Independent Terminal Evaluation

Implementation of BAT and BEP for reduction of UP-POPs releases from open burning sources

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LIST OF ACRONYMS AND ABBREVIATIONS

AMD	Armenian Dram
AWHHE	Armenian Women for Health and Healthy Environment
BAT	Best Available Techniques
BEP	Best Environmental Practices
EA	Executing Agency
EBRD	European Bank for Reconstruction and Development
EIA	Environment Impact Assessment
GEF	Global Environment Facility
EMIC	Environmental Monitoring and Information Center
HSWPD	Hazardous Substances and Waste Policy Division
IA	Implementing Agency
ISID	Inclusive and Sustainable Industrial Development
LFM	Logical Framework Matrix
M&E	Monitoring and Evaluation
MoNP	Ministry of Nature Protection
MRF	Material Recovery Facility
MSP	Medium-sized Project
MTE	Mid-term Evaluation
NGO	Non-Governmental Organization
NIP	National Implementation Plan
NPC	National Project Coordinator
NPM	National Project Manager
PAHs	Polycyclic Aromatic Hydrocarbons
PCDDs	Polychlorinated dibenzo-p-dioxins
PCDFs	Polychlorinated dibenzofurans
PIR	Project Implementation Review
PM	Project Manager
PMT	Project Management Team
POPs	Persistent Organic Pollutants
PSC	Project Steering Committee
RECETOX	Research Centre for Toxic Compounds in the Environment
SAICM	Strategic Approach to International Chemicals Management
SC	Stockholm Convention
SNCO	State Non-Commercial Organization
TOR	Terms of Reference
TWG	Technical Working Group
UN	United Nations
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
UP-POPs	Unintentionally Produced POPs
VOC	Volatile Organic Compound
WRC	Waste Research Center

Executive Summary

A. Introduction.

The medium size project "*Implementation of BAT and BEP for reduction of UP-POPs releases from open burning sources*" funded by the Global Environment Facility was implemented from June 2015 to December 2018 by the United Nations Industrial Development Organization (UNIDO). The project was nationally executed by the Environmental Monitoring and Information Center falling under the Ministry of Nature Protection of the Republic of Armenia.

The overall objective of the project was to reduce UP-POPs releases in open burning sources in Armenia through the introduction of BAT/BEP and create capacity within the government and private sector on BAT/BEP. The evaluation covered the whole duration of the project.

B. Evaluation findings and conclusions

The in-depth evaluation included a review of project documents and a country visit to interview project personnel, intended beneficiaries, project partners, and other stakeholders involved in the project by using a participatory approach. Field visit to the selected landfill in Ararat was also undertaken during the country mission. Based on the information available and the findings of the discussions held, the evaluation team made the following conclusions.

Relevance: The project is highly relevant as it is assisting Armenia to fulfill its obligations towards the Stockholm Convention. The project is particularly relevant with regard to the challenges facing Armenia for the management of waste. It is also in line with GEF strategic priorities in the POPs focal area.

Efficiency: The project duration was originally designed for 2 years, but due to delays encountered the actual duration was 3½ years. Thanks to the active involvement of key stakeholders, the flexibility of the contractors, and the adequate guidance and support from UNIDO, the project team was able to get the project on the right track. Despite the delays, the project performed very well and delivered quality outputs within the planned budgets.

Effectiveness: All the stated project objectives have been achieved. The project succeeded in strengthening of the national legislation as well as building capacity on BAT/BEP for waste management. Best available technologies were successfully transferred to the pilot landfill, where best environmental practices have been adopted for the sound management of wastes. These interventions have already produced tangible results. Open burning of wastes has stopped at the demonstration site resulting in the ceasing of UP-POPs emission. The workers are no longer exposed to these toxic emissions and they are now fully equipped with personal protective equipment provided by the project. The project helped to raise the awareness at all levels, and replication efforts are already on-going.

Sustainability: As no risk has been identified, chances of long term sustainability of project results are high and impact is likely.

Cross-cutting issues: The role of UNIDO was crucial for the project to meet its objectives. It has taken timely actions, and provided technical back-stopping by hiring quality international and

national experts. Procurement of goods and services for the project as well as funds transfer were done in a timely manner.

Involvement of women in the project has been quite satisfactory. A total of two hundred and twenty seven persons attended the different events of the project such as inception workshop and training & awareness raising workshops; one hundred and twenty were males and ninety-eight were females.

Regarding M&E, the logical framework proposed in the project document is adequate to allow for proper monitoring and tracking of project results. SMART indicators in logical framework were used by project management to monitor project progress. All PSC as well as TWG meetings were held and relevant reports were submitted timely.

	Evaluation criteria	Rating
A	**Impact (progress toward impact)**	**S**
B	**Project design**	**S**
1	• Overall design	S
2	• Logframe	S
C	**Project performance**	**S**
1	• Relevance	HS
2	• Effectiveness	S
3	• Efficiency	S
4	• Sustainability of benefits	L
D	**Cross-cutting performance criteria**	
1	• Gender mainstreaming	S
2	• M&E: ✓ M&E design ✓ M&E implementation	S
3	• Results-based Management (RBM)	S
E	**Performance of partners**	
1	• UNIDO	HS
2	• National counterparts and Executing partners	HS
3	• Donor	S
F	**Overall assessment**	**S**

C. Recommendations

To UNIDO
1. For this project as well as for other projects, reporting from national counter-part on materialized co-financing is very often a challenge. It is recommended that in future projects the subcontract between the implementing agency and the national executing agency includes clauses that payments are not only linked to progress reports, but reporting of materialized co-financing as well.
2. Replication efforts in three provinces are on-going in Armenia thanks to international and bilateral support. However, for replication nationwide to cover all the provinces in the context of Armenia's strategy on waste management, substantial additional resources would be required. It is recommended that UNIDO considers to facilitate the availability of international financial as well as technical support.
3. For this project, there was some confusion regarding the actual start date. The signature of the contract between the implementing agency and the executing agency

was delayed due to structural reorganization within the Ministry of Nature Protection. As a result the date for completion of activities in the contract (March 2018) was well after the official closing date of the project (June 2017). The implementing agencies should better communicate the starting date to the national counterparts and they should ensure that the duration of the contract be in line with the project implementation timeframe.
To National Government
4. The project has contributed to the development and adoption of a number of legislation on wastes, BAT/BEP and licensing. For the sound management of wastes in the country in order to eliminate UP-POPs emission from open burning at dumpsites, the national authorities should ensure that these pieces of legislation are properly enforced. In particular, the appropriate enforcing and monitoring system should be put in place. 5. When the MRF will be operational after obtaining the appropriate license, it is important that the procedures and good practices are strictly followed while managing the wastes, this could be done through regular inspection and monitoring. 6. The project has been very successful producing very good results and valuable lessons. These should be gathered and shared with other municipalities and regions.

D. Lessons learned

Two key lessons emerged from this project:
1. A strong stakeholder commitment and high ownership that would contribute to achieve success can be secured by involving key stakeholders in all the phases of the project from the preparatory phase through implementation to project execution. 2. Simple project management structure and committed and flexible project managers at the implementing agency and the executing agency leads to efficient and effective project implementation.

1. Introduction

1.1 Evaluation objectives and scope

1. This terminal evaluation had two main objectives. The first was to assess the project' performance based on the criteria of relevance, effectiveness, efficiency, sustainability and impact. On the other hand, the second was to develop a series of findings, lessons and recommendations for enhancing the design of new projects and implementation of ongoing projects by UNIDO. The assessment included an analysis of the completion of project activities, delivery of outputs, occurrence of outcomes, and of risk management. The key question was whether the project has achieved or is likely to achieve the main objective "to reduce Unintentionally Produced Persistent Pollutants (UP-POPs) in open burning sources in Armenia through the introduction of Best Available Technology / Best Environmental Practices (BAT/BEP) and create capacity within the government and private sector on BAT/BEP implementation". This question was addressed by assessing the extent to which the project contributed to the conditions necessary to build the capacity of Armenia for the sound management of solid wastes through the introduction of BAT/BEP.

2. The purpose of this evaluation exercise was also to draw lessons and recommendations for UNIDO and the GEF that could help improve on the identification, design and implementation of future similar projects. This terminal evaluation report also includes examples of good practices for other projects. The evaluation covered the whole duration of the project, from June 2015 to December 2018.

1.2 Overview of the Project Context

3. Since its formulation in 2014, the GEF-funded project *Implementation of BAT and BEP for reduction of UP-POPs releases from open burning source* has been very relevant for the Republic of Armenia. Indeed, the situation of waste collection and transportation is outdated and insufficient, particularly in the rural areas, where almost all industrial and municipal wastes are disposed to landfills without separation and open burning of waste is common. This is because it is the cheapest and easiest means of volume reduction and disposal of combustible materials. This solution, though, is not efficient in reducing the sanitary risks due to the pathogens present in the waste. In particular, contaminated ashes from processes (incinerators, cement kilns or industrial boilers) are often dispersed in open dedicated fields and waste oils are burnt. Poor or incomplete combustion due to insufficient air (smoldering phases typical of open burning), inhomogeneous and poorly-mixed fuel materials, the presence of chlorinated precursors and catalytic metals (copper, iron) are the main factors for the formation and releases of UP-POPs in open burning processes. Releases from uncontrolled burning processes also include polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), heavy and volatile metals (Pb, Cu, Cd, Hg, Mn) and particulate matter (PM10 and PM2.5). The volatile nature of these pollutants impacts wildlife and humans far away from their point of release.

