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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Ninety-fifth Meeting
Montreal, 4-8 December 2024
Item 9(c) of the provisional agenda¹

PROJECT PROPOSAL: BAHRAIN

This document consists of the comments and recommendation of the Secretariat on the following project proposal:

Phase-out

- | | | | |
|---|---|----------------|------------------|
| • | HCFC phase-out management plan
(stage II, third tranche) | UNEP and UNIDO | Blanket approval |
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¹ UNEP/OzL.Pro/ExCom/95/1

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS

Bahrain

(I) PROJECT TITLE	AGENCY	MEETING APPROVED	CONTROL MEASURE
HCFC phase-out plan (stage II)	UNEP (lead), UNIDO	88 th	73.5% phase-out by 2025

(II) LATEST ARTICLE 7 DATA (Annex C, Group I)	Year: 2023	29.60 ODP tonnes
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(III) LATEST COUNTRY PROGRAMME SECTORAL DATA (ODP tonnes)								Year: 2023	
Chemical	Aerosol	Foam	Fire-fighting	Refrigeration		Solvent	Process agent	Lab use	Total sector consumption
				Manufacturing	Servicing				
HCFC-22				1.83	27.77				29.60
HCFC-141b in imported pre-blended polyol									16.45

(IV) CONSUMPTION DATA (ODP tonnes)				
2009-2010 baseline:	51.90	Starting point for sustained aggregate reductions:		61.39
CONSUMPTION ELIGIBLE FOR FUNDING				
Already approved:	58.64	Remaining:		2.75

(V) ENDORSED BUSINESS PLAN		2024	2025	2026	Total
UNEP	ODS phase-out (ODP tonnes)	3.37	0.00	0.00	3.37
	Funding (US \$)	62,150	0	0	62,150
UNIDO	ODS phase-out (ODP tonnes)	1.29	0.00	0.00	1.29
	Funding (US \$)	22,470	0	0	22,470

(VI) PROJECT DATA			2021	2022	2023	2024	2025	Total
Montreal Protocol consumption limits (ODP tonnes)			33.74	33.74	33.74	33.74	16.87	n/a
Maximum allowable consumption (ODP tonnes)			33.74	30.45	30.00	29.50	13.75	n/a
Funding agreed in principle (US \$)	UNEP	Project costs	249,500	0	79,500	55,000	0	384,000
		Support costs	32,435	0	10,335	7,150	0	49,920
	UNIDO	Project costs	203,999	0	54,000	21,000	0	278,999
		Support costs	14,280	0	3,780	1,470	0	19,530
Funds approved by ExCom (US \$)		Project costs	453,499		133,500			586,999
		Support costs	46,715		14,115			60,830
Total funds recommended for approval at this meeting (US \$)		Project costs				76,000		76,000
		Support costs				8,620		8,620

Secretariat's recommendation:	Blanket approval
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PROJECT DESCRIPTION

1. On behalf of the Government of Bahrain, UNEP as the lead implementing agency has submitted a request for funding for the third and final tranche of stage II of the HCFC phase-out management plan (HPMP), at a total cost of US \$84,620, consisting of US \$55,000, plus agency support costs of US \$7,150, for UNEP and US \$21,000, plus agency support costs of US \$1,470, for UNIDO.² The submission includes a progress report on the implementation of the second tranche, the verification report on HCFC consumption for 2023, and the tranche implementation plan for 2025 to 2026.

Report on HCFC consumption

2. The Government of Bahrain reported a consumption of 29.6 ODP tonnes of HCFCs in 2023, which is 43 per cent below the HCFC baseline for compliance. The 2019-2023 HCFC consumption is shown in table 1.

