achieved; some parts of Intermediate State 1 are already being achieved; continuation is assessed to be realistic. 647.94 MT of PCBs have been eliminated within the framework of the project, thus already contributing to aimed impact.</i>	S
B. Project Design		S
B.1 Overall design	<i>The design is technically feasible and adequate to reach aspired objective.</i>	S
B.2 Logframe	<i>Logframe has been prepared, with Activities, Outputs and Outcomes, and including specific and measurable indicators.</i>	S
C. Project performance		
C.1 Relevance	<i>In line with priorities of the Republic of Serbia, Stockholm Convention, UNIDO and the GEF.</i>	HS
C.2 Effectiveness	<i>All project Outputs and Outcomes have been achieved.</i>	HS
C.3 Efficiency	<i>Project has been extended four times, till November 2023. Delays have been due to selection and recruitment of NPMU only in April 2016, and due to COVID-19. Over USD</i>	S

	<i>9 million co-finance is reported to have been spent by institutions.</i>	
C.4 Likelihood of Sustainability of benefits	<i>The mobile PCB-decontamination unit has been produced by the in-country Institute Nikola Tesla; human and technical expertise and knowledge exists in the country to continue the work.</i>	S
D. Cross-cutting performance criteria		
D.1 Gender mainstreaming	<i>No gender-related issues were reported; participation of both genders in project activities, at stakeholder institutions and in the NPMU; special brochure prepared with gender considerations.</i>	HS
D.2 M&E	<i>Sub-section on M&E is included in the project document. Monitoring has been carried out by the NPMU, as well as regular reporting. UNIDO PM has submitted detailed annual PIRs to GEF. MTE and TE have been conducted as foreseen.</i>	S
D.3 Results-based management (RBM)	<i>Forthcoming activities have been presented to, and approved by, the PSC; monitoring has been carried out by the NPMU; UNIDO PM has implemented adaptive management measures by extending the project till November 2023, to include the disposal of additional quantities of identified PCBs.</i>	S
E. Performance of partners		S
E.1 UNIDO	<i>UNIDO HQ-based management considered to be effective; UNIDO PM followed adaptive management measures; UNIDO HQ provides support and technical inputs.</i>	S
E.2 National counterparts	<i>MoEP is supportive to the project; representatives of main stakeholder institutions participate actively in the PSC meetings and in decision-making.</i>	HS
E.3 Donor	<i>The GEF has provided comments and feedback to the initial PIF. It receives annual PIRs. As such, no feedback is received on the PIRs. This might be standard procedure,</i>	S

	<i>but it is also not clear what its role and participation in the project – after approval of PIF – should be.</i>	
F. Overall assessment	<i>Project has already achieved the project objective, over-achieved the foreseen quantity of 200 MT of PCBs by 224%, and is planning the disposal of potential additional quantity between 100-250 MT.</i>	HS

As mentioned in the TOR, the evaluation rating scale is as follows:

Score		Definition	Category
6	Highly Satisfactory (HS)	Level of achievement presents no shortcomings (90% - 100% achievement rate of planned expectations and targets).	Satisfactory
5	Satisfactory (S)	Level of achievement presents minor shortcomings (70% - 89% achievement rate of planned expectations and targets).	
4	Moderately Satisfactory (MS)	Level of achievement presents moderate shortcomings (50% - 69% achievement rate of planned expectations and targets).	
3	Moderately Unsatisfactory (MU)	Level of achievement presents some significant shortcomings (30% - 49% achievement rate of planned expectations and targets).	Unsatisfactory
2	Unsatisfactory (U)	Level of achievement presents major shortcomings (10% - 29% achievement rate of planned expectations and targets).	
1	Highly Unsatisfactory (HU)	Level of achievement presents severe shortcomings (0% - 9% achievement rate of planned expectations and targets).	

Source: GEF, UNIDO.

The following table entails the UNIDO rating for sustainability (six-point rating scale) and the corresponding GEF rating for sustainability¹⁵ (four-point rating scale):

UNIDO rating	UNIDO rating for sustainability	GEF rating for sustainability
6	Highly likely (HL)	Likely (L)
5	Likely (L)	Moderately Likely (ML)
4	Moderately Likely (ML)	Moderately Likely (ML)
3	Moderately Unlikely (MU)	Moderately Unlikely (MU)
2	Unlikely (U)	Moderately Unlikely (MU)
1	Highly Unlikely (HU)	Unlikely (U)

Source: TOR for the terminal evaluation.

8. Conclusions, recommendations, lessons learned, good practices

8.1 Conclusions

The overall rating for the project is **'highly satisfactory'**.

Project design: Project's objective is "to ... dispose off 200 tons of PCBs/equipment...". is similar to that of several other UNIDO PCB projects and entails technical components, such as, legal framework, capacity building, awareness raising, PCB inventory and an assessment of contaminated sites. The project approach is deemed to be sound and appropriate and design technically feasible. The project document includes a logical framework with specific and measurable indicators, however, the Outputs describe deliverables that the project will produce to achieve Outcomes.

The overall rating for project design is **'satisfactory'**.

Relevance and Coherence: Project, and disposal of PCBs, is considered to be highly relevant by all key stakeholders. It is in alignment with the country's national priorities and strategies, such as the National Waste Management Strategy and National Sustainable Development Strategy and the NIP.

The overall rating for relevance and coherence is **'highly satisfactory'**.

¹⁵ GEF uses a four-point scale for the criterion of sustainability.

Efficiency: GEF approval was received in December 2014 and first PAD was released at UNIDO in February 2015, with a foreseen project duration of 48 months. UNIDO signed the contract with the national executing agency in July 2015; project commenced, in practice, in April 2016 upon recruitment of the members of the NPMU; in line with this, project completion should have been in April 2020. Project has been extended till November 2023; this means altogether a delay of 3.5 years, without taking the effects of COVID-19 into account. Three changes of PM at UNIDO HQ have taken place, reportedly without any negative effect on project implementation. As of 31 January 2023, an amount of USD 1.6 million has been spent, leaving an amount of USD 500,000. Co-finance amounting to over USD 9 million has been reported to have been spent by the partnering institutions.

The overall rating for efficiency is **'satisfactory'**.

Effectiveness: All Outcomes have been achieved, Outcome 4 has been over-achieved. Suggestions for an updating of the existing legal framework related to PCB-management, which already exists in the country to a great extent, has been submitted to the MoEP; training workshop has been conducted on PCB-management guidelines, protocols and procedures; sampling of more than 1,000 transformers has taken place and database prepared; 647.94 MT of oils and equipment has been disposed off, thus achieving 224% more than the foreseen target of 200 MT; regarding contaminated sites, preliminary site investigation and risk assessment have been carried out for 3 sites, and detailed site investigation for one site, which has then reportedly been remediated by the new private owner company.

Overall project objective is assessed to be **achieved**.

The overall rating for effectiveness is **'highly satisfactory'**.

Likelihood of sustainability of project results: Risks, namely, financial, socio-political, institutional and governance and environmental, are considered to be low, with respect to project results; environmental risks, in case the old wooden railway crossties are not disposed off in an environmentally-sound manner, are considered to be high. An additional PCB quantity of 447.94 MT beyond the foreseen quantity has been eliminated, further potential quantity of between 100-250 MT planned in the extension time in 2023. Guidelines and other guidance documents have been prepared; and capacity – human and technical – exists in the country to continue, upscale and replicate results, even at the international level, if they wish to.

Sustainability of project results is considered to be **'likely'**.

Gender mainstreaming: Gender mainstreaming has been taken into account in the project document, as well as in some of the activities, for example, a brochure was prepared about the effects of PCBs on pregnant women. Both genders were represented amongst the interviewees and in the NPMU.

The overall rating for gender is **'highly satisfactory'**.

8.2 Recommendations

Project has been extended till November 2023¹⁶, and has unspent funds amounting to around USD 500,000. Taking into account all Outputs completed till date, recommendations are as follows:

The **PMU** should:

- Provide support in preparing for, and/or commence with, the disposal of railway crossties, during the remaining duration of the project;
- Bring up the issue of the old wooden railway crossties to the MoEP, and provide support to the MoEP to prepare project proposals for their disposal, beyond the (extended) time duration of this project;
- Carry out a visit to the transformer maintenance and repair workshops of the Serbian Railways, EPS, HBIS and HIP to ensure adherence to ESM of (potential) PCBs;
- Provide information to Institute Nikola Tesla about participation in tenders for PCB-disposal with mobile facility.

UNIDO should:

- Disseminate results and information from this project to other PCB projects;
- Disseminate the brochure on effects of PCBs on pregnant women to other PCB and POPs projects.

MoEP should:

- Consider updating the existing PCB-related legislations as soon as realistically possible.
- Consider preparing project proposals for the disposal of old wooden railway crossties for the time period after project completion;
- Consider integrating the PCB-related information, provided on the current PCB website, into the Ministry's website, after August 2024, in order to ensure continued provision of PCB-related information and documents to institutions and the wider public.

8.3 Lessons learned

- The availability of a national institution, the Faculty of Technology and Metallurgy, which is capable of taking up the role of the National Executing Agency is seen as

¹⁶ Document with information on Activities as well as workplan for the time period till November 2023 has been requested from the PM.

being conducive to project implementation in the country. One advantage noticed in the implementing modality of this project is that the Faculty is a Legal Entity and can make its own contracts, has a separate bank account, a Legal Department as well as an Accounting Department.

- National human and technical expertise, including certified laboratory and personnel, have proven to be highly conducive to achieving the Outputs, Outcomes and Project Objective.

8.4 Good practices

- In-country Institute Nikola Tesla has produced the mobile PCB-decontamination unit itself, and was a member of the consortium which won the tender for PCB-disposal in the country.
- Taking the gender aspect into consideration, a special brochure was prepared for pregnant women about the effects of PCBs on pregnant women.