4. The main objective of the project was to facilitate the implementation of the Stockholm Convention – ratified by the Armenian Government in 2003 – particularly its obligations on the continuous reduction of UP-POPs from open burning sources. To achieve its goals, the project provided the opportunity for involving national stakeholders, such as some Ministries, municipalities, local authorities, research and academic institutions, NGOs and universities as

technical partners. The private sector was also tapped to participate in the project, in particular by implementing BAT/BEP, and making a shift from burning of waste to recycling or re-use. Relevant government ministries and departments, laboratories have also been involved for awareness raising activities and for the coordination of the project implementation. In particular, the *Hazardous Substances and Wastes Policy Division*, as a structural subdivision of the *Ministry of Nature Protection* of the Republic of Armenia regulates the problems dealing with chemicals and wastes. It performs the following activities:

- Develop concepts and strategy, as well as programs aimed at management of chemicals and wastes;
- Develop drafts of the legislative acts on chemicals and waste management;
- Carry out inventory of wastes generated on the territory of the Republic of Armenia;
- Analyze risks degree at enterprises, on the territory of which there is production, use of chemicals and wastes, which are potentially subject to industrial accidents, as well as inventory/accounting of a.m. enterprises;
- Coordinate activities dealing with chemicals and wastes management, as well as classification of chemicals produced and used and wastes generated on the territory of Armenia, according to degree of hazard;
- Provide expertise of Safety Passports for the hazardous industrial entities.

1.3 Overview of the Project

5. The main objective of the project was the reduction of UP-POPs releases from open-burning sources in Armenia through the introduction of BAT and BEP; at the same time, the project also aimed at creating capacity within both the Government and private sector on BAT/BEP implementation. The expected outcomes and outputs are given below.

Project component	*Expected Outcomes*	*Expected Outputs*
1. Regulatory framework and institutional strengthening	National regulatory and enforcement infrastructures in place to assure continuous release reduction of Annex C POPs from open burning sources	1.1: Waste management regulatory framework updated 1.2: Adequate management capacity built in implementing BAT/BEP and waste management practices 1.3: Adequate capability strengthened in monitoring activities and in evaluating and reporting data of U-POPs releases
2. Promotion of BAT/BEP at selected demonstration locations	Annex C POPs releases into the environment are gradually reduced from open burning activities	2.1: Cost and benefits of the available BAT/BEP measures for reducing Annex C POPs releases from open burning assessed 2.2: Pilot demonstration activities carried out in a selected site promoting waste reduction, re-use, recycle and BAT/BEP implementation

3. Awareness and dissemination	Project activities are sustainable and replicated	3.1: Awareness raising campaigns implemented 3.2: U-POPs from open burning and chemical safety of waste management related matters incorporated into educational curricula

6. Project factsheet is given below:

Project title	Implementation of BAT and BEP for reduction of UP-POPs releases from open burning sources in Armenia
UNIDO ID	150063
GEF Project ID	5038
Region	Europe and Central Asia
Country(ies)	Republic of Armenia
Project donor(s)	GEF
Project implementation start date	1st September 2015
Expected duration	24 months
Expected implementation end date	31 December 2018
GEF Focal Areas and Operational Project	GEF-5: POPs CHEM-1
Implementing agency(ies)	UNIDO
Executing Partners	Ministry of Nature Protection of the Republic of Armenia
Cooperating agency:	Waste Research Center[1] - State Non-commercial Organization.
GEF project grant (excluding PPG, in USD)	853,000
Project GEF CEO endorsement / approval date	15 March 2015
UNIDO input (in kind, USD)	40,000 (cash) + 60,000 (in-kind)
Co-financing at CEO Endorsement, as applicable	3,388,420 (cash + in-kind)
Total project cost (USD), excluding support costs and PPG	4,241,420
Mid-term review date	September 2017
Terminal evaluation date	December 2018 – March 2019

1.4 Project Implementation Arrangement

7. The implementation arrangement proposed in the project document was the following:

[1] As a result of reorganization within the MoNP, WRC and three other units of MoNP were merged to form the new entity Environmental Monitoring and Information Center (EMIC)

8. UNIDO was the GEF implementing agency for the project, it was responsible for overall project implementation. A National Project Officer was appointed to undertake full coordination with the Project Management Team (PMT).

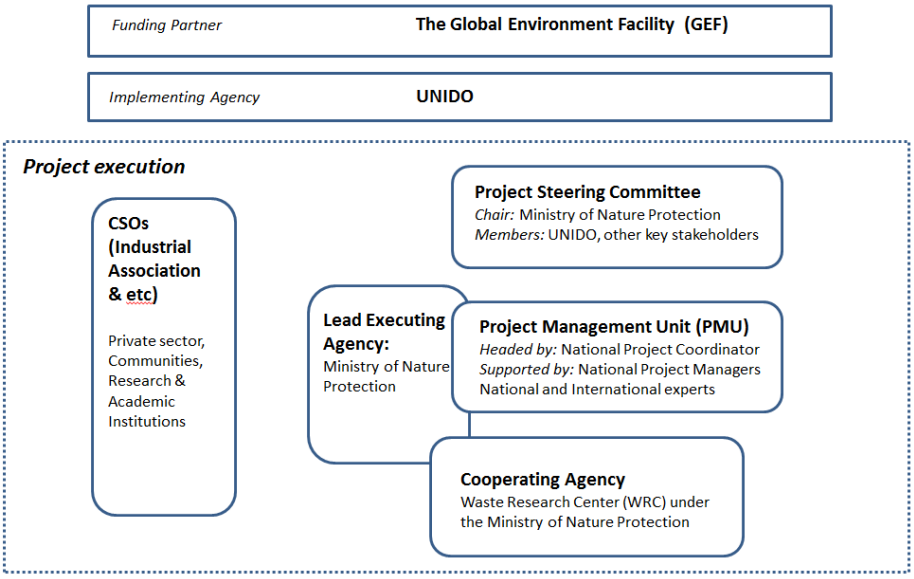
9. The Hazardous Substances and Waste Policy Division (HSWPD) of the Ministry of Nature Protection (MoNP) of the Republic of Armenia was the executing agency for the project as it is the national focal point for the Stockholm Convention in Armenia. It was responsible of the day-to-day management of the project.

10. The Environmental Monitoring and Information Center (EMIC), successor of the Waste Research Center (WRC), is a state non-commercial organization at the Ministry of Nature Protection of the Republic of Armenia. EMIC was the cooperating agency which entered into contractual arrangements with UNIDO to perform specific activities in the project. EMIC was engaged in the development of scientifically based recommendations aimed at implementing the most appropriate measures in minimizing open burning activities in dumpsites and in the adoption of the BAT/BEP at dumpsites/landfills. At the same time it was involved in the development of the manuals for landfill operation and control and in the assessment of the proposed solutions to decrease the risks for the population. Finally, EMIC was engaged in the process of taking samples of different environmental media for further analyses.

11. The Ararat Communal Service under Ararat municipality was responsible for the execution of the demonstration activities under Component 2 with the supervision of HSWMD and UNIDO.

12. A Project Management Team (PMT) was established within MoNP to ensure adequate organizational structure and to facilitate day-to-day monitoring of implementation progress based on the project's annual work plan and its indicators. The National POPs Focal Point was nominated as the National Project Coordinator (NPC) and was responsible to lead the PMT. The latter was supposed to regularly inform UNIDO of any delays or difficulties faced during implementation so that appropriate support or corrective measures could be adopted in a timely and remedial fashion.

13. A national Project Steering Committee (PSC), chaired by NPC was established and comprised of representatives from relevant ministries, UNIDO and other relevant stakeholders. The members of the PSC were finalized during the project inception phase. The PSC planned to hold its regular sessions twice a year throughout the project implementation, but additional meetings could be held if necessary. A Technical Working Group (TWG) may also be formed to discuss technical issues that may arise during project implementation. The TORs of both PSC and TWG would be formulated and agreed during the project inception phase. The TWG would include a representative from the MoNP and the NPC. The structure of the project management structure is given below.



1.5 Theory of Change

14. No explicit theory of change (ToC) was proposed for the project, however the project document (including the logical framework) contained enough information for the reconstruction of the ToC (Annex 4) that describes how the project was expected to contribute to put in place necessary preconditions for impact in the long term.

15. The ToC (Annex 4) developed by the evaluation proposes that in order to bring about behavioral changes for effective impact in Armenia, it is critical that a set of necessary preconditions are achieved. Indeed, for the protection of the health of the population and the environment of Armenia against the hazardous effects of polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs), it is necessary (1) to update and strengthen the national regulatory framework for the sound management of wastes. Abilities to bring about change would be accomplished by (2) building capacity for sound management of wastes and by (3) adapting best available technologies (BAT) and adopting best environmental practices (BEP) to eliminate the emissions of PCDD/Fs at landfill sites. Finally, it is necessary that (4) awareness is fully raised at all levels regarding risk exposure to PCCD/Fs and the corresponding health hazards.

16. The project has greatly assisted Armenia to put in place these preconditions. However, these preconditions are not sufficient for effective impact. The evaluation has identified three necessary intermediate states that need to occur for impact. These are (see Annex 4): (1) Capacity to implement and replicate sound waste management system in place; (2) Support and incentive to implement sound waste management system in other regions; and (3) Implementation of National waste strategy (2017 – 2036) and corresponding action plans. One of the key components of the project was to build capacity for sound management of waste; it is vital that this built capacity is adequately used to enable replication in other regions of Armenia. For this replication, it is vital that appropriate support (both technical and financial) and incentive are in place in Armenia that would contribute to convince provinces and regions to adopt these sound management technologies and practices for management of waste in the context of the 2017 –

2036 national strategy that has already been adopted, and is being implemented across the country.

17. Many important assumptions were made during the design of the project. High ownership and the commitment of Armenia to fulfill its obligations towards the Stockholm Convention was one of the main ones. This assumption proved to be correct as the project got strong support from the government and high ownership was seen among the national stakeholders. The other key assumption was that local authorities are willing to participate and invest to implement BAP/BEP for waste management. This also proved to be correct as initiatives for the sound management of wastes are being implemented in Yerevan and in the Gegharkunik and Kotayk provinces.

1.6 Evaluation methodology

18. The terminal evaluation was conducted in accordance with the UNIDO Evaluation Policy[2], the UNIDO Guidelines for the Technical Cooperation Programme and Project Cycle[3], the GEF Guidelines for GEF Agencies in Conducting Terminal Evaluations[4], the GEF Monitoring and Evaluation Policy[5] and the GEF Minimum Fiduciary Standards for GEF Implementing and Executing Agencies[6].

19. A participatory approach that sought to inform and consult with all key stakeholders of the project was used. The evaluation team consisted of Nee Sun Choong Kwet Yive, international consultant, and Artak Ter-Torosyan, national consultant.