Table 1. HCFC consumption in Bahrain (2019-2023 Article 7 data)

HCFC	2019	2020	2021	2022	2023	Baseline
Metric tonnes (mt)						
HCFC-22	669.44	595.55	447.38	463.90	538.13	935.80
HCFC-141b	2.01	0.00	0.00	0.00	0.00	4.00
Total (mt)	671.45	595.55	447.38	463.90	538.13	939.70
HCFC-141b in imported pre-blended polyols*	125.54	89.82	115.18	155.90	149.55	91.87**
ODP tonnes						
HCFC-22	36.82	32.76	24.61	25.51	29.60	51.50
HCFC-141b	0.22	0.00	0.00	0.00	0.00	0.40
Total (ODP tonnes)	37.04	32.76	24.61	25.51	29.60	51.90
HCFC-141b in imported pre-blended polyols*	13.81	9.88	12.67	17.15	16.45	10.11**

* Country programme (CP) data

** Average consumption between 2007 and 2009

3. HCFC consumption in Bahrain decreased from 2019 to 2022 due to the enforcement of the licensing and quota system, the conversion of the HCFC-22-based air-conditioning (AC) manufacturing sector to non-HCFC-based alternatives, the introduction of refrigeration and air-conditioning (RAC) equipment based on alternative refrigerants, and the implementation of phase-out activities related to the refrigeration servicing sector under stage I of the HPMP. The low consumption in 2021 and 2022 was attributed to the COVID-19 pandemic. Consumption increased from 25.51 ODP tonnes in 2022 to 29.6 ODP tonnes in 2023 due to continuing demand from the servicing sector. The import of HCFC-141b contained in pre-blended polyols has been increasing each year since 2020 mostly attributed to the boom in the building sector after the pandemic.

Country programme implementation report

4. The Government of Bahrain reported HCFC sector consumption data under the 2023 country programme (CP) implementation report that is consistent with the data reported under Article 7 of the Montreal Protocol.

Verification report

5. The verification report confirmed that the Government of Bahrain was implementing a licensing and quota system for HCFC imports and exports and that the total consumption of HCFCs reported under Article 7 of the Montreal Protocol for 2023 was correct (as shown in table 1 above). The verification

² As per the letter of 13 August 2024 from the Supreme Council for Environment of Bahrain to UNEP.

concluded that Bahrain was in compliance with the allowable consumption established in the Agreement with the Executive Committee.

Progress report on the implementation of the second tranche of stage II of the HCFC phase-out management plan

Legal framework

6. The Government of Bahrain ratified the Kigali Amendment on 1 July 2024. The Government will enforce bans on the import and use of HCFC-141b contained in pre-blended polyols, and the import and manufacture of HCFC-22-based air-conditioning (AC) equipment from 1 January 2025. Bahrain has also secured a written commitment from the relevant industry to cease using HCFC-22.

Manufacturing sector

7. The umbrella project to phase out 135.93 mt of HCFC-141b contained in imported pre-blended polyols in the foam sector is in an advanced stage of implementation. The enterprises included in the project³ received technical assistance to transition to low-GWP technologies, with methyl formate being the preferred technology to be adopted from 1 January 2025 when the ban on the import and use of HCFC-141b contained in pre-blended polyols enters into force. Activities implemented under the second tranche included a technical assistance seminar for foam sector stakeholders on alternatives to HCFC-141b polyol-based foam technologies (63 participants of which 22 per cent were female); and technical support to four beneficiary enterprises undertaking conversions including specialized in-person training for two PU foam manufacturing enterprises and five training workshops for two spray foam manufacturing enterprises.

Refrigeration servicing sector

8. The following activities have been implemented:

- (a) Organized an awareness workshop for 67 participants from Government authorities on the new Gulf Cooperation Council (GCC) regulations related to the Montreal Protocol and the Kigali Amendment; upgraded the e-licensing and monitoring system with an e-service to request refrigerant analysis;
- (b) Provided training to an additional 40 newly recruited customs officers (6 female) on the Montreal Protocol and HCFC import controls including risk profiling and the operation of the e-licensing system;
- (c) Trained 40 RAC technicians (one female) in four training workshops on RAC good servicing practices, refrigerant recovery and recycling, and the safe handling of flammable refrigerants; 40 technicians certified;
- (d) Initiated a new service to register large RAC systems and maintain a record of the work performed on these units; conducted a technical workshop with 83 participants on reducing leaks in large RAC systems, and non-ODS and low-GWP alternative technologies;

³ Two insulation foam enterprises (Awal Gulf Manufacturing (AGM) and Awal Refrigeration and Air-Conditioning), two spray foam enterprises (Al Khonaizi and Al Manai) and an additional 35 spray foam enterprises.