Annexes

- I List of stakeholders consulted
- II List of documents consulted/reviewed
- III Evaluation Framework Matrix
- IV Logframe
- V Terms of Reference (ToR) without Annexes

I. List of stakeholders consulted

Via Zoom

Name	Organization	Position	Role in Project
Ms. Sonja Roglic	Ministry of Environmental Protection, Division for Chemicals Management / Department for Chemicals	Head of Division for Chemicals Management Stockholm Convention National focal point	PSC member
Mr. Ivan Djurickovic	Ministry of Environmental Protection, Department for waste management and waste water	Senior Advisor, and OFP for Stockholm Convention	Representing National Project Director
Mr. Zlatko Drasko	Infrastructure of Serbian Railways	Project manager of particular importance for railways	Stakeholder representative and PSC member
Ms. Jelena Lukic	EE Institute Nikola Tesla, Belgrade	Head of laboratory for insulating oil	Owner and operator of mobile PCB oil decontamination unit Service provider for final disposal of PCBs and laboratory analysis of PCB in oil
Ms. Slavica Tanaskovic	HBIS GROUP Serbia Iron and Steel d.o.o. Beograd	Director Environmental Department	PCBs owner - Steelworks
Ms. Ljubica Dreg	HBIS GROUP Serbia Iron and Steel d.o.o. Beograd	General Manager of Environmental Department	PCBs owner - Steelworks

Ms. Dubravka Saric	HIP-Petrohemija d. o.o.Pancevo	Head of Waste Management Department Environmental Protection Department	PCB owner – Petrochemical industry
Ms. Sanja Dankovic	HIP-Petrohemija d. o.o.Pancevo	Head of Environmental Protection Department	PCB owner – Petrochemical industry
Ms. Zorana	HIP-Petrohemija d. o.o.Pancevo		PCB owner – Petrochemical industry
Ms. Ivana Mirkovic	MITECO, Belgrade private sector company; Exporting company, temporary storage owner and waste collection	Executive director	Service provider for final disposal of PCBs
Ms. Tatjana Markov- Milinkovic	Public utility company „BEOGRADSKE ELEKTRANE“ Head of Unit for development of the Quality	Independent expert for Waste Management Strategic Policy Framework	National expert
Ms. Ivana Antonovic		Independent expert for environmental data bases	National expert
Mr. Alessandro Amadio	UNIDO	Industrial Development Officer	(Former) Project Manager

Mr. Aleksandar Orlovic	Faculty of Technology and Metallurgy University of Belgrade	Professor Faculty of Technology and Metallurgy	National Project Manager
Ms. Olivera Kuzmanovic	Faculty of Technology and Metallurgy University of Belgrade	National Technical Expert under contract for this project	Technical Specialist
Ms. Sandra Glisic	Faculty of Technology and Metallurgy University of Belgrade	Assistant Professor and Senior Research Fellow Faculty of Technology and Metallurgy	Assistant NPM

II. Documents consulted/reviewed

Project document
TOR for the PCB Cluster Evaluation
PIRs 2016, 2017, 2018, 2019, 2020, 2021, 2022
National Implementation Plan
Contract Institute Nikola Tesla (IEENT)
Contract for Project Management Services
Contract VINCA Inst. 3000063261
Contract Tauw – capacity building and technical support – 1267560
MOU: Ministry and Faculty
Roadmap for circular economy in Serbia
Workshop and training reports
Safety handbooks for operators and handling, and for sampling and analysis
Technical guidelines for ESM of PCBs Serbia
PSC minutes of the meetings 2015, 2017, 2019, 2021,
Progress reports 1-11
IEENT Final Report on PCB Oil samples collected and analysed 419017.
IEENT Report on Training Session 418007.
VINCA – Progress report No. 1.
VINCA – Progress report No. 2.
Minutes of stakeholder meetings
Documentation – Technical Vendor Workshop
Output lessons learned and experience gained
Letter of co-finance spent – Serbian Railways
Excel table – documentation of co-finance by NPMU
Waste management program of the Republic of Serbia for the period 2022-2031
Awareness-raising material – banner, flyer, leaflet
TOR Extension of project activities
TOR for provision of additional services
www.pcbsserbia.rs

III. Evaluation Matrix

Evaluation criteria and corresponding questions	
1	<u>Project's contribution to development results – Effectiveness and likelihood of impact</u>
a	<p><u>a. Project's achieved results and overall effectiveness</u></p> <ul style="list-style-type: none"> • SO FAR, what are the main results (mainly outputs and if possible, outcomes) of the project? What have been the quantifiable results of the project to-date? • To what extent did the project achieve their objectives (outputs and outcomes), against the original/revised target(s)? Please provide a brief analysis on the project progress in achieving the objectives. • What is the quality of the results? How do the stakeholders perceive them? What is the feedback of the beneficiaries and the stakeholders on the project effectiveness? Please provide evidence/examples from the project to back up the statements. • Were the right target groups reached? • Can the project attain its objectives and utilize the resources assigned for this within the remaining period?
b	<p><u>b. Progress towards impact</u></p> <ul style="list-style-type: none"> • What difference has the project made to the beneficiaries? • What is the change attributable to the project? To what extent? • What are the social, economic, environmental and other effects, either short-, medium-, or long-term, on a micro- or macro-level? • What effects are intended or unintended, positive or negative? <p>a) Behavioural change</p> <ol style="list-style-type: none"> i. Economically competitive – Advancing economic competitiveness: Changes in the functioning and management of the resources, finances, income, and expenditure of, for example, a community, business or enterprise, contributed by the intervention ii. Environmentally sound – Safeguarding environment: Biophysical changes in reduction of threats emanating from action of humans and changes in the status of the environment

<u>Evaluation criteria and corresponding questions</u>	
	<p>iii. Socially inclusive – Creating shared prosperity: Changes in the provision of certain rights to all individuals and groups in society, such as employment, education and training.</p> <p>b) Broader adoption</p> <p>i. Mainstreaming: To what extent are information, lessons learned, or specific results of the project incorporated into broader stakeholder mandates and initiatives such as laws, policies, regulations and project?</p> <p>ii. Replication: To what extent are the project's specific results (for example methodology, technology or lessons learned) reproduced or adopted?</p> <p>iii. Scaling-up: To what extent are the project's initiatives and results implemented at larger geographical scale?</p>
<u>2</u>	<u>Project's quality and performance</u>
a	<p><u>Project design</u></p> <ul style="list-style-type: none"> • The project design was adequate to address the problems at hand? • Is the project consistent with the Country's priorities, in the work plan of the lead national counterpart? Does it meet the needs of the target group? Is it consistent with UNIDO's Inclusive and Sustainable Industrial Development? Does it adequately reflect lessons learnt from past projects? Is it in line with the donor's priorities and policies? • Is the applied project approach sound and appropriate? Is the design technically feasible and based on best practices? Does UNIDO have in-house technical expertise and experience for this type of intervention? • To what extent the project design (in terms of funding, institutional arrangement, implementation arrangements...) as foreseen in the project document still valid and relevant? • Does the project document include a M&E plan? Does the M&E plan specify what, who and how frequent monitoring, review, evaluations and data collection will take place? Does it allocate budget for each exercise? Is the M&E budget adequately allocated (see a M&E sample) and consistent with the logframe (especially indicators and sources of verification)? • Risk management: Are critical risks related to financial, social-political, institutional, environmental and implementation aspects identified with specific risk ratings? Are their mitigation measures identified? Where possible, are the mitigation measures included in project activities/outputs and monitored under the M&E plan?

Evaluation criteria and corresponding questions	
b	<p><u>Project results framework/logframe</u></p> <ul style="list-style-type: none"> • Expected results: Is the expected result-chain (impact, outcomes and outputs) clear and logical? Does impact describe a desired long-term benefit to a society or community (not as a mean or process), do outcomes describe change in target group's behaviour/performance or system/institutional performance, do outputs describe deliverables that project will produce to achieve outcomes? Are the expected results realistic, measurable and not a reformulation or summary of lower-level results? Do outputs plus assumptions lead to outcomes, do outcomes plus assumptions lead to impact? Can all outputs be delivered by the project, are outcomes outside UNIDO's control but within its influence? • Indicators: Do indicators describe and specify expected results (impact, outcomes and outputs) in terms of quantity, quality and time? Do indicators change at each level of results and independent from indicators at higher and lower levels? Do indicators not restate expected results and not cause them? Are indicators necessary and sufficient and do they provide enough triangulation (cross-checking)? Are they indicators sex-disaggregated, if applicable? • Sources of verification: Are the sources of verification/data able to verify status of indicators, are they cost-effective and reliable? Are the sources of verification/data able to verify status of output and outcome indicators before project completion?
c	<p><u>Relevance</u></p> <ul style="list-style-type: none"> • So far, how relevant is the project to the: <ul style="list-style-type: none"> ○ target groups' needs ○ development priorities of the country (national poverty reduction strategy, sector development strategy, etc.) ○ UNIDO comparative advantages and ○ project's donor policies and priorities • Are appropriate beneficiaries groups being targeted by the project? • Are the original project objectives (expected results) still valid and pertinent to the target groups? If not, have then been revised? Are the revised objectives still valid in today context?
d	<p><u>Efficiency at current stage of implementation</u></p> <ul style="list-style-type: none"> • Comment on how economically the project resources/inputs (in terms of funding, expertise, time...) are being used to produce results (outputs and outcomes) SO FAR? Comment on the quality of expertise/technical assistance provided; whether the expected results were achieved within the original budget, if no please explain why.

<u>Evaluation criteria and corresponding questions</u>	
	<ul style="list-style-type: none"> • How timely is the project in producing outputs, initial outcomes and delivering inputs (with least delays)? Based on the work plan, comment on the delay or acceleration of implementation period of the project. Were the project's activities in line with the schedule of activities as defined by the project team and annual work plans? Were the disbursements and project expenditures in line with budgets? • Have the inputs from the donor, UNIDO and Government/counterpart been provided as planned, and were they adequate to meet the requirements? • Is the project cost-effective compared to similar interventions? Could the project have produced more with the same resources, or the same with less money, or with less delay? Wherever possible, the MTE team should also compare the costs incurred and the time taken to achieve outcomes with that for similar projects? <p><u>Financial management and co-financing</u></p> <ul style="list-style-type: none"> • Review the financial management of the project, with specific reference to the cost-effectiveness of interventions. Did the project have appropriate financial controls, including reporting and planning, that allowed management to make informed decisions regarding the budget and allowed for timely flow of funds? Was there due diligence in the management of funds and financial audits? • Review the changes to fund allocations as a result of budget revisions and assess the appropriateness and relevance of such revisions. • Did promised co-financing materialize? Is co-financing being used strategically to help the objectives of the project? Is the Project Team meeting with all co-financing partners regularly in order to align financing priorities and annual work plans.
e	<p><u>Likelihood of Sustainability of benefits</u></p> <p>The MTE should validate whether the risks identified in the Project Document and progress reports or implementations reviews are the most important and assess the following risks to sustainability:</p> <p><i>Financial risks:</i></p> <ul style="list-style-type: none"> • What is the likelihood of financial and economic resources not being available once the project ends? (Such resources can be from multiple sources, such as the public and private sectors or income-generating activities; these can also include trends that indicate the likelihood that, in future, there will be adequate financial resources for sustaining project outcomes.)? <p><i>Socio-political risks:</i></p> <ul style="list-style-type: none"> • Are there any social or political risks that may jeopardize the sustainability of project outcomes? • What is the risk that the level of stakeholder ownership and engagement (including ownership by governments and other key stakeholders) will be insufficient to allow for the project outcomes/benefits to be sustained? • Do the various key stakeholders see that it is in their interest that project benefits continue to flow?