20. The evaluation was carried out from December 2018 to April 2019. The theory of change approach was used to identify causal and transformational pathways from the project outputs to outcomes and longer-term impacts, and drivers as well as barriers to achieve them. In particular the extent to which the project contributed to conditions necessary to achieve the overall objective of the project was assessed using this approach.

21. A combination of methods was used to deliver evidence-based qualitative and quantitative information from various sources: desk studies, individual interviews, focus group meetings and direct observation. In preparing for interviews and visit in Armenia, the evaluation team reviewed the documentation of the project provided by the UNIDO Project Manager and the NPC. This included the project document, Project Implementation Review (PIR) reports, minutes of Project Steering Committee (PSC) and the Technical Working Group (TWG) meetings, annual and progress reports, training as well as awareness raising workshop reports. The full list of documents consulted and persons interviewed during the evaluation are given in the annexes[7]. The planning of the country mission, which took place in 11 – 15 December 2018, and the stakeholders to be interviewed were done in close consultation with the UNIDO PM, the UNIDO evaluation office, and NPC. The national consultant of the evaluation team worked closely with

[2] UNIDO. (2015). Director General's Bulletin: Evaluation Policy (UNIDO/DGB/(M).98/Rev.1)
[3] 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)
[4] GEF. (2017). Guidelines for GEF Agencies in Conducting Terminal Evaluations for Full-sized projects (Evaluation Office, Evaluation Document, 11 April 2017)
[5] GEF. (2010) The GEF Monitoring and Evaluation Policy (Evaluation Office, November 2010)
[6] GEF. (2011). GEF Minimum Fiduciary Standards: Separation of Implementation and Execution Functions in GEF Partner Agencies (GEF/C.41/06/Rev.01, 3 November 2011, prepared by the Trustee)
[7] See Annexes 2 and 3.

the NPC to schedule the interviews and the field visit at the Ararat municipality, the demonstration site.

22. Besides the use of the theory of change approach, face to face interviews and desk review of the project documentation, the evaluation developed tables (annex 5) to gather information during country visit that allowed to assess causality, explain why objectives were achieved or not, and to triangulate information.

1.7 Limitations of the Evaluation

23. No major limitations in terms of access to information was encountered. All the set of documentation relative to implementation and monitoring was made available to the evaluation. During the country mission to Armenia, which took place on 11 – 15 December 2018, it was possible to interview all the key stakeholders and partners of the project, which included the NPC, EMIC, co-executor of the project, national consultants, the Armenian Women for Health and Healthy Environment (AWHHE), NGO involved in awareness raising, members of the project steering committee, and the Mayor of the Ararat municipality. A visit at Ararat, the pilot site for BAT/BEP demonstration to soundly manage solid waste, was also undertaken, and it was possible to meet and discuss with the waste workers. On 13 December 2018, the preliminary findings and conclusions were presented[8] to the key national counterparts, who expressed their satisfaction and high appreciation of the assistance provided by the project for the sound management of waste in Armenia. The feedback and comments made by the counterparts were considered in this report.

2. Project's contribution to Development Results - Effectiveness and Impact

2.1 Project's achieved results and overall effectiveness

24. Overall effectiveness is rated as **Satisfactory**. This rating is based on: i) the extent to which the outputs have been delivered and the outcomes accomplished, and ii) the extent to which outcomes have contributed to the conditions likely to lead to the desired long-term changes.

25. The project included 24 activities that were designed to deliver 9 outputs and to contribute to 4 outcomes. 18 of the 24 activities corresponding to 7 outputs referred to 3 components that contributed to the substantive project outcomes: (i) 3 outputs were designed to strengthen the national regulatory and enforcement infrastructures to assure continuous reduction of dioxin releases from open burning sources; (ii) 2 outputs pertained to the promotion of waste reduction, re-use, recycling and BAT/BEP implementation at a selected demonstration site to reduce dioxin emissions from open burning at dumpsites; (iii) 2 outputs were planned for awareness raising activities targeting relevant stakeholders, including vulnerable groups such as women and children, and incorporating POPs in educational curricula. The remaining 2 outputs were related to project management, and monitoring and evaluation activities. The summary of ratings for the project is reported in Table 1. Note that the ratings of the activities mentioned in Table 1 for each output are those given in Annex 6. Furthermore, as explained in Annex 6, the rating for an output is based on the average rating of all the activities for that output.

[8] The preliminary findings and recommendations were shared with the national counterparts through a PowerPoint presentation.

Table 1: Rating of outputs[9] for the projects

	Output	No of activities	Rating* of activities	Rating* of Output
Outcome 1	Output 1.1	4	2 HS; 2 S	S
	Output 1.2	2	2 S	S
	Output 1.3	2	2 S	S
Outcome 2	Output 2.1	2	2 S	S
	Output 2.2	3	2 S; 1 MS	S
Outcome 3	Output 3.1	3	3 S	S
	Output 3.2	2	2 S	S
Total	7	18	2 HS + 15 S + 1 MS = 18	7 S

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

26. **Outcome 1: National regulatory and enforcement infrastructures in place to assure continuous reduction of annex C POPs releases from open burning sources**. The focus for this component was to enhance institutional capacity and technical capability of public bodies and relevant stakeholders. It encompassed a review of the gaps in the current legislation and development of policies and incentive mechanism for the adoption of waste management practices and BAT/BEP with specific connection to open burning and landfill operation. As can be seen in Table 1, all the activities have been very satisfactorily completed and outputs delivered. The key achievement for this outcome was the strengthening of the national regulation for the sound management of wastes in Armenia. The project contributed to the development of 16 legislative and policy documents related to waste management (see Annex 6), which were subsequently approved by the Government. The key documents were those related to BAT - "*Establishing criteria set forth to the best available techniques*"; (No. 666-N dated June 15, 2017)"; licensing for recycling – "*Licensing Procedures for Recycling, Treatment, Storage, Transportation and Placement of Hazardous Wastes in the Republic of Armenia*" (1029-N dated September 27, 2018); and strategy on "*Concept for Extended Producer (Importer) Responsibility Regarding Manufactured Products" (*Annex 1, Protocol Decision of the Government of the Republic of Armenia - No. 14 dated April 12, 2018) and its Appropriate Action Plan for 2018-2020 (Annex 2, Protocol Decision of the Republic of Armenia Government - No. 14 dated April 12, 2018).

27. For this component, proposal for landfills proper management and operation was done by an international expert recruited by the project. In particular, based on studies made by national consultants, the international expert proposed a number of key procedures that included best practices notably (i) Procedure comprising strategic elements for reducing biodegradable waste going to landfill; (ii) Procedure to facilitate an application and permit system for waste disposal; (iii) Procedure for introducing waste acceptance practices; (iv) Procedure for introducing control and monitoring procedures for landfill operation, closure and aftercare; (v) Landfill best practices and proposed regulatory framework; and (vi) Landfill operations guidance manual.

28. Adequate management capacity in implementing BAT/BEP and waste management practices has also been built through a two-day training workshop that was held on 21 – 22 July 2016 in Yerevan, and targeting local authorities. 51 participants coming from ministries, territorial (regional) subdivisions of state environmental inspectorates, municipalities and regional administrations attended this workshop. Local capacity in sampling and analysis methods of UP-POPs was also adequately strengthened. In particular, the Head of Division of waste inventory,

[9] See annex 6 for detailed rating of activities and outputs

classification and technology investigation of EMIC attended a training course at the Research Center for Toxic Compounds in the Environment (RECETOX) of Masaryk University, Brno, Czech Republic. RECETOX is a research center of excellence on toxic compounds in the environment, and it is hosting the Regional Centre for Capacity Building and the Transfer of Technology in the Central and Eastern Europe for the Stockholm Convention on POPs. Since 2008, RECETOX has been actively involved in the Global Monitoring Plan (GMP) on POPs for the effectiveness evaluation of the Convention[10]. It was under the guidance of the RECETOX that the personnel of EMIC collected air and soil samples at the Ararat landfill demonstration site. The testing of these samples (requiring HRGC-HRMS[11]) for POPs was done by RECETOX, and the analysis of the results obtained was done by EMIC using an adequate modelling software.

29. **Outcome 2: Annex C POPs releases into the environment are reduced from open burning activities.** Under this outcome also[12], all the outputs have been satisfactorily delivered (see Table 1). Preliminary evaluation of dioxin releases and risk assessment study for the current practices of open burning at the Ararat dumpsite were adequately done. Two campaigns of air and soil sampling under the guidance of RECETOX were done by EMIC. Appropriate representative samples were collected, and analyzed for PCDD/PCDFs at RECETOX.

30. Economic and technological study on the potential reduction of UPOPs after BAT/BEP implementation at the demonstration site was satisfactorily undertaken by a national expert. The study covered key issues and included the following: (i) Analysis of waste generation - types, morphological composition, and seasonal characteristics, (ii) Consideration of environmental damage done to the environment due to direct disposal of waste at landfills, (iii) The rationale for sorting and separating waste collection, (iv) Economic assessment of separate collection of waste with the purpose of their further processing, (v) Technical and economic feasibility of establishing a sorting line and its use at landfills of municipal solid wastes, and (vi) Reasoning for environmental benefits of applying sorting line.

31. The highlight of this component was the successful and effective rehabilitation of the selected dumpsite at the Ararat municipality to reduce dioxin emission from open burning. Before renovation works started at the Ararat dumpsite, geological assessment was done in 2016 to ensure that the rehabilitation of the dumpsite would be feasible and it would not cause harm to the environment such as polluting underground water (Figure 1).