- (e) Provided training tools and equipment to four training institutions, and service tools to 40 certified technicians;⁴ and
- (f) Carried out information dissemination activities including preparation of a flyer on stage II of the HPMP to promote HCFC phase-out and the use of low-GWP alternatives.

Project implementation and monitoring

9. The project management unit (PMU) implements the activities, monitors progress and reports achievements. Of the US \$24,500 approved for the PMU in the second tranche, the level of funds disbursed is US \$10,000, comprising staff and consultants (US \$7,000) and meetings and workshops (US \$3,000). The balance of US \$14,500, originally allocated to the PMU, was re-allocated to additional servicing sector activities including *inter alia* an additional US \$1,500 for customs training, US \$1,500 for RAC technician training, and US \$8,500 for technical assistance to large end-users.

10. The total expenditure of the PMU in the first and second tranches amounts to US \$38,000 with the following breakdown: staff and consultants (US \$27,000); meetings and workshops (US \$11,000).

Level of fund disbursement

11. As at 21 October 2024, of the US \$586,999 approved so far, US \$572,929 had been disbursed (US \$326,000 for UNEP and US \$246,929 for UNIDO), as shown in table 2. The balance of US \$14,070, will be disbursed in 2025.

Table 2. Financial report of stage II of the HPMP for Bahrain (US \$)

Agency	First tranche		Second tranche		Total		
	Approved	Disbursed	Approved	Disbursed	Approved	Disbursed	Balance
UNEP	249,500	249,500	79,500	76,500	329,000	326,000	3,000
UNIDO	203,999	203,999	54,000	42,930	257,999	246,929	11,070
Total	453,499	453,499	133,500	119,430	586,999	572,929	14,070
Disbursement rate (%)	100		89.5		97.6		

Implementation plan for the third and final tranche of stage II of the HCFC phase-out management plan

12. The following activities will be implemented between January 2025 and December 2026:
- (a) Continue targeted awareness campaign aimed at Government authorities and relevant stakeholders about the introduction and enforcement of the latest GCC regulations: (UNEP) (US \$5,000);
 - (b) Training of newly recruited customs officers on Montreal Protocol and the control of HCFCs including risk profiling (40 officers including females): (UNEP) (US \$6,000);
 - (c) Continue implementation of the training programme on RAC good servicing practices for RAC technicians, in collaboration with local institutes with the certification of at least 40 technicians: (UNEP) (US \$34,000);

⁴ Sets of tools and equipment purchased included, *inter alia*, electronic leak detector; clamp meter; digital thermometer; side cutters; hacksaw; recovery hoses; adjustable wrench; charging hoses; flaring and swaging tools; split AC unit for training; oxy acetylene welding torches with hoses; micron gauge; and valve core removal tool.

- (d) Provision of additional sets of tools and equipment to technicians certified:⁵ (UNIDO) (US \$21,000 plus balance from the previous tranche); and
- (e) Project monitoring (UNEP) (US \$10,000), including staff and consultants (US \$7,000), and meetings and workshops (US \$3,000).