Evaluation criteria and corresponding questions	
	<ul style="list-style-type: none"> Is there sufficient public/stakeholder awareness in support of the project's long-term objectives? <p><i>Institutional framework and governance risks:</i></p> <ul style="list-style-type: none"> Do the legal frameworks, policies, and governance structures and processes within which the project operates pose risks that may jeopardize the sustainability of project benefits? Are requisite systems for accountability and transparency and required technical know-how in place? <p><i>Environmental risks:</i></p> <ul style="list-style-type: none"> Are there any environmental risks that may jeopardize the sustainability of project outcomes? <p>Are there any project outputs or higher level results that are likely to have adverse environmental impacts, which, in turn, might affect the sustainability of project benefits?</p>
f	<p><u>Gender mainstreaming</u></p> <ul style="list-style-type: none"> Did the project/programme design adequately consider the gender dimensions in its interventions? If so, was gender considered at the level of project outcome, output or activity? Was a gender analysis included in a baseline study or needs assessment (if any)? Were there gender-related project indicators? How gender-balanced was the composition of the project management team, the Steering Committee, experts and consultants and the beneficiaries? Have women and men benefited equally from the project's interventions? Do the results affect women and men differently? If so, why and how? How are the results likely to affect gender relations (e.g., division of labour, decision-making authority)? Are women/gender-focused groups, associations or gender units in partner organizations consulted and/or included in the project? To what extent were socioeconomic benefits delivered by the project at the national and local levels, including consideration of gender dimensions?
3	<p><u>Performance of partners</u></p>
a	<p><u>UNIDO</u></p> <p>✓ Project team in the field</p> <ul style="list-style-type: none"> Has the project team discharged its project implementation and management functions adequately (in terms of work planning and executing, monitoring and reviewing performance, allocating funds, and following up agreed/corrective actions)? Has an effective M&E system been put in place, was it closely link with the logframe, does it generate information on performance and results which is useful for project managers and PSC to make critical decisions?

Evaluation criteria and corresponding questions	
	<ul style="list-style-type: none"> • Has the management of flow of funds and procurement been suitable for ensuring timely implementation? • How proactive and prompt the project team was to ensure timely implementation of recommendations from experts of support missions and HQ-based project managers? <p>✓ UNIDO HQ-based management</p> <ul style="list-style-type: none"> • Timely recruitment of project staff • Project modifications following changes in context • Follow-up to address implementation bottlenecks • Role of UNIDO country presence (if applicable) supporting the project • Engagement in policy dialogue to ensure up-scaling of innovations • Coordination function <p>Exit strategy, planned together with the government</p>
b	<p><u>National counterparts</u></p> <ul style="list-style-type: none"> • Do local and national government stakeholders support the objectives of the project? Do they continue to have an active role in project decision-making that supports efficient and effective project implementation? • Has the government assumed ownership and fulfilled responsibility for the project? • Were counterpart resources (funds and staffing) provided as planned in the project design? • Did the government ensure suitable coordination of the various departments involved in the project implementation?
c	<p><u>Donor</u></p> <ul style="list-style-type: none"> • How active has the donor been in reviewing the project performance and implementation? • How proactive and prompt has the donor been in providing necessary support to the project implementation (in terms of decisions on fund installment, approval/rejection of request from project team...)? • Does the donor ask for information related to project performance and results? • To what extent does the donor make decisions based on performance and results information?
4	Factors facilitating or limiting the achievement of results
a	<u>Project management</u>

Evaluation criteria and corresponding questions	
	<ul style="list-style-type: none"> Review overall effectiveness of project management as outlined in the Project Document. Have changes been made and are they effective? Are responsibilities and reporting lines clear? Is decision-making transparent and undertaken in a timely manner? Recommend areas for improvement. Review whether the national management and overall coordination mechanisms have been efficient and effective? Did each partner have assigned roles and responsibilities from the beginning? Did each partner fulfil its role and responsibilities (e.g. providing strategic support, monitoring and reviewing performance, allocating funds, providing technical support, following up agreed/corrective actions)? The UNIDO HQ-based management, coordination, monitoring, quality control and technical inputs have been efficient, timely and effective (e.g. problems identified timely and accurately; quality support provided timely and effectively; right staffing levels, continuity, skill mix and frequency of field visits)?
	<p><u>Results-based work planning, M&E, reporting</u></p> <p>a <u>Results-based work planning</u></p> <ul style="list-style-type: none"> Review any delays in project start-up and implementation, identify the causes and examine if they have been resolved. Are there any annual work plans? Are work-planning processes results-based? Has the logframe been used to determine the annual work plan (including key activities and milestone)? If not, suggest ways to re-orientate work planning to focus on results? Examine the use of the project's results framework/ logframe as a management tool and review any changes made to it since project start. <p>b <u>Results-based M&E</u></p> <ul style="list-style-type: none"> Verify whether an M&E system is in place and facilitated timely tracking of progress toward project objectives by collecting information on selected indicators continually throughout the project implementation period; annual project reports are complete and accurate, with well-justified ratings; the information provided by the M&E system is used to improve performance and to adapt to changing needs; and the project has an M&E system in place with proper training for parties responsible for M&E activities to ensure that data will continue to be collected and used after project completion. Are monitoring and self-evaluation carried out effectively, based on indicators for outputs, outcomes and impact in the logframe? Is any project steering or advisory mechanism put in place? Do performance monitoring and reviews take place regularly? Review the monitoring tool currently being used: Do they provide the necessary information? Do they involve key partners? Are they aligned or mainstreamed with national systems? Do they use existing information? Are they efficient? Are they cost-effective? Are additional tools required? How could they be made more participatory and inclusive?

Evaluation criteria and corresponding questions	
c	<ul style="list-style-type: none"> • Examine the financial management of the project monitoring and evaluation budget. Are sufficient resources being allocated to monitoring and evaluation? Are these resources being allocated effectively? • How has the logframe been used for Monitoring and Evaluation purposes (developing M&E plan, setting M&E system, determining baseline and targets, annual implementation review by the Project Steering Committee...) to monitor progress towards expected outputs and outcomes? Do project team and manager make decisions and corrective actions based on analysis from M&E system and based on results achieved? Is information on project performance and results achievement being presented to the Project Steering Committee to make decisions and corrective actions? Do the Project team and managers and PSC regularly ask for performance and results information? • How well have risks outlined the project document and in the logframe been monitored and managed? How often have risks been reviewed and updated? Has a risk management mechanism been put in place? <p><u>Results-based reporting</u></p> <ul style="list-style-type: none"> • Assess how adaptive management changes have been reported by the project management and shared with the PSC. • Assess how well the Project Team and partners undertake and fulfil donor and UNIDO reporting requirements (i.e. how have they addressed delays or poor performance, if applicable?) • Assess how lessons derived from the adaptive management process have been documented, shared with key partners and internalized by partners.
a	<p><u>Stakeholder engagement and communication</u></p> <p><u>Stakeholder engagement</u></p> <ul style="list-style-type: none"> • Project management: Has the project developed and leveraged the necessary and appropriate partnerships with direct and tangential stakeholders? • Participation and country-driven processes: Do local and national government stakeholders support the objectives of the project? Do they continue to have an active role in project decision-making that supports efficient and effective project implementation? • Participation and public awareness: To what extent has stakeholder involvement and public awareness contributed to the progress towards achievement of project objectives?
b	<p><u>Communication</u></p>

	<u>Evaluation criteria and corresponding questions</u>
	<ul style="list-style-type: none">• Review internal project communication with stakeholders: Is communication regular and effective? Are there key stakeholders left out of communication? Are there feedback mechanisms when communication is received? Does this communication with stakeholders contribute to their awareness of project outcomes and activities and investment in the sustainability of project results?• Review external project communication: Are proper means of communication established or being established to express the project progress and intended impact to the public (is there a web presence, for example? Or did the project implement appropriate outreach and public awareness campaigns?)

IV. Logframe

Interventions	Objectively Verifiable Indicators (Targets)	Means of Verification	Assumptions	Mitigation Measures
<p>Project Objective: The project objective is to protect human health and the environment by reducing and eliminating the releases of and exposure to PCBs through establishment of an environmentally sound PCB management system and final disposal of 200 tons of PCB equipment</p>	<ul style="list-style-type: none"> □ Amount of PCB oil and equipment disposed of (200 tons); □ Number of companies adopting best practices (3); □ Equivalent CO₂ pollution prevented; □ Number of PCB management plan, environment laws and regulation approved/enacted (1); □ Number of new businesses (1); □ Amount of incremental investment by key stakeholders for sound management of chemicals (Target: USD 400,000) 	<ul style="list-style-type: none"> □ National reports to Stockholm Convention on identified and disposed PCB quantities; □ State of the environment report □ Project Steering Committee's meeting minutes; □ Project Progress Reports; □ Minutes of the meetings; □ Procurement documents; □ Evaluation Reports; □ Service provider's reports on disposal/destruction of PCB-containing equipment and wastes; □ Copies of import, export and transit permits; □ Copy of the PCB contaminated sites strategy; 	<ul style="list-style-type: none"> □ Government management and enforcement structure dedicated to sound PCB management; □ Legislations will be in effect and adequate enforcement efforts will be made for integrated and sustainable PCB management and disposal; □ PCB owners committed to financially contribute to sustaining the established ESM system and disposal technology on PCB 	<ul style="list-style-type: none"> □ MoAEP that is in charge of the environmental regulations is the chair of the Project Steering Committee which oversees the project execution. PSC will also endorse PCB regulation drafts and follow up to provide political support for the PCB regulations in effect; □ The Working Group during the PPG phase and Project Steering Committee during the execution phase reviews and endorse the project document, work plan, and budget to meet the priorities of the government. The enforcement institutions will be given training and tools for enforcement; □ Additional awareness raising campaigns on PCB adverse effects, then on country obligations towards the Stockholm Convention, and permanent actualization of the PCB issue by NGOs through media