Figure 1: Picture taken from geological assessment report (2016)

[10] Article 16 of the Stockholm Convention concerns the effectiveness evaluation of the Convention.
[11] High Resolution Gas Chromatography High Resolution Mass Spectrometry
[12] See Annex 6 for detailed rating of outputs and activities

After obtaining the appropriate Environmental Impact Assessment certificate, the renovation works started in 2017 and the project contributed to the successful implementation of the following measures:

- The site has been properly fenced with an adequate gate at the entrance.
- About three hectares of land has been levelled off and all the soil work has been completed.
- The solid waste that was previously dumped at the site was removed. A concrete cell was designed. A large pit with concrete side-walls and concrete bottom to store the remaining waste after segregation was constructed.
- A concrete cell for storing the residual waste after waste segregation and recycling has been built.
- Construction works for hosting the BAT technology have been finished (Figure 2(a)).
- The conveyor belt (Figure 2 (b)) for waste pickers has been installed, and the waste compacter (Figure 2 (c)) as well as tractor have been purchased.
- Municipality of Ararat Town has provided a new power line (Figure 2 (d) to the facility (3-phase 380 volts including a transformer), and reconstructed the main road as part of their national in-kind contribution. The municipality has also provided a new water and drainage system.

In Armenia, water distribution utility is managed by the private sector. During the construction works the ownership of the water utility changed. Veolia, a French enterprise, took over from SAUR-Armenia, and they informed the project that the former approval for water connection for the MRF had to be renewed at higher costs. This caused a few months delay in the construction.

(a) (b) (c) (d)

Figure 2: (a) Building hosting the BAT (b) Conveyor belt (c) Waste compactor (d) New power line

32. After completion of the renovation works, the personnel of the waste facility received dedicated on-site training (at the Ararat pilot site) in waste disposal management on 10 – 11 October 2018. The training that the evaluation considers adequate covered the following topics:

- Guidelines and BAT/BEP measures for environmentally sound management of wastes at open waste dumpsites and to reduce unintentional POPs releases due to open burning
- Main concepts on material recovery facilities including storage and final disposal of residues
- Basic measures to manually sort types of recyclables in a material recovery facility.
- National regulations on sanitary protection of settlements at household waste collection, storage, transportation, treatment, recycling, recovery, decontamination and burial

- Control Functions of the Health and Labor Inspection Body of the Republic of Armenia on Collection, Storage, Transportation, Treatment, Processing, Recovery, Decontamination and Burying of Consumption Wastes in Settlements

33. All the necessary documents have been prepared and signed so that the renovated landfill (or material recovery facility – MRF) become officially the property of the Ararat Municipality. In order to operate the MRF, the municipality has already applied for a "License for Recycling, Treatment, Storage, Transportation, and Placement of Hazardous Wastes", which it had not obtained yet at the time of the terminal evaluation. According to information available[13], the Ararat Municipality has already established contact with recycling companies (for textile wastes, paper, plastics, glass, and metals). Once the license obtained, the price for the recyclable wastes would be negotiated with the companies, and contracts would be concluded. When the MRF would be operational, the national authorities should consider undertaking regular monitoring to ensure that the proper procedures and best practices are applied for the sound management of wastes at the MRF.

34. **OUTCOME 3: Project activities are sustainable and replicated**. For this outcome also, all the activities have been satisfactorily undertaken (Table 1 and Annex 6). Targeted awareness raising campaigns on environmental and health hazards of U-POPs for relevant stakeholders have been successfully undertaken by the NGO AWHHE in cooperation with EMIC. The seminars specifically raised the awareness of the participants on POPs and household wastes, and they were undertaken in the cities of Hrazdan (Kotayk Province), Dilijan (Tavush Province), Stepanavan (Lori Province), and Gavar (Gegharkunik Province). A total of 95 participants (majority of women)[14] attended these seminars, during which information materials (pamphlets) developed in local language were distributed. Some titles of these pamphlets included: "Do not Burn Your Trash!" and "Wise Approach to the Problem of Household Waste Management".

35. The "Prevention of Wastes Open Burning" training workshop was held on August 1, 2017 in Yerevan to share information and experiences on good practices and to promote BAT/BEP for waste management. A total of 36 participants (17 males and 19 females) attended this workshop and they were from the Ministry of Nature Protection, Ministry of Health, Ministry of Emergency Situations, Ministry of Agriculture, EMIC, Center for Ecological-Noosphere studies, National Academy of Science, and NGOs.

36. In general during these awareness raising activities, EMIC developed a number of awareness raising tools and materials that were distributed to the participants; these included notepads, T-shirts, pens, folders and calendars. Similarly, after each workshop and training EMIC developed press releases to create wide media coverage, which are available on the following websites: (MoNP web:) www.Mnp.am; www.econews.am; www.gyumri.info; www.slaq.am, and www.newsroyal.am. Since the start of the project 18 scientific papers have been submitted for publication in proceedings of International Conferences and/or books[15].

[13] Interview with Mayor of Ararat town

[14] Although it was not possible to get the exact numbers of males and females that attended these seminars, the evaluation was informed that the majority of them were females (more than 70%).

[15] See Annex 7 for list of publications

37. In terms of mainstreaming POPs in educational curricula, the project has been quite successful. It has contributed to the development of three educational materials: (1) "*Persistent Organic Pollutants: Fate in the Environment*" (in Armenian and Russian); (2) "*Dioxins as century challenge*" (in Armenian and Russian); and (3) "*Harmful Impacts of POPs to the Environment and Human Health*" (in English). Moreover, leading universities in Armenia such as the Armenian National Agrarian University, Vanadzor State University, the State Polytechnic University of Armenia, and the Yerevan State Medical University included topics on POPs and related issues in their curricula. For example, the Post-Graduate Course "Health and Environment" of the Yerevan State Medical University includes a number of topics covering POPs such organochlorine pesticides, challenges of chemical safety and harmful impacts of POPs on human health and the environment.

2.2. Progress towards impact

38. Assessment of impact can be associated to the extent to which project interventions have brought about changes in the human condition or in the environment. Changes, whether intended or unintended, can be positive or negative. For this project, the evaluation did not find any evidence of negative impacts on human health or on the environment. For impact, there is need for behavioral changes at the level of the project beneficiaries. Behavioral changes may happen at three levels: (i) Economically competitive - Advancing economic competitiveness; (ii) Environmentally sound – Safeguarding environment; and (iii) Socially inclusive – Creating shared prosperity, which are discussed below.

2.2.1. Behavioral change

39. **Economically competitive** – Economic competitiveness refers to the ability of an economy to compete fairly and successfully in markets for internationally traded goods and services that allows for rising standards of living over time. For the project, the issue is different as it relates to the sound management of solid wastes in Armenia. Instead of competitiveness, it would rather be the economic sustainability of the MRF once it is operational. On recommendation by the MTE, a cost and benefit assessment of the MRF was done in order to ensure that the required financing for running, maintaining, expanding, and long-term monitoring of the MRF would be available. There are good indications of the long term economic sustainability of the MRF. According to information available[16], before the project, the Ararat municipality was allocating 8% of its total budget (660 M AMD)[17] for the management of solid waste, which consisted of the collection of the wastes once daily and transporting them to the dumpsite, which has now been renovated into the MRF. After the project, the municipality increased this allocation to 20% that included the operation of the MRF. The Mayor of the Ararat Municipality indicated that they are expecting to have an increase in their income thanks to the MRF. For instance, before the project, only 85% of the Ararat population (about 20,300) were paying the waste management fee (180 AMD per person per month). After the project, 100% of population are now paying this fee[18]. This is a direct impact of the project according to the Mayor, the population have more trust in the municipality for waste management. Furthermore, the neighboring municipalities (located within 15 kilometers from Ararat), which were impressed with the renovated MRF, the first of its kind in Armenia, have already contacted the Ararat municipality to manage their wastes. The Ararat municipality is currently working to conclude business agreements with these neighboring municipalities, and which would be a very good opportunity to generate significant

[16] Interview with the Mayor of the Ararat Municipality
[17] AMD: Armenian dram; 1 USD = 485 AMD
[18] Representing an increased income of about 6.6 M AMD annually (20,300 x 0.15 x 12 x 180 = 6577200 AMD)

income. Once the MRF is operational, the Ararat municipality would also be able to generate some income by selling recyclable wastes at agreed prices to recycling companies, who have been contacted already. The municipality has already a contract with the recycling company Eco-engineering for plastic bottles collection at a selling price of about 60 AMD/kg.

40. **Environmentally sound** – The key change that occurred thanks to the project interventions is the complete stop of open burning at the selected landfill (see Figure 3(a) and (b)). According to the project document, open burning was due to fires set by some scavengers and also that happened spontaneously and unintentionally during summer, and a lot of ash is spread all over the place at the dumpsites. Only once per year that the municipality sent a truck with water to wash the waste in order to extinguish fires, and the municipality did not have any allocated budget to purchase soil and cover the waste daily to drastically reduce the open burning events. It was estimated that 30% of the wastes were burned through these open fires. Using the UNEP toolkit[19], it was calculated that about 230.75 mgTEQ[20] were being emitted annually to the environment at the selected dumpsite. With the implementation of the project, accidental burning of wastes has completely stopped, and given that the MRF would be managing all the wastes generated in Ararat, dioxins will no longer be emitted to the environment. The project also contributed to the safety and well-being of the workers. Before the renovation, the workers were not using any personal protective equipment (PPE), and they did not have any place (building) to protect themselves from the weather (sun, rain or snow) or to take a shower. The project has provided them with the adequate PPE (e.g. gloves, boots and mask) and appropriate clothes - overalls (Figure 3(c)). The construction of the MRF included a building dedicated for the workers (Figure 4). This building was not included in the design (contract), but at the request of the project the contractors agreed to include it without any additional costs.

(a) (b) (c)

Figure 3: (a) Before renovation, open burning[21] (b) After renovation, no open burning (c) Worker wearing PPE

[19] Standardized toolkit for the identification and quantification of dioxins and furan releases. Edition 2.1, December 2005, UNEP Chemicals

[20] TEQ: Toxic Equivalent is a unit to express the level of dioxins and furans in the environment.

[21] Picture taken from project document

Figure 4: Building for workers

41. **Socially inclusive** – All the workers (7 in total) recruited to work at the MRF come from the communities living in the nearby areas of the landfill. They are very satisfied with the project. Their conditions of work have very much improved; they are better equipped to do their job (appropriate PPE and clothes), and they are no longer exposed to the fumes of the burning wastes. With the construction of the building dedicated for them (Figure 4), they have a place to rest or to take their meals. Furthermore, in summer when it can get very hot (above 35 ^{0}C), they can take a shower after work, or they can stay inside when the weather is bad (raining or snowing).