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

HCFC consumption trend and prospects of compliance

13. Noting the growing trend in HCFC-22 consumption in the last two years, the Secretariat requested an assessment of the expected future trends in consumption for manufacturing and RAC servicing, and the strategy being followed to ensure that the required HCFC reduction in 2025 is achieved in a sustained manner. UNEP informed that Bahrain had consistently achieved the consumption targets in previous years, would continue to implement regulations and guidelines for refrigerant management, support the refrigerant recovery, recycling and reclaiming (RRR) system, and ban the import and manufacturing of HCFC-22-based systems from 1 January 2025, as noted in decision 88/45(d)(ii).⁶ UNEP noted that in the initial phase of HPMP implementation in Bahrain, 80 per cent of HCFC consumption was in the manufacturing sector. With the activities to phase out consumption in the manufacturing sector completed, the operation of the refrigerant reclaiming centre will positively impact future HCFC demands from the RAC servicing sector. The Government of Bahrain reaffirmed its commitment to achieving full compliance with its HCFC reduction targets.

14. UNEP also confirmed that the increased imports of HCFC-141b contained in imported pre-blended polyols since 2021 was due to the boom in the building sector after the COVID-19 pandemic and informed that because of activities implemented by UNIDO under stage II of the HPMP, traders and end-users have begun importing alternatives to HCFC-141b in pre-blended polyols. UNEP also confirmed that effective 1 January 2025, the importation of HCFC-141b in pre-blended polyols will no longer be permitted.

Progress report on the implementation of the second tranche of stage II of the HCFC phase-out management plan

Legal framework

15. The Government of Bahrain has already issued HCFC import quotas for 2024, 2025, and 2026 in at 29.50 ODP tonnes, 13.75 ODP tonnes, and 13.75 ODP tonnes, respectively, which are lower than the Montreal Protocol control targets and in accordance with the targets set in the Agreement with the Executive Committee.

Manufacturing sector

16. On the status of adoption of low-GWP technologies in the PU foam sector in Bahrain, UNEP explained that the project offered several options, including cyclopentane, HFOs and methyl formate. Cyclopentane was a preferred option for many enterprises, but its application is limited to certain conditions due to flammability; and HFOs prices are still high in Bahrain in comparison with those of HCFC-141b. Considering both cost and technical performance, methyl formate emerged as the most preferred option for all eligible four enterprises to test. The testing results were positive, demonstrating effective expansion

⁵ Ibid.

⁶ The enterprise AGM will also complete its voluntary phase-out of 16.50 ODP tonnes of HCFC-22 in the manufacturing of residential AC before 1 January 2025.

properties, low toxicity, high-quality products, and environmentally acceptable parameters, all at a cost similar to HCFC-141b.

Refrigeration servicing sector

17. The Secretariat noted that activities in the refrigeration servicing sector continue to be implemented as planned. During previous tranches the national RRR programme was strengthened through provision of basic tools and equipment. Noting the relevance of RRR to help reduce the demand for new refrigerant in Bahrain, UNEP, in response to queries from the Secretariat, informed that HCFC-22 is the most recovered refrigerant and that the amounts of recovered refrigerants have increased significantly to approximately 17 to 21 mt since 2022. UNEP expects that the upcoming reduction of the HCFC import quota in 2025 by almost 50 per cent of the 2024 level will lead to an increase in refrigerant reclaiming, potentially reaching 30 mt of HCFC-22 in the 2025-2026 period.

18. UNEP also provided additional detail on the operation of the technicians' certification in Bahrain, indicating that for technicians to receive the certification, they must successfully pass the certification criteria, which include achieving a minimum score of 50 per cent in the theoretical exam, 70 per cent in the practical exam, and 85 per cent in brazing. The majority of technicians who participate in the training programmes successfully meet these requirements and receive certification. The Secretariat noted with appreciation that, during discussions on the action plan for the third tranche, the target for additional technicians to be trained and certified was raised from 40 to 50, bringing the total to 130—30 more than the 100 initially planned for this stage. The Secretariat considers that the certification process should continue and expand in the upcoming stages of the HPMP and the Kigali HFC implementation plan to better prepare technicians for adopting low-GWP alternatives to HCFCs and HFCs.