<p>Outcome 1: Legal, regulatory and policy framework for sound PCB management established and enforced</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Number of environment policies, strategies, laws, regulation approved/enacted (1); <input type="checkbox"/> Number of PCB management guidelines, protocols, procedures and occupational health and safety measure guidance with gender dimensions (3) 	<ul style="list-style-type: none"> <input type="checkbox"/> Copies of regulations, laws, and procedures; <input type="checkbox"/> Meeting minutes; <input type="checkbox"/> Project Progress Reports; <input type="checkbox"/> Copies of the guidelines, protocols, and safety procedures 	<ul style="list-style-type: none"> <input type="checkbox"/> Government regulatory commission commit to timely processing the amendments; <input type="checkbox"/> Proper enforcement will be provided by relevant institutions 	<ul style="list-style-type: none"> <input type="checkbox"/> Ensure recommended laws and regulations are practical and enforceable and recommended guidance are developed according to internationally accepted procedures; <input type="checkbox"/> Stakeholders will be included in the regulatory and technical guidelines development process; <input type="checkbox"/> Government officials are closely involved in project planning during the PPG period in order to build relationships and promote open information exchange
<p>Output 1.1: Existing legal acts updated based on the available Gap Analysis Evaluation Report</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Number of environment policies, strategies, laws, regulation approved/enacted (1); <input type="checkbox"/> Number of stakeholders involved in the regulatory preparation with gender segregation information (3); <input type="checkbox"/> Number of round table discussions and participants (male/female) (1) 	<ul style="list-style-type: none"> <input type="checkbox"/> Minutes of the meetings with the key stakeholders on regulation improvement; <input type="checkbox"/> Copy of prepared amendments for proposed new/revised legal text; <input type="checkbox"/> Project Progress Reports; <input type="checkbox"/> Evaluation Reports; <input type="checkbox"/> Records of published and posted guidelines and protocols (newspapers, web-site, official gazette); 	<ul style="list-style-type: none"> <input type="checkbox"/> Legislative upgrading is done in a timely and concerted manner; <input type="checkbox"/> Key stakeholders agree regulative measures and are committed to supporting the project objectives during the consultation process; <input type="checkbox"/> Government commitment to timely processing of required regulation changes; <input type="checkbox"/> Legislation developed up to internationally accepted provisions and standards; 	<ul style="list-style-type: none"> <input type="checkbox"/> Additional awareness raising efforts for the government officers are planned through PCB workshops and direct consultation with the stakeholders; <input type="checkbox"/> Stakeholders (private and governmental sector, NGOs) are included in the regulative development process; <input type="checkbox"/> Willingness of project parties has been documented through the co-finance letters attached to this proposal; <input type="checkbox"/> Recommended laws and regulations should be practical and enforceable
<p>Output 1.2: Technical guidelines, protocols and procedures prepared and improved for ESM of PCB-containing</p>	<ul style="list-style-type: none"> <input type="checkbox"/> PCB management guidelines, protocols and procedures developed, upgraded and adapted in accordance with international standards, 	<ul style="list-style-type: none"> <input type="checkbox"/> Minutes of the meetings of the key stakeholders on guidelines and protocols development; <input type="checkbox"/> Copies of the guidelines and safety procedures; <input type="checkbox"/> Project Progress Reports; 	<ul style="list-style-type: none"> <input type="checkbox"/> The preparation of guidance and procedures is done in good cooperation with project stakeholders; <input type="checkbox"/> Technical measures meet the capacities of the key 	<ul style="list-style-type: none"> <input type="checkbox"/> Stakeholders are included in the drafting process of the guidelines and protocols; <input type="checkbox"/> Technical and institutional capacities will be assessed by experts and recommendations meeting the capacities of the key stakeholders on the guidelines will

<p>electrical equipment, waste and contaminated sites</p>	<p>practices and toolkits for safe PCB management (3); <input type="checkbox"/> Gender-sensitized occupational health and safety measures while handling PCB-containing equipment and waste defined (1); <input type="checkbox"/> Number of round table discussions on guideline (1) improvement/development <input type="checkbox"/> Number of participants (male/female) (20/10);</p>	<p><input type="checkbox"/> Evaluation Reports; <input type="checkbox"/> Records of published and posted guidelines and protocols (newspapers, web-site, official gazette);</p>	<p>stakeholders; <input type="checkbox"/> Key stakeholders agree regulative measures and are committed to supporting the project objectives during the consultation process; <input type="checkbox"/> Government commitment to timely processing of required guidelines and protocols; <input type="checkbox"/> Guidelines and protocols developed up to internationally accepted procedures, standards, and practices</p>	<p>be provided; <input type="checkbox"/> Additional awareness raising efforts for the government and key stakeholders are planned through PCB workshops and direct consultation</p>
<p>Outcome 2: Institutional capacities and awareness improved for sound PCB management</p>	<p><input type="checkbox"/> Project management structures (inter-sectoral body, Project Focal Point, and PMU) of MoAEP and other ministries and institutions established (1); <input type="checkbox"/> Number of training (4); <input type="checkbox"/> Number of participants (male/female) (72/48); <input type="checkbox"/> Number of adopted standards and laboratory analysis (1); <input type="checkbox"/> Number of strengthened institutions adopting ESM of chemicals (3); <input type="checkbox"/> Incentive mechanism to sustain the ESM on PCBs approved (1)</p>	<p><input type="checkbox"/> Minutes of the meetings of Project Steering Committee; <input type="checkbox"/> Ministerial decision; <input type="checkbox"/> Project Progress Reports; <input type="checkbox"/> Training reports and training materials with a participant list; <input type="checkbox"/> Copy of approved standards; <input type="checkbox"/> Awareness raising campaigns reports, copies of newspapers, copies of publications; <input type="checkbox"/> Financial record or report of the incentive mechanism</p>	<p><input type="checkbox"/> Political support and management commitment are leveled in Ministries and key stakeholders capable for integrated and sustainable PCB management; <input type="checkbox"/> Government's enforcement capacities and companies' technical personnel are available and responsive to the recommendations for sound PCB management; <input type="checkbox"/> Laboratories capacities will be sufficient for PCB analysis and monitoring; <input type="checkbox"/> Awareness raising campaigns are sufficient to increase knowledge on PCB issues among different target groups; <input type="checkbox"/> Incentive mechanism</p>	<p><input type="checkbox"/> Institutional capacity building and training will be provided; <input type="checkbox"/> The commitment from the government and companies will be secured with confirmation letters and additional awareness raising meetings on regulatory and PCB sound management provisions; <input type="checkbox"/> A training will be given to strengthen laboratory capacities for developing a relevant PCB analytical capacity in a sustainable manner; <input type="checkbox"/> Discussion on a sustainable incentive mechanism will be held in consultation with governmental institutes and key stakeholders</p>

			appropriate to sustain the PCB management beyond the project duration	
Output 2.1: PCB management roles in different government institutions defined	<input type="checkbox"/> Number of governmental institutions with their roles and responsibilities defined (3); <input type="checkbox"/> Number of training (1); <input type="checkbox"/> Number of participants from governmental institutions (male/female) (20/10); <input type="checkbox"/> Project management structure established and staffed for securing sustainability of the ESM practices (1)	<input type="checkbox"/> Meeting Minutes of the Project Steering Committee; <input type="checkbox"/> Copy of ministerial decisions; <input type="checkbox"/> Project Progress Reports; <input type="checkbox"/> Evaluation Reports; <input type="checkbox"/> Decision for the establishment of a POPs Unit;	<input type="checkbox"/> The coordination mechanism is sufficient to provide integrated approach in PCB management within different governmental institutions; <input type="checkbox"/> The managerial structure of the government is sufficient to secure sustainable and effective enforcement of the PCB-related legislations beyond the project completion	<input type="checkbox"/> Keystakeholders are consulted and their letters of commitment from the stakeholders are given to actively participate in the project realization; <input type="checkbox"/> Training on the institutional capacity building to the governmental institutions will be provided; <input type="checkbox"/> The sustainability of the ESM created by the project will be ensured by integrating all project components into existing structures or under the responsibility of existing entities

<p>Output Monitoring and enforcement institutions trained and active</p>	<p>2.2: trained</p> <ul style="list-style-type: none"> <input type="checkbox"/> Number of training with gender dimensions (1) <input type="checkbox"/> Number of inspectors trained to carry out site inspections (male/female) (20/10); <input type="checkbox"/> Two hundred quick PCB screening test kits delivered to the inspectorate; <input type="checkbox"/> Number of custom officers trained and equipped for PCB detection(male/female) (20/10); <input type="checkbox"/> One hundred quick PCB screening test kits delivered to the custom departments; <input type="checkbox"/> Number of technical and managerial personnel of PCB equipment owners trained on inventory (male/female) (20/10); <input type="checkbox"/> Number of managerial and technical personnel of transformer maintenance facilities and PCB owners trained (male/female) (25/5); <input type="checkbox"/> Two hundred quick PCB screening test kits delivered to the transformers maintenance workshops; <input type="checkbox"/> Number of companies adopting best practices and 	<ul style="list-style-type: none"> <input type="checkbox"/> Training reports with a list of participants; <input type="checkbox"/> Copies of safety procedures and inspection system specifications; <input type="checkbox"/> Procurement documents on supply of PCB test kits; <input type="checkbox"/> Reports on the screened transformers received for servicing and transformer oil waste for regeneration; <input type="checkbox"/>Project Progress Reports; <input type="checkbox"/>Evaluation Reports; <input type="checkbox"/>Interviews with private sectors adopting best practices 	<ul style="list-style-type: none"> <input type="checkbox"/>There are enforcement capacities and resources given to absorbthe training content and carry out the enforcement tasks to retain the ESM of PCBs; <input type="checkbox"/>PCB owners and power sectors will cooperate and comply withthe PCB regulations including occupational health and safety procedures; <input type="checkbox"/>PCB owners and equipment maintenance facilities will accept to install a separate line for handling, repairing and dismantling of PCB-containing transformers 	<ul style="list-style-type: none"> <input type="checkbox"/> Political support will be leveraged through awareness raising and a political consultation by UNIDO as needed; <input type="checkbox"/>The financial mechanism will be designed to encourage and sustain the enforcement activities; <input type="checkbox"/> Commitment of the Government enforcement institutions (environmental inspectorate, customs) to include the PCB management issues in their everyday work; <input type="checkbox"/> The project execution will start with the development and upgrade of PCB regulations and guidelines <input type="checkbox"/> The Working Group formed during the PPG phase has informed PCB holders about the changes to install control over PCBs in the country, and the willingness of project parties have been documented through the co-finance letters <input type="checkbox"/> The risk will be further mitigated by additional awareness raising through PCB workshops and direct contacts with the stakeholders
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	new waste management procedures (3)			
Output 2.3: Analytical capacities improved for PCB sampling, analysis and monitoring	<input type="checkbox"/> Number of trained laboratory personnel (male/female) (20/10); <input type="checkbox"/> Number of internationally recognized standards related to POPs/PCB measurements in environmental media and food adopted as national ones (1);	<input type="checkbox"/> Training reports; <input type="checkbox"/> Copy of accreditation documents, a list of training participants, and training certificates for the laboratory personnel; <input type="checkbox"/> List of POPs/PCB analytical methods adopted by the Serbian Institute for Standardization and implemented in laboratories;	<input type="checkbox"/> Sufficient laboratory capacities are available to absorb the training content; <input type="checkbox"/> Laboratories are willing to invest their times and resources to get accredited for the PCB and relevant analysis	<input type="checkbox"/> Government commitment to support the operation of such laboratories in the long term will be expressed at the PSC meetings; <input type="checkbox"/> Commitment of laboratories will be sustained by sharing information on the enforcement training and related project activities.