42. According to information available, the Ararat municipality has organized four public hearings for the citizens. The citizens were very happy that the municipal waste management problems would be resolved by the project. The people living near the demonstration site were also reached by the project, and they were also very satisfied with the project. In particular, they are no longer troubled by the fumes and bad odors coming from the landfill.

2.2.2. Broader adoption

43. This section addresses the catalytic effect of the project that relates to the extent to which the project' interventions have been adopted within the country, or beyond the domains and scales originally targeted. Overall, the project has performed well, and the achievement of the project objective to reduce UP-POPs releases in open burning sources at the Ararat pilot demonstration landfill site has already been achieved (Section 2.2.1). This has been done through the implementation of BAT/BEP at the landfill site. The question is whether mechanisms are in place for the continuation of process adoption to bring about behavioural changes at broader scales after the project. The three mechanisms frequently used to promote the broader adoption of project interventions and innovations are: mainstreaming, replication and scaling-up.

44. **Mainstreaming** occurs when information, lessons or specific results generated by the project are incorporated into broader institutional mandates and operations such as laws, policies, regulations and programs. The evaluation found sound evidence that mainstreaming has taken place in the country. This concerns mainly the 16 legal acts, regulations and policies - linked to chemicals, waste management issues (including re-use and recycling) and establishment of BAT/BEP criteria – which the project has contributed greatly in their elaboration, and that have already been adopted by the government for most of them (see Annex 6). The project was implemented in the context of the country's solid waste management strategy, which was adopted by the government in 2014, and which envisaged building a total of six regional landfills to cover the whole country. It is anticipated that these legal acts, regulations and policies would be adopted and enforced by the national and local authorities.

45. **Replication** occurs when the initiatives, technologies or innovations supported by the project are reproduced or adopted on a comparable scale. The evaluation has found evidence of replication efforts in the country. With the financial assistance of the German bank, KFW, (5.5 M Euro as grant and 5.5 M Euro as loan), a sanitary landfill is under construction (2016 – 2020) to manage the municipal waste of the Gegharqunik and Kotayk marzs[22]. Similarly, another sanitary landfill is being constructed in Yerevan (2018 – 2021), the Capital City of Armenia. For this construction, financial assistance was secured from the European Bank for Reconstruction and Development (16 M Euro as loan and 10 M Euro as grant). Finally, feasibility studies are being carried out to build sanitary landfills and transfer stations for the Syunik, Shirak, Lori and Tavush marzs.

46. **Scaling-up** takes place when the project-supported interventions are implemented at a larger scale. These can be administrative, geopolitical, ecological or business scales. Initiatives that are scaled up are often expanded or adapted to accommodate new aspects or concerns relative to the new scales. Given that the landfills under construction (see previous paragraph) would be managing waste at provincial level (Population: Lori: 225,000; Shirak: 243,000; Syunik: 139,000, Tavush: 125,000 and Yerevan: 1,073,000)[23] as compared to the pilot landfill for the Ararat municipality with a population of about 22,000, these replication initiatives can also be considered as scaling-up efforts.

47. The project has produced very tangible results such as dioxins are no longer emitted at the renovated landfill site, laws and regulations for the sound management of wastes drafted and adopted, and better working conditions for the waste workers. Given also that broader adoption of project results are already taking place, the overall rating on effectiveness is **Satisfactory**.

3. Project's quality and performance

3.1. Design

48. The development of the project was participatory. It was based on the discussion with national counterparts, and their views and recommendations were taken into consideration in the design of the project document. The project was formulated to take into consideration national and local priorities and strategies. In particular, the project was designed to address some of the priorities listed in the National Implementation Plan on POPs for Armenia. The formulation was also done taking into consideration the on-going activities, which served as baseline for the project intervention.

49. The project had a clear thematically focused development objective, namely, to reduce UP-POPs releases in open burning sources in Armenia through the introduction of BAT/BEP and create capacity within the government and private sector on BAT/BEP implementation. The project was designed to address the identified problems, gaps and barriers. The components and interventions included in the project were adequate and relevant to the achievement of the proposed objectives. The outcomes were also sufficiently clear to help guide project implementation. Besides the project management and M&E component, it included 3 substantive outcomes. The first outcome looked at legislation and policy framework to integrate BAT/BEP

[22] A marz is the name given to a province in local language.
[23] Population figures taken from: https://en.wikipedia.org/wiki/Administrative_divisions_of_Armenia

principles into the regulatory infrastructure. The second outcome encompassed technology transfer to demonstrate BAT/BEP in municipal waste management and disposal. Finally, the third outcome addressed awareness-raising activities to assure sustainability and replication of the project interventions.

50. The logical framework approach methodology was adopted, which led to the establishment of the Logical Framework Matrix (LFM) that included the main elements of the projects: overall objective, outcomes, and outputs. The LFM included adequate indicators and means of verification for each of the outputs that allowed for proper monitoring of progress and tracking of results. Realistic assumptions and potential risks were also mentioned in the LFM. The timeframe provided in the project document was adequate to undertake the planned activities. Similarly, a list of entities responsible for each of the activities / outputs was proposed in the project document. However, the midterm evaluation highlighted that the project document could have been more explicit regarding activities to be undertaken at the landfill pilot site. The document stated that the construction of the MRF facility was to be financed by the GEF budget, but for the fencing around the facility the project document stated: "*may be carried out and funded by the Municipality".* This created some confusion at the start of the project and it was finally agreed by all partners / stakeholders that the studies, designs, construction and the supervision of the construction of the MRF would be financed from the GEF budget, while the renovation of the road that leads to the MRF, and the development of the utilities like electricity, water and sewage would be financed by the Municipality.

51. Project Design is rated **Satisfactory**.

3.2. Relevance

52. The project is highly relevant as it is assisting Armenia to fulfill its obligations towards the Stockholm Convention. The project is particularly relevant with the challenges facing Armenia for the management of waste in general and municipal waste in particular is very important. There are more than 400 illegal dumpsites in the country where open burning happens regularly. Improving waste management system in Armenia is therefore on the top list of the national development agenda. Interview data with the national stakeholders confirmed the high relevance of the project. They stated that this would be the first landfill/MRF in Armenia that would have an official and legal operational permit. According to the Mayor of Ararat Town the project has a very strong and positive impact on the life of people of Ararat. Before the intervention often the wind blew dust from the cement facility, bad odor and ash from the dump to the city. The project would significantly improve the livelihood of the citizens, and this alone would ensure strong commitment at the local level.

53. Project outcomes are consistent with the operational program strategies of the GEF[24]. 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, amongst the objectives to be achieved included: strengthening capacities for National Implementation Plan (NIP) implementation, especially assisting those countries that lag farthest behind to establish basic, foundational capacities for sound management of chemicals. GEF-5

[24] Focal Area Strategies and Strategic Programming for GEF-5, May 12, 2010. GEF Policy Paper, October 2007.

encompassed an increase of 25% of resources for the POPs focal area compared to the GEF-4 allocation of $300 million, to continue work in support of the objectives of this focal area. The project that aimed at reducing the releases of Annex C POPs via legislation, capacity building and technology transfer, to enable Armenia to comply with its obligations set out in the Stockholm Convention, is fully in line with these GEF objectives in the POPs Focal area. Moreover, this project would lay a sound foundation to fulfill Armenia's commitments, and would support its waste management regimes, which in turn would contribute to protect human health and environment from the threats of POPs.

54. The project is also in line with UNIDO priorities and the renewed mandate on Inclusive and Sustainable Industrial Development (ISID). UNIDO's Mission Statement (IDB.39/13/Rev.1) includes safeguarding the environment – "UNIDO aspires to reduce poverty through sustainable industrial development. We want every country to have the opportunity to grow a flourishing productive sector, to increase their participation in international trade and to safeguard their environment", and reiterates the flexible UNIDO approach for ISID – "Differentiate and adapt our approaches and methodologies according to the needs of countries at different stages of development".

55. One of the pillars of the ISID is "Safeguarding the Environment - environmentally sustainable growth, via cleaner industrial technologies and production methods, including in the fields of waste management and recycling; 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 developing countries to protect their populations and their environmental resources from POPs-related pollution".

56. Given that the project is responding to the needs Armenia regarding waste management to reduce UP-POPs emissions, and it is fully in line with GEF Chemicals Focal area and UNIDO mandates, rating on relevance is **Highly Satisfactory**.

3.3. Efficiency

57. The CEO endorsement date was 18 March 2015 and project implementation started officially at UNIDO in June 2015. Project was planned to have a duration of 2 years ending in June 2017. However due to delays, two extensions were granted to allow for completion of project activities, and the project closed in December 2018. A mixed mode of project execution was adopted to execute the project. While the ex-Water Research Center (now the Environmental Monitoring and Information Center) was sub-contracted to execute some components of project, in particular the renovation of the selected landfill (construction of MRF), other activities such as the recruitment of national and international consultants and the procurement of goods were directly executed by UNIDO. This modality of national procurement process for the construction of the MRF proved to be very efficient. As stated by the midterm evaluation, compared to similar projects where procurement was with the implementing agency, this project was very cost efficient. The project had used approximately 280 000 USD from the GEF grant to build the MRF, while in other projects just the planning of a landfill would cost more than 100 000 USD. The construction was also very effective. The planning, including EIA, all the geological and environmental surveys, and the construction was finished in 14 months which is considered fast and efficient.

58. Factors favoring efficiency included the adequate technical assistance provided by the project. As reported by the midterm evaluation, interview data evidenced that project partners were very satisfied with the inputs provided by the UNIDO HQ. No issues were reported regarding communication with the UNIDO PM; communication was regular and in case of queries, the UNIDO PM could be contacted via e-mail or telephone easily; and the queries were answered very fast. Technical assistance was also provided by international experts who undertook several field missions during the project life. As evidenced during the field mission[25], the national partners were very satisfied with the inputs of these experts. According to UNIDO internal procedures international experts have to report to the backstopping UNIDO PM. They are also required to debrief national counterparts on the findings and recommendations they concluded during their assignments. However as these debriefings are not usually recorded therefore the impact of these recommendations is low. The midterm evaluation recommended that international experts should also report to the national counterpart organizations.