<p>Output 2.4: Awareness and knowledge on POPs/PCBs issue among different target groups improved</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Number of gender-sensitive awareness propagation materials (brochures, web page, web site) prepared and published (3); <input type="checkbox"/> Number of awareness raising campaigns, workshops, and roundtable discussions on PCB risks and regulatory requirements among authorities, workers, media, NGOs, vulnerable groups conducted (3); <input type="checkbox"/> Number of participants trained from different target groups (NGOs, media, industry workers, women associations) (male/female) (20/10); <input type="checkbox"/> Number of interviews in the media presenting the PCB issue (1); <input type="checkbox"/> Number of curricula for sound chemical management (POPs and especially PCBs) strengthened (1) 	<ul style="list-style-type: none"> <input type="checkbox"/> Copies of publications (brochures, pamphlets, and/or leaflets); <input type="checkbox"/> Reports on gender-sensitized awareness raising campaigns, workshops, seminars, roundtable discussions, and public forums with lists of participants; <input type="checkbox"/> Web site; <input type="checkbox"/> Documented media appearances (interviews) and newspaper articles; <input type="checkbox"/> Content of educational and academic publications; <input type="checkbox"/> Copy of curricula 	<ul style="list-style-type: none"> <input type="checkbox"/> PCB related information on health and safety will be shared in an accessible manner among a wider range of audience; <input type="checkbox"/> Different target groups will maintain their interests in ensuring the PCB are treated properly in the country; <input type="checkbox"/> Different target groups will actively participate in the project related events; <input type="checkbox"/> Sound management of chemicals including POPs/PCB issues will be included in their actions and programs 	<ul style="list-style-type: none"> <input type="checkbox"/> The project information will be posted on the project website; <input type="checkbox"/> Awareness campaigns and reports will use very simple choice of words and tools that are most appropriate for the target groups; <input type="checkbox"/> Pre-assessment of the available tools and their effectiveness to convey information to public will be undertaken; <input type="checkbox"/> Visualization of the main messages of the campaigns will assist comprehending the information
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<p>Output 2.5: Sustainable incentive mechanism developed for sound PCB management</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Programme for sustainable financial mechanism developed and agreed (1); <input type="checkbox"/> Incentive mechanism for sustainable PCB management approved (1) 	<ul style="list-style-type: none"> <input type="checkbox"/> Records of published and posted programme for financial mechanism; <input type="checkbox"/> Project Progress Reports; <input type="checkbox"/> Financial record/reports of the incentive mechanism; <input type="checkbox"/> Evaluation Reports 	<ul style="list-style-type: none"> <input type="checkbox"/> The government and key stakeholders agree on the incentive mechanism; <input type="checkbox"/> A business plan is well developed to sustain the incentive mechanism; <input type="checkbox"/> Incentives will be given in government policies for PCB replacement 	<ul style="list-style-type: none"> <input type="checkbox"/> Consultation meetings with the private and governmental sector will be held to define a common solution on the incentive mechanism; <input type="checkbox"/> The PCB regulations will be properly enforced to encourage the good practice and penalize non-compliance inaction; <input type="checkbox"/> The additional financing of the project is expected as a result of introduction of the legislation for PCB
<p>Outcome 3: Detailed inventory of PCB containing equipment and waste carried out</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Number of tested and PCB identified equipment, waste and stockpiles (2000); <input type="checkbox"/> PCB inventory database established and updated (1); <input type="checkbox"/> Number of inventory database entries (2000); <input type="checkbox"/> A list of priorities for disposal defined (1) 	<ul style="list-style-type: none"> <input type="checkbox"/> Laboratory data; <input type="checkbox"/> Inventory Reports; <input type="checkbox"/> Project Progress Reports; <input type="checkbox"/> Inventory database; <input type="checkbox"/> Risk assessment report 	<ul style="list-style-type: none"> <input type="checkbox"/> PCB owners willing to identify and report PCB-containing equipment and related waste; <input type="checkbox"/> Incentives are given for cooperative action by PCB owners and power sectors; <input type="checkbox"/> Key stakeholders will accept internationally accepted regulations and guidelines respecting regulatory practice and standards; 	<ul style="list-style-type: none"> <input type="checkbox"/> Stakeholders are involved in the project design process as well as technology selection criteria process; <input type="checkbox"/> Identification of potentially conflicting stakeholder interests through involvement of stakeholders in the project design process; <input type="checkbox"/> The PCB regulations are designed to provide incentives to encourage cooperative behaviors and penalize non-compliance status

<p>Output 3.1: Sampling of in-service equipment, waste and stockpiles completed</p>	<p><input type="checkbox"/> Number of transformers selected, sampled, screened, verified and labelled (2000)</p>	<p><input type="checkbox"/> Sampling plans of transformers with defined list of transformers for sampling; <input type="checkbox"/> Project team verification reports through direct visits of the project stakeholders; <input type="checkbox"/> Inventory reports on sampling, identification and labeling of PCB-containing equipment, waste, stockpiles</p>	<p><input type="checkbox"/> Infrastructure and laboratory facilities are sufficient for PCB identification in a timely manner; <input type="checkbox"/> PCB owners will arrange and allow access for sampling and labeling particularly for on-line equipment</p>	<p><input type="checkbox"/> Letter of Interest and MoU with the potential owners of PCB-containing equipment and waste will be arranged in advance to allow enough time to arrange sampling activities of particularly online equipment; <input type="checkbox"/> The inventory task teams will be comprised of environmental inspectors (project team member) and the company members (electrical technicians); <input type="checkbox"/> Teams will continuously report their progress. If needed, MoAEP/EPA will assign more teams to speed up the process</p>
<p>Output 3.2: PCB presence determined by screening and laboratory analysis</p>		<p><input type="checkbox"/> Laboratory Reports on screening and verification; <input type="checkbox"/> Project Progress Report; <input type="checkbox"/> Evaluation Reports</p>		
<p>Output 3.3: Database prepared and maintained for PCB-containing equipment, waste, stockpiles and contaminated sites</p>	<p><input type="checkbox"/> PCB database developed and used for disposal prioritization and reporting requirements of the Stockholm Convention (1);</p>	<p><input type="checkbox"/> ToR for the database development; <input type="checkbox"/> Contract signed; <input type="checkbox"/> Database in use</p>	<p><input type="checkbox"/> PCB database is functional and used for Country Convention compliance status reporting; <input type="checkbox"/> The database will be continuously maintained by MoAEP or a designated institution beyond the project period</p>	<p><input type="checkbox"/> The format of the PCB database will refer to the Convention's reporting format; <input type="checkbox"/> The database will have a user interface for easy input and reporting; <input type="checkbox"/> The design of the database will be finalized by consulting with users</p>
<p>Output 3.4: Detailed inventory developed of PCB-containing equipment and wastes in the demonstration areas, countrywide estimations and</p>	<p><input type="checkbox"/> Report on valid estimations on PCB quantities by extrapolation based on representative sample performed (1); <input type="checkbox"/> Priority list for phasing-out</p>	<p><input type="checkbox"/> List of sampled, screened and verified transformers; <input type="checkbox"/> List of PCB identified transformers, waste; <input type="checkbox"/> Evaluation report on estimated quantities of PCB equipment and waste;</p>	<p><input type="checkbox"/> There are enough information and data given by potential PCB owners and power sectors on the number and locations of all equipment for ensuring the estimation is as accurate as possible; <input type="checkbox"/> The sampled equipment has the</p>	<p><input type="checkbox"/> The validity of samples will be checked randomly by inspectors and introducing penalties for any violation of the regulation; <input type="checkbox"/> The sampling will be carefully planned and so the extrapolation makes sense statistically</p>

<p>prioritization of transformers for disposal</p>	<p>of the PCB containing equipment prepared (1)</p>	<p><input type="checkbox"/> Priority risk assessment report for phasing-out</p>	<p>similar characterization of PCB presence as other parts of the country where the PCB presence will be extrapolated.</p>	
<p>Outcome 4: Pilot quantities of 200 tons of PCB-containing equipment and waste disposed of in an environmentally sound manner</p>	<p><input type="checkbox"/> 200 tons of PCB-containing equipment and waste disposed of; <input type="checkbox"/> Number of companies adopting best practices (3); <input type="checkbox"/> Number of new businesses(1); <input type="checkbox"/> National PCB Management Plan adopted</p>	<p><input type="checkbox"/> ToR for the disposal/destruction of the PCB equipment and wastes; <input type="checkbox"/> Contract signed with the selected bidder; <input type="checkbox"/> Service provider's record on PCB disposal; <input type="checkbox"/> Laboratory analysis reports; <input type="checkbox"/> Copy of National PCB Management Plan <input type="checkbox"/> Evaluation Reports</p>	<p><input type="checkbox"/> Stakeholders are willing and agree to deliver the PCB-containing equipment and waste for disposal; <input type="checkbox"/> Stakeholders will have equipment to replace the identified PCB-containing equipment; <input type="checkbox"/> Maintenance workshops will properly handle equipment labeled as PCB-containing equipment; <input type="checkbox"/> There is a local company which can technically handle the final disposal option;</p>	<p><input type="checkbox"/> The relevance and importance of PCBs issue as well as the benefit of the project will be communicated to the PCB owners and key stakeholders; <input type="checkbox"/> The PCB regulations will be properly enforced to encourage cooperative actions and penalize non-compliance status; <input type="checkbox"/> National PCB Management Plan will be formulated in consultation with PCB owners so that PCB owners could plan their resource allocations in a longer term.</p>

<p>Output 4.1: BAT/BEP disposal options and technologies applicable to the disposal strategy validated</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Study with elaborated country needs, nature and quantity of wastes, cost-benefit analyses, economic and market conditions prepared in order to optimize the grants provided for the project (1); <input type="checkbox"/> A list of criteria for the selection of disposal/ destruction options identified which will include cost-benefit analysis as well as comparison of different scenarios for final disposal and destruction(1); <input type="checkbox"/> National PCB Management Plan adopted (1) 	<ul style="list-style-type: none"> <input type="checkbox"/> Feasibility study on BAT/BEP and available disposal options; <input type="checkbox"/> Minutes of the meetings of the Project Steering Committee on technology requirements; <input type="checkbox"/> Copy of National PCB Management Plan 	<ul style="list-style-type: none"> <input type="checkbox"/> Criteria for technology selection will be chosen considering the technical and economic factors; <input type="checkbox"/> There is a local company which can technically handle the final disposal option; <input type="checkbox"/> The financial mechanism design will be determined by the time to assess the final disposal option so that the operational cost can be estimated 	<ul style="list-style-type: none"> <input type="checkbox"/> Project Steering Committee will be reminded that the regulations and PCB management mechanism including the incentive scheme need to be finalized to facilitate the proper business plan development and choose the final disposal option that could be sustained beyond the project period
<p>Output 4.2: PCB treatment service provider selected</p>	<ul style="list-style-type: none"> <input type="checkbox"/> PCB treatment service operator selected (1) 	<ul style="list-style-type: none"> <input type="checkbox"/> ToR for the disposal/destruction of the PCB equipment and wastes; <input type="checkbox"/> Minutes of the meeting of the pre-bid conference; <input type="checkbox"/> Minutes of the meeting of the Project Steering Committee; <input type="checkbox"/> Contract signed with the selected bidder 	<ul style="list-style-type: none"> <input type="checkbox"/> There is a local company which can technically handle the final disposal option; <input type="checkbox"/> The incentive mechanism design will be determined by the time to assess the final disposal option so that service providers can make their business plans 	<ul style="list-style-type: none"> <input type="checkbox"/> Project Steering Committee will be reminded that the regulations and PCB management mechanism including the incentive scheme need to be finalized to facilitate the proper business plan development and choose the final disposal option that could be sustained beyond the project period

<p>Output 4.3: Permits for the storage operation/technology treatment installation obtained</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Number of permits for the PCB disposal activities obtained (1); <input type="checkbox"/> A facility for the PCB treatment operations upgraded (1) <input type="checkbox"/> Amount of incremental investment (USD 400,000) 	<ul style="list-style-type: none"> <input type="checkbox"/> Copies of Governmental/Local authorities permits (EIA, IPPC, permit for handling, collection and treatment of hazardous wastes, etc.) for operation of the storage/technology treatment installation; <input type="checkbox"/> Evaluation Reports 	<ul style="list-style-type: none"> <input type="checkbox"/> Local communities will accept the treatment facility to be installed in their neighborhood; <input type="checkbox"/> The final disposal equipment and facility will be operated with proper safeguard and safety equipment; 	<ul style="list-style-type: none"> <input type="checkbox"/> Awareness raising and sensitization of technology will be improved through meetings; <input type="checkbox"/> Round table discussions between the government, local community authorities and NGOs will be arranged to explain that the facility will meet the safety standards and operate respecting the best working practices and procedures for protection of human health and the environment, supported by regular inspections and monitoring program
<p>Output 4.4: Monitoring system established in the interim storage/treatment facility</p>	<ul style="list-style-type: none"> <input type="checkbox"/> A monitoring system in the interim storage/treatment facility installed (1) 	<ul style="list-style-type: none"> <input type="checkbox"/> Baseline study indicating current, i.e. historical PCB pollution of the storage site; <input type="checkbox"/> Environmental monitoring report at the end of the operation of the storage/treatment facility. 	<ul style="list-style-type: none"> <input type="checkbox"/> The installed monitoring system is effective for determination of eventual PCB emissions and exposure 	<ul style="list-style-type: none"> <input type="checkbox"/> The design of the monitoring system will refer to the internationally accepted method by consulting experts in the field

<p>Output 4.5: 200 tons of PCB-containing equipment and waste disposed</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Number of phased out and replacement plans for PCB identified in-service equipment prepared in cooperation with the stakeholders (3); <input type="checkbox"/> Number of companies adopting best practices (3); <input type="checkbox"/> Number of new businesses (1); <input type="checkbox"/> 200 tons of PCB-containing equipment and waste disposed/destroyed in an environmentally sound manner; <input type="checkbox"/> Number of equipment recycled and reused (150 tons); <input type="checkbox"/> Revenue values and the quantities of the saved raw materials (USD); <input type="checkbox"/> Savings in energy loss as a difference in the energy efficiency between the new and the old transformers calculated, and quantities of CO₂ emissions prevented (tons) 	<ul style="list-style-type: none"> <input type="checkbox"/> Expert assessment of the phase-out plans; <input type="checkbox"/> Service provider's record on incoming and outgoing material at/from the storage site; <input type="checkbox"/> Service provider's disposal reports including laboratory results confirming the successfulness of the treatment, if export all accompanying notification documents and consents; <input type="checkbox"/> Import, transit and export consents for the disposal of the PCB-containing waste abroad and the freight documentation; <input type="checkbox"/> Evaluation Reports 	<ul style="list-style-type: none"> <input type="checkbox"/> Stakeholders are willing and agree to deliver the PCB-containing equipment and waste for disposal; <input type="checkbox"/> Stakeholders will have equipment to replace the identified PCB-containing equipment; <input type="checkbox"/> PCB owners are interested in and committed to the disposal of their PCB-containing equipment 	<ul style="list-style-type: none"> <input type="checkbox"/> Letter of Commitment between the MoAEP and the potential/identified PCB owners are arranged on discounted disposal of a limited number of equipment during the project phase; <input type="checkbox"/> National PCB Management Plan with realistic and planned terms for disposal is agreed by stakeholders in advance; <input type="checkbox"/> Legal and economic incentives will be provided for PCB owners to bring their PCB-containing equipment during the project phase.
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<p>Outcome 5: Public private partnership (PPP) policy integrated into national assessment scheme for PCBs contaminated sites</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Number of PPP policies, strategies, laws, regulation approved/enacted (1); <input type="checkbox"/> A list of priority setting criteria upgraded and PCB contaminated sites prioritized (1); <input type="checkbox"/> Risk assessment study with site investigation performed (1); <input type="checkbox"/> National strategy on contaminated sites approved (1) 	<ul style="list-style-type: none"> <input type="checkbox"/> Copy of policies, strategies, laws, regulation approved/enacted; <input type="checkbox"/> Meeting Minutes of the Project Steering Committee; <input type="checkbox"/> Copies of risk assessment and detailed site investigation studies; <input type="checkbox"/> Report on decontamination technology assessment; <input type="checkbox"/> Laboratory analysis report; <input type="checkbox"/> Decision of the government on PCB contaminated sites national strategy 	<ul style="list-style-type: none"> <input type="checkbox"/> Potential investors can be identified; <input type="checkbox"/> Proper access to potentially PCB contaminated sites will be granted by the contaminated site owners and public institutions; <input type="checkbox"/> Technical and environmental advisory capacities are sufficient for adequate risk assessment analysis; <input type="checkbox"/> Legal framework including enforcement regulations will be in effect in a timely manner; <input type="checkbox"/> National strategy appropriate to address PCB contaminated sites 	<ul style="list-style-type: none"> <input type="checkbox"/> Investors network will be contacted through Serbia's Public Procurement Office and other relevant public organizations <input type="checkbox"/> Additional consultations are arranged with the owners of the possible PCB contaminated locations; <input type="checkbox"/> Government commitment will be ensured to address the PCB contaminated sites through Project Steering Committee's political support; <input type="checkbox"/> Additional funds will be leveraged for the implementation of the strategy
<p>Output 5.1: PCB contaminated sites investigated</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Number of possible PCB contaminated sites identified (5); <input type="checkbox"/> Site investigation conducted (1) 	<ul style="list-style-type: none"> <input type="checkbox"/> List of possible PCB contaminated sites based on desk analyses; <input type="checkbox"/> Sampling plan; <input type="checkbox"/> Laboratory analysis reports on soil samples; <input type="checkbox"/> Site investigation report to confirm the eventual contamination 	<ul style="list-style-type: none"> <input type="checkbox"/> Proper access to potentially PCB contaminated sites will be granted by the contaminated site owners and public institutions; <input type="checkbox"/> Legal framework including enforcement regulations will be in effect in a timely manner; <input type="checkbox"/> Site investigation adequately define the scope of decontamination; <input type="checkbox"/> National strategy appropriate to address PCB contaminated sites 	<ul style="list-style-type: none"> <input type="checkbox"/> Additional consultations and data on the past companies activities will be requested to facilitate the site investigation; <input type="checkbox"/> Site owners will be involved at an early stage as stakeholders; <input type="checkbox"/> The approval process of the legal framework to facilitate the site investigation will be expedited
<p>Output 5.2: Criteria defined for prioritization of PCB contaminated sites</p>	<ul style="list-style-type: none"> <input type="checkbox"/> A list of criteria for priority setting defined (1); <input type="checkbox"/> PCB contaminated site prioritized (1); 	<ul style="list-style-type: none"> <input type="checkbox"/> List of defined priority setting criteria; <input type="checkbox"/> Rankings of the PCB contaminated sites based on the 	<ul style="list-style-type: none"> <input type="checkbox"/> Legal framework including enforcement regulations will be in effect in a timely manner; 	<ul style="list-style-type: none"> <input type="checkbox"/> The approval process of the legal framework to facilitate the site investigation will be expedited