59. The materialization of significant co-financing also contributed to the successful completion of project activities. As can be seen in Table 2, 97.9 % of the total planned co-financing materialized. In particular, the contribution of the Ararat Municipality was used for the following activities at the landfill site: (i) to renovate the access road to the waste dumpsite; (ii) to perform activities at the dumpsite such as collection of burying sharp, barbed articles, containers of chemical substances and chemicals; (iii) to level off some parts of the site; (iv) to assist in electricity supply system laying (Figure 2 (d)); (v) to assist and participate in water-supply system laying; (vi) to ensure further uninterrupted functioning of the waste-dump and its compliance to the Republic of Armenia legislation; (vii) to assist in arrangement of public hearings on design and/or financial documents for waste-dump renovation and infrastructure construction; and (viii) to assist in awareness-raising among the community population. The National Project Coordinator and the National Project Manager were from the MoNP, and their salaries, which were paid by MoNP, are included in the figures reported in Table 2.

Table 2: Co-financing

*Including contribution from EMIC/WRC **Project funded by Poland not undertaken

Source of co-financing	**Co-financing at design**	**Co-financing materialized**	**% materialized**
	Cash + In kind ($)	**Cash + In kind ($)**	
Ministry of Nature Protection*	500,000	712,000	142.4
Ararat Municipality	443,460	371,134	83.7
UNIDO	100,000	100,000	100
Asian Development Bank	750,000	750,000	100
RECETOX	300,000	300,000	100
Bureau for Chemical Substances Poland**	210,960	-	0
European Union Framework of the European Neighborhood and Partnership Instrument	1,084,000	1,084,000	100
Total	**3,388,420**	**3,317,134**	**97.9**

60. Project implementation faced significant delays mainly due to a structural reform that occurred at the level of MoNP in November 2016 and that affected its external units, WRC being

[25] Interview with key partners that included the MNP and Ararat Mayor during the evaluation mission in Armenia

one of them. The Government Decision No.1277 of December 15, 2016 merged the four legal entities namely the Waste Research Center (WRC), the Center of Environmental Monitoring, the Information Analytical Center, and the Hydrogeological Monitoring Center into a newly established organization called Environmental Monitoring and Information Center (EMIC), a State Non-Commercial Organization (SNCO). The reorganization was finalized in April 2017. During this period the WRC was not fully functional. There was no official director to lead the organization. After the registration of the new entity the company seals were developed, and their registration took a month. There was also a change in the directorship in the first month of operation which also caused some delays. These delays severely impacted on the signature of contract between UNIDO and EMIC/WRC, the national executing agency. UNIDO published a request for offer on 18 December 2015 to subcontract project related technical tasks (landfill renovation) to WRC. WRC submitted its proposal on 25 January 2016. Based on the proposal, a terms of reference (ToR) was developed by UNIDO (dated 17 February 2016), and which provided a legal ground for UNIDO and WRC to enter into a contract on the 1 March 2016. The deadline for completion of the tasks stipulated in the contract was 1 March 2018, well after the closing date of the project, which was June 2017. Due to the reorganization within MoNP, an amendment was developed to the contract that changed WRC to EMIC SNCO, the new legal entity that took over the rights and responsibilities of WRC. This amendment was signed by UNIDO on 29 May 2017 and on 2 June 2017 by the SNCO and MoNP.

61. There were delays also due to technical reason. Because of a very strong and long winter, the landfill construction works could not start on time. These bad weather conditions also delayed the collection of water samples for dioxin and furan analysis. Finally, as mentioned previously (Section 2.1 under Outcome 2), water connection at the MRF caused a few months of delay due to change of ownership of the water utility. Given the delays encountered by the project, the midterm evaluation recommended a one year extension that was eventually granted.

62. The delays did not affect the cost effectiveness of the project. All the outputs were satisfactorily delivered. Table 3 reports the expenditures of GEF funds for the project. Moreover, the delays did not also increase the project management costs (GEF funds) as the salaries of the NPC and the NPM were paid by the MoNP. While the figures (Table 3) appear adequate in terms of expenditure per item (budget line), it is very difficult to reconcile these figures with those of the project document for which allocation of funds was per component (or output/activity).

Table 3: Total expenditures*– GEF funds only

*Figures provided by UNIDO

Budget line	Released budget ($)	Expenditures ($)	Available budget ($)
Staff & International Consultants	71,698.58	62,505.33	9,193.25
Local travel	12,806	15,319.25	-2,513.25
National Consultants / Staff	286,144.92	289,705.98	-3,561.06
Contractual Services	470,629	472,445.98	-1,816.98
Training/Fellowship/Study	1,402.14	1,402.14	0
Equipment	1,120.75	1,120.75	0
Other Direct Costs	9,198.61	5,798.43	3,400.18
Total	**853,000**	**848,297.86**	**4,702.14**

63. Given that cost effectiveness of the project was not affected by the delays and quality outputs have been satisfactorily delivered, the rating on efficiency is **Satisfactory**.

3.4. Sustainability

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

65. **Sociopolitical risks** – The project is highly relevant as emphasized by all the stakeholders during the interviews. Armenia is party to many multilateral environmental agreements and is fully committed to fulfill its obligations towards them. Moreover, solid waste management is a high priority in Armenia, and a national strategy has been adopted in 2014 (see Section 2.2.2 under Mainstreaming). The previous and current governments have demonstrated high ownership of the project; there is no particular reason why this would change in the future given the replicating activities taking place in the country. For these reasons, sociopolitical risks are considered low.

66. **Financial risks** – Financial risks are also considered low. The Communal Service of Ararat Town will be responsible for running the MRF. To ensure that the required financing for the operation of the MRF would be available, a cost and benefit study was done. As already mentioned, there are indications that financial sustainability would be likely (Section 2.2.1 under Economically Competitive). The Municipality of Ararat has increased its allocation for solid waste management (including running of the MRF) from 8% to 20% of its total budget. The Municipality of Ararat is also expecting to generate significant income from the management of household wastes of nearby municipalities, with whom it is concluding business agreements. Since a number of years, the global prices of secondary raw materials are increasing, which really supports recycling. The MRF is also expected to generate income from the sale of segregated wastes to recyclers. Simultaneously, the amount of waste to be stored would be reduced, thus the landfill can operate longer. These information already indicate that there would already be immediate returns on investment that would contribute to financial sustainability of the MRF, which would in turn ensure sustainability of project outcomes and results. As recommended by the MTE, the MRF will be open for the public as a buy-back center for segregated wastes. With this a much higher segregated waste quality could be achieved than through sorting of incoming mixed waste. This initiative would not only reduce costs for handling and sorting at the MRF, it would also prepare citizens, enterprises and other waste generators for the next level of waste management – segregation at source.

67. **Institutional framework and governance risks** – As reported in the Section 2.1 under Outcome 1, the project has significantly contributed to the strengthening of the national regulatory and enforcement infrastructures for the sound management of wastes in Armenia. In particular, 16 legislative documents pertaining to BAT, ownership of wastes and licensing have been produced and adopted by the government. The merging of four organizations into EMIC (within the MoNP) in view to re-organize resources more efficiently for the better management of environmental issues would suggest sustainability of institutional framework[26]. With training

[26] Interview data with MoNP

provided by RECETOX, the laboratory of EMIC has been strengthened for sampling and monitoring of POPs, which also provides for sustainability. For these reasons, institutional framework and governance risks are considered low.

68. **Environmental risks** – The project is considered ecologically sustainable as it has been designed to build the capacity of Armenia for the sound management of solid wastes and reduce the emission of UP-POPs. Furthermore, as no environmental risk that can influence or jeopardize the project outcomes and future flow of project benefits has been identified, environmental risk is considered low.

69. Given that all four types of risks are low, sustainability of project outcomes and results is rated **Likely**.

3.5. Gender mainstreaming

70. By reducing the emissions of dioxins at the selected landfill in Ararat, the project also reduced risks that specifically affect women and the youth. Dioxins are highly toxic chemicals that pose risks to all human populations; they cause many health problems such as damage the immune system, interfere with hormones and can cause cancer. Once absorbed by the body, dioxins last a long time due to their chemical stability and their ability to get absorbed in fat tissues, where they are stored in the body. Their half-life in the body is estimated to be several years and up to decades for some congeners. Dioxins can also cause birth defects[27], and males are affected as well, as their sperm counts are reduced as a result of exposure to POPs[28].

71. According to data compiled by project management, involvement of women in the different project activities such as inception workshop, training courses and awareness raising workshops has been quite satisfactory. As can be seen in Table 4, a total of two hundred and twenty seven persons attended the different events, of which one hundred and twenty were males and ninety eight were females. They came from different government agencies, public and private sectors, academia, and local authorities. Except for events No2, No6 and No7 (Table 4), for which the participation of males was much higher, and which is comprehensible given the nature of the activity, participation in the other events in terms of gender was somewhat similar. Note that the NPC was a woman and the awareness raising and dissemination activities was sub-contracted to the NGO “Armenian Women for Health and Healthy Environment”.

72. Rating on gender mainstreaming is **Satisfactory**.

Table 4: Gender participation in project activities*

Event	No of Participants	Ratio: men / women
1. Inception workshop	**35**	**15 / 20**
2. Training course on Solid Waste Management Application of BAT and BEP	**36**	**28 / 8**
3. Awareness raising workshop	**34**	**18 / 16**
4. Workshop on Strengthening the Regulatory Framework	**35**	**17 / 18**

[27] Toichuev, et al.. 2017b. “Organochlorine Pesticides in Placenta in Kyrgyzstan and the Effect on Pregnancy, Childbirth, and Newborn Health.” *Environ Sci Pollut Res*. https://doi.org/10.1007/s11356-017-0962-6.
[28] Galimova EF, Amirova ZK, Galimov SN (2015) "Dioxins in the semen of men with infertility". Environ Sci Pollut Res Int. 22(19):14566-14569.