within the PPP framework		classification/categorization scheme	<input type="checkbox"/> National strategy appropriate to address PCB contaminated sites	
Output 5.3: Risk assessment for a pilot site completed	<input type="checkbox"/> Expert on risk assessment study identified and selected (male/female) (1/1); <input type="checkbox"/> A gender-sensitized report on the risk to the environment and human health assessed (1);	<input type="checkbox"/> Contract signed by experts <input type="checkbox"/> Copy of the risk assessment study;	<input type="checkbox"/> Legal framework including enforcement regulations will be in effect in a timely manner; <input type="checkbox"/> National strategy appropriate to address PCB contaminated sites	<input type="checkbox"/> The approval process of the legal framework to facilitate the site investigation will be expedited
Output 5.4: Finalization of pilot remediation agreement under PPP scheme	<input type="checkbox"/> Disposal, remediation technologies for PCB-contaminated site identified and evaluated (3); <input type="checkbox"/> Technology selection screening matrix developed (1); <input type="checkbox"/> Technology for the pilot remediation demonstration selected (1); <input type="checkbox"/> ToR for site clean up operation articulating PPP modality agreed;	<input type="checkbox"/> Report on available PCB contaminated sites remediation technologies; <input type="checkbox"/> ToR drafted and agreed among stakeholders and investors; <input type="checkbox"/> Meeting Minutes of the Project Steering Committee	<input type="checkbox"/> Legal framework including PPP modality and enforcement regulations will be in effect in a timely manner; <input type="checkbox"/> Potential investors will be identified; <input type="checkbox"/> National strategy appropriate to address PCB contaminated sites	<input type="checkbox"/> The approval process of the legal framework to facilitate the site investigation will be expedited; <input type="checkbox"/> Investors network will be contacted through Serbia's Public Procurement Office and other relevant public organizations
Output 5.5: National strategy for PCB contaminated sites developed	<input type="checkbox"/> Expert on strategy development identified and selected (male/female) (1/1); <input type="checkbox"/> Strategy for PCB contaminated sites	<input type="checkbox"/> Copy of the Strategy document; <input type="checkbox"/> Decision of the government to adopt the strategy;	<input type="checkbox"/> The government is committed to develop this strategy as a priority in a timely manner; <input type="checkbox"/> Legal framework including enforcement regulations will be in effect in a timely manner	<input type="checkbox"/> The approval process of the legal framework to facilitate the site investigation will be expedited

	developed and approved (1);			
Outcome 6: Project progress properly monitored and evaluated	<input type="checkbox"/> Project management structure established (1); <input type="checkbox"/> Project Progress Reports (8); <input type="checkbox"/> Project Implementation Report (4); <input type="checkbox"/> Meeting Minutes of the Project Steering Committee (4); <input type="checkbox"/> Evaluation Reports(2)	<input type="checkbox"/> Project progress reports; <input type="checkbox"/> Copies of job descriptions and contracts <input type="checkbox"/> Meeting Minutes of the Project Steering Committee <input type="checkbox"/> Evaluation Report including interviews with project staff and governmental officials	<input type="checkbox"/> The Project Steering Committee is well supported by the Ministries and members of the Committee; <input type="checkbox"/> The project staff will stay with the project and contribute to absorbing the technical knowledge and institutional memories	<input type="checkbox"/> PSC meetings will track and evaluate project progress and make necessary arrangement to avoid delays; <input type="checkbox"/> Project work plan and budget will be reviewed and confirmed each year, which can accommodate changes in the execution environment
Output 6.1: Project results monitored and reported including the gender dimension	<input type="checkbox"/> PMU established (1); <input type="checkbox"/> PSC capable for coordination, management, monitoring and evaluation of the project activities, established (male/female) (1 PSC with 6/4); <input type="checkbox"/> National and international experts recruited (male/female) (2/2);	<input type="checkbox"/> Drafted job descriptions for the national and international experts on PCB management; <input type="checkbox"/> Copy of the contracts for PMU members and international consultants; <input type="checkbox"/> Decision for the establishment of the multistakeholder PSC; <input type="checkbox"/> Project progress report	<input type="checkbox"/> PSC is committed to ensure the project is smoothly implemented; <input type="checkbox"/> The project staff will stay with the project and contribute to absorbing the technical knowledge and institutional memories	<input type="checkbox"/> Project Steering Committee will be informed of the project progress so that PSC could provide relevant political support to the project; <input type="checkbox"/> Carefully selected and well-trained project staff will be appointed

<p>Output 6.2: Project evaluated meeting the GEF's evaluation criteria</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Inception Workshop held (1); <input type="checkbox"/> Work plan with project indicators updated and measured (4); <input type="checkbox"/> Biannual Project Reports prepared (8); <input type="checkbox"/> Financial audits completed (1); <input type="checkbox"/> Project Implementation Review completed (4); <input type="checkbox"/> Project Terminal Report completed (1); <input type="checkbox"/> Mid-term external evaluation held (1); <input type="checkbox"/> Project Closure Workshop held (1); <input type="checkbox"/> Terminal external evaluation held (1); 	<ul style="list-style-type: none"> <input type="checkbox"/> Project Inception Report <input type="checkbox"/> Annual work plans with indicators updated <input type="checkbox"/> Minutes of the meetings <input type="checkbox"/> Copy of § Annual Project Reports; <input type="checkbox"/> Copy of Project Implementation Review; <input type="checkbox"/> Copy of Biannual/Quarterly Progress Reports; <input type="checkbox"/> Copy of Periodic Thematic Reports; <input type="checkbox"/> Copy of Mid-term external evaluation report; <input type="checkbox"/> Copy of Terminal external evaluation report; <input type="checkbox"/> Project Closure Report 	<ul style="list-style-type: none"> <input type="checkbox"/> Project monitoring and evaluation structure appropriate to control the execution of the project activities; <input type="checkbox"/> Key stakeholders share information critical for the project monitoring and evaluation; 	<ul style="list-style-type: none"> <input type="checkbox"/> Clear mandate and impact indicators will assure compliance to the work plan and budget; <input type="checkbox"/> Proper communication channels are established; <input type="checkbox"/> The project management team able to set a monitoring and evaluation scheme and to adapt to different project input or conditions.
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V. Terms Of Reference (ToR)



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

TERMS OF REFERENCE

Cluster evaluation of UNIDO projects

Polychlorinated biphenyls (PCBs)

| June 2022 |

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1. UNIDO PCBs portfolio background

The Stockholm Convention (SC) 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 is of a major public health concern, in particular impacts upon women and, through them, upon future generations.

PCBs are industrial products or chemicals mainly used in the energy sector, widely deployed as dielectric and coolant fluids in electrical apparatus, carbonless copy paper and heat transfer fluids. Generally, PCBs are very stable, which explains their persistence in the environment.

UNIDO’s PCBs management and disposal strategy aims to create fundamental capacities within industries, governments, institutions and PCBs owners, in order to comply with the PCB-related obligations under the SC. The projects implemented by UNIDO enhance the critical regulatory and legislative framework and strengthen institutions at the national, regional and local level to manage equipment and waste that contain PCBs in an environmentally sound manner.

Compliance with legislation is ensured by building capacities in local laboratories for PCB sampling and analysis, transfer of technology know-how for local PCBs treatment and elimination and undertaking inspections at PCB-contaminated sites. Environmentally sound PCB management practices reduce PCB releases and risks to human health and the environment; best practices are then further disseminated through public awareness raising initiatives.

Furthermore, UNIDO’s PCB projects include the elimination and disposal of PCBs, often by leveraging interests of the project recipient countries in non-combustion technology, which, in many cases, offer technical and financial advantages. One is on-site PCB decontamination, which solves many technical and procedural barriers for very large transformers that cannot be transported on the road to transformer maintenance facilities. The other is the regeneration of oil. Because workers would usually need to drain and dismantle these transformers, this helps reducing the workers’ risk of exposure to PCBs.

2. Rationale and purpose of the evaluation

Given the number of PCB projects in the last phase of implementation and taken into account significant similarities at project design level, a cluster evaluation approach will be used. The cluster will be tentatively composed of eight (8) projects selected from Table 1 below and the final list of projects included will be validated at Inception phase.

One of the main reasons of the Cluster evaluation would be to overcome some of the shortcomings present in traditional project evaluation, namely the inward-looking nature of the exercise, the timing and high transactional costs and administrative burden.

The purpose of the cluster approach is to produce synergies and increase the value added in the conduct of evaluations.

The efficiency gains produced by this approach will be invested in additional learning and more strategic assessments to inform UNIDO management, Member States, donors and beneficiaries with further more relevant and useful evaluation findings, conclusions and recommendations, such as:

- a) Inter-project comparisons (e.g. differences in implementation approaches, different strategies for broader adoption)
- b) Incorporation of additional aspects normally not so well-covered (e.g. socio-economic and environmental impacts of projects, other aspects (e.g., global crisis such as the COVID 19 pandemic).
- c) Aggregated information for cross-cutting and recurrent issues, such as management, systemic challenges and root causes based on several cases and therefore less anecdotal.

Table 1. List of projects for Cluster Evaluation

Region	Country	UNIDO project N.	GEF ID	Theme area	Project budget(EUR)	Year of Eval	Budget left (SAP 31.03.22 USD)
EUR	SERBIA	100313	4877	PCB	2,100,000	2022	786,423
ASP	INDIA	104044	3775	PCB	14,100,000	2022	107,230
ASP	LAO PDR	140157	4782	PCB	1,400,000	2022	271,414
LAC	BOLIVIA	140296	5646	PCB	2,000,000	2022	278,300
LAC	GUATEMALA	140298	5816	PCB	2,000,000	2022	403,866
EUR	RUSSIAN FEDERATION	140019	4915	PCB	7,400,000	2022	30,000

AFR	CONGO	140160	5325	PCB	975,000	2022	25,000
AFR	MOROCCO	170117	9916	PCB	1,826,484	2022	621,734 (ex OpenData)
<i>tot</i>					<i>31,801,484</i>		<i>1,902,233</i>

3. Scope and focus of the evaluation

The final cluster of projects will be decided upon in the Inception Report, based on the following criteria:

- *Thematic*: projects from same or similar programme, or within interrelated technical areas
- *Timing*: project which Terminal Evaluations are due within +/- 6 months

Projects will be selected based on the planned timing for the project end or operational completion and the respective thematic focal area. The final selection will be made in coordination with the respective project managers and the GEF coordination unit to ensure smooth implementation of the evaluation.

The Cluster Evaluation, as foreseen in the Independent Evaluation Division Work Plan (WP) 2018-19¹⁷ and reiterated in WP 2020-21¹⁸, will follow the UNIDO Evaluation Policy¹⁹, the UNIDO Guidelines for the Technical Cooperation Project and Project Cycle²⁰, and UNIDO [Evaluation Manual](#). Furthermore, the GEF Guidelines for GEF Agencies in Conducting Terminal Evaluations, the GEF Monitoring and Evaluation Policy²¹ and the GEF Minimum Fiduciary Standards for GEF Implementing and Executing Agencies will be applied. The evaluation will also

¹⁷ https://www.unido.org/sites/default/files/files/2018-11/IEV_WP_2018-19_final_180228.pdf

¹⁸ https://www.unido.org/sites/default/files/files/2021-06/2021-04-21_EIO%20Evaluation%20work%20plan-budget%202020-21_Update%202021_EB%20Approved_F.pdf

¹⁹ UNIDO. (2018). Director General's Bulletin: Evaluation Policy (UNIDO/DGB/2018/08)

²⁰ 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)

²¹ https://www.thegef.org/sites/default/files/council-meeting_documents/EN_GEF.ME_C56_02_GEF_Evaluation_Policy_May_2019_0.pdf

build upon the findings and recommendations of the Cluster Evaluation on UNIDO POPs portfolio carried out in 2015²².