5. Training workshop on Prevention of Open Wastes burning in Yerevan	**36**	**17 / 19**
6. Training workshop on Prevention of Open Wastes burning in Ararat town	**33**	**22 / 11**
7. Training for Staff engaged in landfill management in Ararat	**18**	**12 / 6**
Total	**227**	**129 / 98**

*Actual total number of participants was more, only number of trained persons in training events reported

4. Performance of Partners

4.1. UNIDO

73. Implementation is rated as **Highly Satisfactory**. According to information available, the project was very efficiently managed by the UNIDO PM. For example, after submission of the required report to UNIDO, funds transfer was quite fast. Generally, EMIC/WRC would receive the corresponding instalment within three working days. Similarly, no issues were reported regarding communication with the UNIDO PM. The national counterparts confirmed that the UNIDO PM could be contacted via e-mail or telephone easily; and queries were answered very fast. However, according to the midterm evaluation there was a misunderstanding between UNIDO and EMIC/WRC, the executing entity on the exact date of the start of the project. According to UNIDO the project starts when the budget is instituted in the SAP system, which was in June 2015. For the national counterpart, the project started on the 2nd of September 2015, the date of the Inception Workshop, which was attended by the UNIDO PM. There is need for the implementing agency to better communicate the project start date to countries especially for projects with very short duration (less than 3 years). Nevertheless, in general all the national stakeholders interviewed during the evaluation mission greatly appreciated the support and guidance provided by the UNIDO PM. On the other hand, the role of the UNIDO Country Representative (CR) was quite limited, just participation to project activities such as inception workshop, awareness and training workshops. The Country Office could be more involved such as promoting the project during the preparatory phase to attract potential donors in order to mobilize additional funding or promote the project results for follow up initiatives.

4.2. National counterparts

74. National execution is also rated **Highly Satisfactory**. The project was hosted at the Ministry of Nature Protection from which a NPC was nominated. As planned the PMT was established at the start of the project and was kept simple. It was constituted by the NPC, who was the lead person, the NPM who was from EMIC, the executing agency, and supporting staff from the MoNP. According to feedback and confirmed during the evaluation mission, the NPC managed the project with strong hands. She has a strong personality, and has vast experience in project implementation and in organizing the work of experts. Furthermore, given her long experience in the government services, she is well known among the different ministries that were involved in the project, and this greatly facilitated the execution of project activities. The PMT performed very well and coordinated project activities very efficiently as evidenced by the short time required to complete the construction of the MRF. Indeed, the development of all the tender documents for the design of the MRF including a municipal landfill cell, the construction, and supervision of works, reception of all regulatory approval for the construction, conduction of an EIA, and construction of the MRF facility were finished within one year. Compared to other initiatives of this kind elsewhere, this was very fast, which highlights the good coordination, and high ownership and commitment of the national counterparts. In particular, the high involvement

of the Ararat Municipality was instrumental in the rapid and successful construction of the MRF. It contributed significant co-finance and facilitated all the processes such as providing quickly all necessary data regarding the selected dumpsite and providing for connection to water supply and electricity, and construction of road to the landfill.

4.3. Donor

75. GEF was the main donor for the project. The funds were available and transfers were timely and adequate. Rating is **Satisfactory**.

5. Factors facilitating or limiting the achievement of results

5.1. Monitoring & evaluation

76. **M&E Design.** The project document included a detailed costed M&E plan. The plan described the necessary activities for monitoring progress as well as the responsible parties for reporting. These included the inception workshop, PSC meetings, annual reviews for progress reporting, Project Implementation Reviews (PIR) for reporting to the GEF, a terminal report and an independent terminal evaluation. Five key impact indicators and the means as well as their frequency of verification have also been proposed in the plan. For the outputs, SMART indicators have been provided in the logical framework. The M&E design did not include a midterm evaluation however, which was undertaken in September – October 2017.

77. **M&E Implementation**. The M&E plan was followed for the implementation of the project. The inception workshop, which was attended by the UNIDO PM, was held on the 2 September 2015 and the corresponding report was submitted. Up to August 2018, five progress reports and two annual reports have been prepared and timely submitted to UNIDO. Similarly, three comprehensive Project Implementation Review (PIR) reports for the years 2016, 2017 and 2018 were prepared and submitted. An independent midterm evaluation (MTE), which was not planned, was undertaken in September – October 2017. Table 5 below reports the recommendations made by MTE and actions taken by project management.

Table 5: Recommendations of MTE and actions taken

No	Recommendations made by MTE	Action taken
1	It is recommended that in future projects the subcontract between the IA and the EA includes clauses that payments are not only linked to progress reports, but reporting of materialized co-financing as well.	Not applicable to the project
2	It is recommended that international experts should also send their mission reports to the national counterpart organization.	Applicable to future projects
3	Project implementation is delayed by approximately 1 year, therefore an extension until September 2018 is recommended.	An extension of one year (September 2017 to September 2018) was granted
4	Project starting time should be better communicated to the national counterparts and the duration of the contracts needs to be in line with the project implementation timeframe.	Applicable to future projects
5.	The material flow at the MRF needs to be designed and the procurement of the equipment / tools (weight bridge, compactor, bailer, forklift, storage shelves/places for the	Purchase of equipment was based on the material flow at MRF

	bailed recycled wastes) shall be based on that plan in order to assure that the work at the MRF will be efficient.	
6.	Discussion with the potential buyers of the segregated wastes shall also start prior to the procurement of the equipment used in the material flow. This will assure that the quality, weight and outside dimensions of the bailed segregated wastes will meet the expectations of the buyers.	Contacts have already been made with the potential buyers / recycling companies.
7.	It is also important to generate enough financial resources within one or two years to expand the landfill cell at the MRF. It is advised that the cost and benefit assessments of the MRF be prepared as soon as possible in order to assure that the required financing for running, maintaining, expanding, and long-term monitoring of the MRF is available.	Cost and benefit assessment was done by a national expert and the Report "*Economic assessment of separate collection of waste for further processing*" was submitted.
8.	It is also recommended to open the MRF for the public as a buy-back center for segregated wastes. With this a much higher segregated waste quality could be achieved than through sorting of incoming mixed waste. This may prepare citizens, enterprises for the next level of waste management – segregation at source.	When it will be operational, after the license needed for the handling of hazardous waste is obtained, the MRF will be opened for the public.
9.	It is recommended that new generations of experts are also trained together with the current ones to foster knowledge and knowledge transfer.	Training for younger experts is not amongst the objectives of the project. For this purpose a specific project is required to training of young specialists. However, two young staff of the EMIC laboratory benefitted training from RECETOX. Another one was also trained on soil, water and air sampling including passive sampling with PUF samplers, including filling the sampling forms, conservation and transport of samples.
10.	In the future it would be better if the progress reports included the indicators of the logical framework and the results would be compared against those indicators. Similarly it would be very informative if the materialized co-financing were also reported.	Reporting against indicators were done in annual and PIR reports but not in progress reports. No information regarding materialized co-finance was available in the reports.

78. The PSC was established and comprised of representatives of the following: UNIDO, MoNP, Ministry of Health, Ministry of Agriculture, Ministry of Emergency Situations, Ministry of Territorial Administration and Development, Ararat Town, academia and NGOs. As the project was delayed due to re-organization that occurred within MoNP and subsequently the contract with UNIDO was delayed, no PSC meetings were held between the Inception Workshop (September 2015) up to February 2017. Otherwise once the contract was signed in 2017, regular meetings (Table 6) were held. The monitoring of project progress was adequate, and recommendations and corrective measures were made to adapt to changing conditions or to unforeseen circumstances. For example, during the PSC meeting held on 15 August 2017 in Yerevan, as there were some delays in project implementation due to reorganization within the Ministry of Nature Protection and because of weather unfavorable conditions, a decision was taken to extend project duration until the end of June 2018.

79. Technical related decisions were taken by the Technical Working Group (TWG) which was a technical committee under the PSC. The membership of this group, which met regularly (Table 6), was similar to the PSC and it included national consultants as well. Project progress was also reported to the Inter-Ministerial / Inter-Agency Committee for Implementation of the Stockholm Convention on Persistent Organic Pollutants (CISC) (Table 6), that reviews national activities related to POPs.

Table 6: Dates of meetings

No	Type of Meeting	Date of meeting
1	Inception Workshop and PSC	2 September 2015
2	CISC	18 September 2015
3	CISC	12 August 2016
4	TWG	5 November 2016
5	PSC and TWG	10 February 2017
6	CISC	20 July 2017
7	PSC and TWG	15 August 2017
8	PSC	13 December 2017
9	CISC	21 December 2017
10	TWG	13 July 2018

80. **Budgeting and Funding for M&E activities.** A total amount of USD 40,000 (GEF funds) was budgeted for M&E activities covering expenses for the Inception Workshop ($10,000) and the independent terminal evaluation ($ 30,000). The other activities such as establishing the project management unit, holding PSC meetings, and reporting costs were covered by national co-financing ($ 40,000). The allocated budgets were adequate, and the MTE, which was not budgeted in the project document, could be financed from the terminal evaluation budget line.

81. Rating on M&E is **Satisfactory**.

5.2. Results-Based Management

82. According to the Joint Inspection Unit of the UN, results-based management (RBM) is a broad management strategy focused on achieving results and aimed at changing the way agencies operate, with improving performance as central orientation. As a management tool, it should enhance responsibility, organizational learning and accountability in the implementation of programmes and budgets[29]. For the United Nations Development Group RBM is a management strategy by which all actors, contributing directly or indirectly to achieving a set of results, ensure that their processes, products and services contribute to the achievement of desired results (outputs, outcomes and higher level goals or impact). The actors would then use the information and evidence on actual results to inform decision-making on the design, resourcing and delivery of programmes and activities as well as for accountability and reporting.[30] The key elements of RMB are (i) Focusing the dialogue on results at all phases of the development process; (ii) Aligning programming, monitoring and evaluation with results; (iii) Keeping measurement and reporting simple; (iv) Managing for, not by results; and (v) Using results information for learning and decision making.

[29] https://www.unjiu.org/content/results-based-management

[30] United Nations Development Group, results-based management Handbook: Harmonizing RBM concept and approaches for improved development results at country level" edited draft October 2011, p 2

83. For this project, the approach adopted for its development and implementation clearly indicates a RBM one. The project document clearly gives the process of identifying the goal and objectives to be achieved – to reduce UP-POPs releases in open burning sources in Armenia through the introduction of BAT/BEP. The project also proposes a strategy as well as the means required to achieve them. The design of the project lays the basis for implementation, monitoring, reporting and evaluation processes. In particular, an adequate costed M&E plan including a comprehensive Logical Framework that would allow for proper monitoring of progress and tracking of results was proposed. The actual implementation of the project, lengthily discussed in the previous sections, followed the planned approach. The monitoring of progress and tracking of results was regularly done at PSC and TWG meetings involving all the key stakeholders. The project results are already being shared and are guiding the authorities to take informed decisions. For example, the neighboring municipalities have already taken the decision to have their solid wastes managed by the Ararat Town. Rating on Results-Based Management is **Satisfactory**.

5.3. Other factors

84. **Factors that had a positive effect on project results** – The appropriate design of the project proposing relevant, precise, and concise information to achieve the project objectives as well as a project coordination and management structure describing the role and responsibilities of key stakeholders and executing partners (see Section 1.4) was an important factor for achieving success.

85. The dedicated and committed project team, led by a pro-active NPC, was one of the key factors for success. This was highlighted by all stakeholders interviewed during the evaluation mission. The team very efficiently coordinated the project activities and was very successful to get the key stakeholders actively involved in the project since the beginning. Recruitment of high quality experts also contributed to success. In particular, their guidance and expertise that were appreciated by the beneficiaries greatly contributed to the successful technology transfer and adoption of best environmental practices at the pilot landfill site.

86. High ownership of the project at all levels was another important factor that contributed to achieve success. In particular, the project got strong support from the Ararat Municipality. The Mayor was personally involved and greatly facilitated the implementation process. He was living with the project as reported by one of the stakeholders interviewed during the evaluation mission. As the mayor stated during the mission, this MRF would be the first of its kind in Armenia and he wants it to be a complete success and a showcase for the whole of Armenia.

87. Finally, the flexibility of the contractors selected for the building of the MRF had a positive effect on efficiency. They accepted modification in the design of the MRF and also construction of the building for the workers, not planned originally in the contract, at no additional costs for the project.

88. **Factors that hampered project results or sustainability** – The main factor that hampered the implementation process were the delays encountered due to reorganization within the MoNP (see Section 3.3). In order to allow for completion of project activities, two extensions were granted, and the project ended in December 2018, 18 months longer than anticipated. These delays however did not impact on cost effectiveness as quality outputs were delivered and management costs were kept within planned budget.

89. Rating on other factors is **Satisfactory**.

5.4. Overarching assessment and rating table

90. Table 7 below summarizes the assessment of the project.

Table 7: Summary of Assessment

	Evaluation criteria	Evaluator's summary comments	Rating
A	**Impact (progress toward impact)**	Already visible signs of impact are seen at the pilot landfill. Waste burning has stopped since the start of the landfill renovation implying emission of dioxins and furans has stopped.	**S**
B	**Project design**		**S**
1	• Overall design	A participatory approach was adopted to develop the project. The components and interventions planned in the proposal are adequate and relevant to the achievement of project objectives.	S
2	• Logframe	The logical framework developed for this project was adequate to allow for proper monitoring and tracking of results. It contains baseline, target and well defined indicators, some of which are SMART.	S
C	**Project performance**	**All stated objectives achieved**	**S**
1	• Relevance	The project is highly relevant as it is assisting Armenia to fulfill its obligations towards the Stockholm Convention. The project is particularly relevant with the challenges facing Armenia for the management of waste. Improving waste management system in Armenia is in the top list of the national development agenda.	HS
2	• Effectiveness	All the stated objectives have been achieved. The construction of the MRF is completed, 16 legal documents related to BAT/BEP, waste management and licensing in waste sector have been drafted and adopted by the government.	S
3	• Efficiency	Despite delays, all activities have been completed and quality outputs delivered within planed budget.	S
4	• Sustainability of benefits	All the three aspects risks (financial, socio-political and institutional) are low. Sustainability is likely.	L
D	**Cross-cutting performance criteria**		
1	• Gender mainstreaming	Involvement of women in project activities was satisfactory.	S
2	• M&E: ✓ M&E design ✓ M&E implementation	The logical framework proposed is adequate to allow for proper monitoring and tracking of project results. The SMART indicators in logical framework were used to monitor project progress. PSC and TWG meetings were held regularly and relevant reports (e.g. PIRs) were submitted timely.	S

3	• Results-based Management (RBM)	The approach adopted clearly indicates a RBM one.	S
E	**Performance of partners**		
1	• UNIDO	The role of UNIDO was crucial for the project to meet its objectives. It has taken timely actions and provided technical back-stopping through quality international and national experts and introducing BAT/BEP to Armenia. Transfer of funds was timely and was greatly appreciated by national counterparts.	HS
2	• National counterparts and Executing partners	The dedicated and committed PMT performed very well, and coordinated activities very efficiently. Involvement of national stakeholders was very satisfactory. In particular, the contribution of the Ararat Municipality was instrumental in the fast construction of the MRF.	HS
3	• Donor	GEF funds were available and mobilization of co-funding contributed to successful delivery of outputs.	S
F	**Overall assessment**		S

RATING OF PROJECT OBJECTIVES AND RESULTS

- Highly satisfactory (HS): The project had no shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
- Satisfactory (S): The project had minor shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
- Moderately satisfactory (MS): The project had moderate shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
- Moderately unsatisfactory (MU): The project had significant shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
- Unsatisfactory (U): The project had major shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
- Highly unsatisfactory (HU): The project had severe shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.
- Likely (L): There are no risks affecting this dimension of sustainability.
- Moderately likely (ML). There are moderate risks that affect this dimension of sustainability.
- Moderately unlikely (MU): There are significant risks that affect this dimension of sustainability.
- Unlikely (U): There are severe risks that affect this dimension of sustainability.

6. Conclusions, recommendations and lessons learned

6.1. Conclusions

91. The project has been successful in achieving all the stated objectives. In particular, it has contributed to build capacity in Armenia to stop UP-POPs emissions from open burning at the selected dumpsite through the introduction of BAT/BEP. The theory of change proposed by the evaluation mentions that four necessary preconditions should be in place for behavioral change and impact. The project greatly assisted in putting in place these four necessary conditions:

- The project contributed to enhance institutional capacity and technical capability of public bodies and relevant stakeholders. In particular, the national regulation for the sound management of wastes in Armenia was strengthened with the development of sixteen legislative and policy documents related to waste management, which were subsequently adopted by the Government.

- Thanks to the project, fifty one officers coming from ministries, territorial (regional) subdivisions of state environmental inspectorates, municipalities and regional administrations had their management capacity built on the implementation of BAT/BEP and waste practices through a two-day training workshop.
- The project facilitated the transfer of best available technologies and adoption of best environmental practices at the selected landfill, which contributed to the total elimination of the emissions of PCDD/Fs from waste burning at the demonstration site.
- The project helped to raise at all levels regarding risk exposure to PCCD/Fs and the corresponding health hazards. In particular, targeted awareness raising campaigns on environmental and health hazards of U-POPs for relevant stakeholders have been successfully undertaken by the NGO AWHHE in cooperation with EMIC. All the key project events such as the Inception Workshop, the training workshops and the inauguration of the MRF were covered by the media (press and TV).

92. Due to an internal reorganization that occurred within the Ministry of Nature Protection, the implementation process was slowed down and was delayed. However, thanks to the active involvement of key stakeholders, in particular the Ararat Municipality who provided much assistance and co-financing, the flexibility of the contractors, and the adequate guidance and support from UNIDO the project team was able to get the project on the right track again. In the end, despite the delays of about 18 months, the project has performed very satisfactorily in delivering the quality outputs and achieving results.

93. As all risks are low, chances of continuous sustained impact of the project are likely.

6.2 Recommendations

94. For continued relevance, sustainability of the project results and impact, the following recommendations are addressed to various key stakeholders of the project.

To UNIDO
1. For this project as well as for other projects, reporting from national counterpart on materialized co-financing is very often a challenge. It is recommended that in future projects the subcontract between the implementing agency and the national executing agency includes clauses that payments are not only linked to progress reports, but reporting of materialized co-financing as well.
2. Replication efforts in three provinces are on-going in Armenia thanks to international and bilateral support. However, for replication nationwide to cover all the provinces in the context of Armenia's strategy on waste management, substantial additional resources would be required. It is recommended that UNIDO considers to facilitate the availability of international financial as well as technical support.
3. For this project, there was some confusion regarding the actual start date. The signature of the contract between the implementing agency and the executing agency was delayed due to structural reorganization within the Ministry of Nature Protection. As a result the date for completion of activities in the contract (March 2018) was well after the official closing date of the project (June 2017). The implementing agencies should better communicate the starting date to the national counterparts and they should ensure that the duration of the contract be in line with the project implementation timeframe.

To National Government
4. The project has contributed to the development and adoption of a number of legislations on wastes, BAT/BEP and licensing. For the sound management of wastes in the country in order to eliminate of UP-POPs emission from open burning at dumpsites, the national authorities should ensure that these pieces of legislation are properly enforced. In particular, the appropriate enforcing and monitoring system should be put in place. 5. When the MRF will be operational after obtaining the appropriate license, it is important that the procedures and good practices are strictly followed while managing the wastes, this could be done through regular inspection and monitoring. 6. The project has been very successful producing very good results and valuable lessons. These should be gathered and shared with other municipalities and regions.

6.3 Lessons learned

7. The project has been successfully completed and the following lessons stemmed out:

Two key lessons emerged from this project:
1. A strong stakeholder commitment and high ownership that would contribute to achieve success can be secured by involving key stakeholders in all the phases of the project from the preparatory phase through implementation to project execution. 2. Simple project management structure and committed and flexible project managers at the implementing agency and the executing agency leads to efficient and effective project implementation.

Annexes

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