The evaluation has three main specific objectives:

- i. Assess the projects` performance in terms of relevance, effectiveness, efficiency, sustainability, coherence, and progress to impact; and
- ii. Develop a series of findings, lessons and recommendations for enhancing the design of new and implementation of ongoing projects by UNIDO.
- iii. Contribute to organizational learning, by UNIDO and its counterparts, while being forward looking, thus also guiding the development of new similar projects.

4. Evaluation approach and methodology

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

The evaluation will use a theory of change (ToC) approach²³ 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 depict the causal and transformational pathways from project outputs to outcomes and longer-term impacts. It also identifies the drivers and barriers to achieving results. The learning from this analysis will be useful for the design of the future projects so that the management team can effectively use the theory of change to manage the project based on results.

5. Data collection methods

The complete array of instruments for data collection will be finalized at Inception Report stage. Among the main methods foreseen to be used by the Evaluation Team:

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

²²

https://www.unido.org/sites/default/files/2015-04/FINAL_report_NIPS_CLUSTER_EVAL_20150409_0.pdf#page=81&zoom=100,120,76

²³ For more information on Theory of Change, please see chapter 3.4 of UNIDO [Evaluation Manual](#)

- The original project document, monitoring reports (such as progress and financial reports, mid-term review report, technical reports, back-to-office mission report(s), end-of-contract report(s) and relevant correspondence.
 - Notes from the meetings of steering 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 projects; and
 - Representatives of donors, counterparts and stakeholders.
- (c) Whenever possible, **field visits** to project sites in the involved countries. Due to the persisting emergency caused by the virus Covid-19, it shall be noted that restrictions on international travels are still in place at the time this ToR is drafted, therefore the field visits should be carried out by the national consultants only.
- On-site observation of results achieved by the project, including interviews of actual and potential project beneficiaries.
 - Interviews with the relevant UNIDO Country Office(s) representative to the extent that he/she was involved in the project, and the project's management members and the various national [and sub-regional] authorities dealing with project activities as necessary.
- (d) **Online data collection** methods such as surveys will be used to the extent possible.

6. Evaluation key questions and criteria

The key evaluation questions, to be further refined at the level of Inception Report, are the following:

- 1) Have they done the right things in the context of PCB issues in the respective countries? How well have the projects fit with other policies and interventions that affect PCBs in the respective countries?
- 2) What are the projects` key results (outputs, outcome and impact)? To what extent have the expected results been achieved or are likely to be achieved? To what extent are the achieved results to be sustained after the completion of the projects?
- 3) What are the key drivers and barriers to achieve the long term objectives? To what extent have the projects helped put in place the conditions likely to address the drivers, overcome barriers and contribute to the long term objectives?
- 4) What are the key risks (e.g. in terms of financial, socio-political, institutional and environmental risks) and how these risks may affect the continuation of results after the projects end?

- 5) What lessons can be drawn from the successful and unsuccessful practices in designing, implementing and managing the analysed projects?
- 6) How far have the Mid-term reviews conducted on the cluster projects been used to ensure the success of the projects in the second phase of implementation?
- 7) Are there tangible differences with regard to the evaluation criteria between MSPs and FSPs?
- 8) Were lessons learned from previous projects in the countries and the POPs thematic area sufficiently taken into account while designing the cluster projects?
- 9) Was the gender dimension given sufficient attention at both project design and implementation?

The table below provides the key evaluation criteria to be assessed by the evaluation. The details questions to assess each evaluation criterion are in annex 2 of UNIDO [Evaluation Manual](#).

Table 2. Project evaluation criteria

#	Evaluation criteria	Mandatory rating
A	Progress to impact	Yes
B	Project design	Yes
1	• Overall design	Yes
2	• Logframe	Yes
C	Project performance	
1	• Relevance	Yes
2	• Effectiveness	Yes
3	• Coherence	Yes
4	• Efficiency	Yes
5	• Sustainability of benefits	Yes
D	Cross-cutting performance criteria	
1	• Gender mainstreaming	Yes
2	• M&E: ✓ M&E design ✓ M&E implementation	Yes 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 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 implementing 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.

The cluster 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**²⁴: appropriate environmental and social safeguards were addressed in the projects' design and implementation, e.g. preventive or mitigation measures for any foreseeable adverse effects and/or harm to environment or to any stakeholder.

7. Rating system

In line with the practice adopted by many development agencies, the UNIDO Independent Evaluation Division uses a six-point rating system, where 6 is the highest score (highly satisfactory) and 1 is the lowest (highly unsatisfactory) as per table below.

Table 3. Project rating criteria

Score		Definition	Category
6	Highly satisfactory	Level of achievement presents no shortcomings (90% - 100% achievement rate of planned expectations and targets).	SATISFACTORY

²⁴ 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

5	Satisfactory	Level of achievement presents minor shortcomings (70% - 89% achievement rate of planned expectations and targets).	
4	Moderately satisfactory	Level of achievement presents moderate shortcomings (50% - 69% achievement rate of planned expectations and targets).	
3	Moderately unsatisfactory	Level of achievement presents some significant shortcomings (30% - 49% achievement rate of planned expectations and targets).	UNSATISFACTORY
2	Unsatisfactory	Level of achievement presents major shortcomings (10% - 29% achievement rate of planned expectations and targets).	
1	Highly unsatisfactory	Level of achievement presents severe shortcomings (0% - 9% achievement rate of planned expectations and targets).	

8. Evaluation process

The cluster evaluation will be conducted from June 2022 to December 2022. The evaluation will be implemented in five phases which are not strictly sequential, but in many cases iterative, conducted in parallel and partly overlapping:

- 1) Inception phase: The evaluation team will prepare the inception report providing details on the evaluation methodology and include an evaluation matrix with specific issues for the evaluation to address; the specific site visits will be determined during the inception phase, taking into consideration the findings and recommendations of the mid-term reviews – whenever available – and the current limitations imposed by the Covid-10 pandemic.
- 2) Desk review and data analysis;
- 3) Interviews, survey and literature review;
- 4) Country visits (whenever possible) and debriefing to key relevant stakeholders in the field;
- 5) Data analysis, report writing and virtual debriefing to UNIDO staff at the Headquarters; and
- 6) Final report issuance and distribution, and publication of the final evaluation report in UNIDO website.

9. Time schedule and deliverables

The evaluation is scheduled to take place from April 2022 to August 2022. The data collection phase from the field is tentatively planned for May 2022 but will be tailored on the different stages of projects' implementation and specific requirements by the different countries. At the end of the data collection, the evaluation team will present the preliminary findings for key relevant stakeholders involved in the project in the country. The tentative timelines are provided in the table below.

After the debriefing to the national stakeholders, the evaluation team will debrief UNIDO Headquarters and the internal stakeholders involved for debriefing and presentation of the preliminary findings of the terminal evaluation. Online presentation is to be arranged in case the visit cannot take place.

After this phase and the factual validation, a synthesis aggregating the comparable findings from the different projects is expected to be produced by the team. 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 Project Managers (PMs), UNIDO Independent Evaluation Division, the UNIDO GEF Coordinator and GEF OFP and other stakeholders for comments. The ET leader is expected to revise the draft TE report based on the comments received, edit the language and submit the final version of the TE report in accordance with UNIDO ODG/EIO/EID standards.

Table 4. Tentative timelines

Timelines	Tasks
June 2022	Desk review and writing of inception report
June 2022	Online briefing with UNIDO project manager and the project teams based in Vienna.
July-August 2022	Data collection from the Field
August 2022	Debriefing in Vienna Preparation of first draft evaluation report
September 2022	Internal peer review of the report by UNIDO's Independent Evaluation Division and other stakeholder comments to draft evaluation report
October 2022	Preparation of the synthesis of aggregated findings from the clustered evaluations
November 2022	Review of the Synthesis and the first draft
December 2022	Final evaluation report

10. Evaluation team composition

Given the number of projects included in the Evaluation and the current travel restrictions in place, the evaluation team will be composed of a mix of two international evaluation consultants - one acting as the team leader - and one

national evaluation consultant per country, supported by a Cluster Evaluation coordinator from UNIDO IED. The evaluation team members will possess a mixed skill set and experience including evaluation, relevant technical expertise, social and environmental safeguards, and gender. All the consultants will be contracted by UNIDO pooling funds from the projects' evaluation budgets.

The tasks of each team member are specified in the job descriptions annexed to these terms of reference. The evaluation team 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 management team in the different countries involved will support the evaluation team. The UNIDO GEF Coordinator and GEF Operational Focal Point (OFP) 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 Independent Evaluation Division will provide technical backstopping to the evaluation team and ensure the quality of the evaluation. The UNIDO Project Managers and national project teams will act as resourced persons and provide support to the evaluation team and the evaluation manager.

11. 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 Team Leader will prepare, in collaboration with the team member, a short inception report that will operationalize the ToR relating to the evaluation questions and provide information on what type and how the evidence will be collected (methodology). It will be discussed with and cleared 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 evaluation team members; field mission plan, including places to be visited, people to be interviewed and possible surveys

to be conducted and a debriefing and reporting timetable²⁵. The draft inception report will also include a suggested outline of the overall synthesis report (see below), including the specific evaluation questions for the cross-cutting analysis.

Evaluation report format and review procedures

All selected projects will be evaluated meeting GEF minimum requirements (see Annex I).

In terms of final outputs, one short evaluation report per project will be produced, including project performance ratings according to OECD-DAC criteria.

In addition, a final synthesis report of the evaluation findings of the cluster projects, inter-project comparisons and additional evaluation aspects will also be produced.

The draft reports will be delivered to UNIDO Independent Evaluation Division (with a suggested report outline) and circulated to UNIDO staff and key 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 will be sent to UNIDO's Independent Evaluation Division for collation and onward transmission to the 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 evaluation team 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 afterwards.

The evaluation report should be brief, to the point and easy to understand. It must explain the purpose of the evaluation, 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 by UNIDO Independent Evaluation Division.

²⁵ The evaluator will be provided with a Guide on how to prepare an evaluation inception report prepared by UNIDO Independent Evaluation Division.

12. Quality assurance

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

The quality of the evaluation report will be assessed and rated against the criteria set forth in the Checklist on evaluation report quality. The applied evaluation quality assessment criteria are used as a tool to provide structured feedback. UNIDO Independent Evaluation Division 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 Independent Evaluation Division, which will submit the final report to the GEF Evaluation Office and circulate it within UNIDO together with a management response sheet.