Gender policy implementation

19. The Secretariat noted that Bahrain continued to make efforts to include women in all its activities and projects by sending invitations to female engineers regarding awareness events, striving to include all female customs officers in training courses, and encouraging stakeholders to nominate female technicians for training events. While the final composition of each training group may depend on the specific circumstances related to the event, the national ozone unit (NOU) remains committed to promoting gender diversity in all training programmes.

20. Fifty-five per cent of the NOU staff are female and they actively participate in all Montreal Protocol related events. Examples of female participation include: a 22 per cent female participation rate in the seminar on alternative technologies to pre-blended polyols for stakeholder in the foam sector; six female customs officers trained; one woman participated in the RAC technician's training; two female participants (out of eight) in consultation meetings with stakeholders from the foam sector; approximately 30 per cent female representation in meetings of the Supreme Council for the Environment (SCE) with the Electricity and Water Authority regarding energy efficiency; and attendance of about 40 female engineering students at ozone layer protection seminars in the Bahrain Polytechnic.

Sustainability of the HCFC phase-out and assessment of risks

21. To support the sustainability of the HCFCs being phased out through the HPMP activities, the Government of Bahrain has an enforceable licensing and quota system, has banned the import of HCFC-based central cooling refrigeration units, has banned the import of pure HCFC-141b as of 1 January 2021, and will ban the import of HCFC-141b contained in pre-blended polyols, and the import and manufacture of HCFC-22-based AC equipment by 1 January 2025.

22. The Secretariat and UNEP discussed the potential risk related to compliance with HPMP targets in view of the RAC servicing sector requirements for HCFC-22 which had remained elevated despite ongoing

efforts to phase out HCFCs. As the country implements significant reductions in the HCFC-22 annual quota, the slow adoption of refrigerant recovery practices could pose a challenge. To address this, the NOU is actively collaborating with major contractors to enhance refrigerant recovery and reclaiming efforts. Furthermore, by increasing the number of trained technicians, the NOU aims to boost the quantity of reclaimed refrigerants.

23. The availability of low-GWP technologies was also classified as a medium risk. UNEP noted that the availability of HFCs should be carefully managed to minimize their future environmental impact. The search for low-GWP alternatives to both HCFCs and HFCs remains an ongoing area of research and development especially for countries with a high-ambient temperature. Despite the risks, no significant delays are expected, and activities should proceed smoothly. A key factor contributing to Bahrain's success is the strong partnership between the NOU and its stakeholders, ensuring timely and efficient implementation.

Conclusion

24. Bahrain has achieved the control targets in its Agreement with the Executive Committee and under the Montreal Protocol. The country is effectively enforcing a licensing and quota system to control the import of HCFCs and equipment. The project for phasing out HCFC-141b polyols is in an advanced stage of implementation, with plans to cease its use before 1 January 2025. Equipment and tools have been provided to support the training and mandatory certification of technicians. The phase-out of HCFC consumption in the manufacturing sector has been completed and the increasing amounts of recovered refrigerants will help to offset the demands of the RAC servicing sector. Thus, with the stepwise reduction of HCFC annual quotas, Bahrain is on track to further reduce consumption of HCFC-22. The Government of Bahrain has made efforts to include gender mainstreaming in the HPMP and women are increasingly involved in HPMP related activities. The disbursement of the second tranche is almost at 90 per cent.

RECOMMENDATION

25. The Fund Secretariat recommends that the Executive Committee:

- (a) Note the progress report on the implementation of the second tranche of stage II of the HCFC phase-out management plan (HPMP) for Bahrain; and
- (b) Request the Government of Bahrain, UNEP and UNIDO to submit on a yearly basis, progress reports on the implementation of the work programme associated with the final tranche through completion of the project, verification reports until approval of stage III, and the project completion report to the second meeting of the Executive Committee in 2027.

26. The Fund Secretariat further recommends blanket approval of the third and final tranche of stage II of the HPMP and the corresponding 2025-2026 tranche implementation plan for Bahrain at the funding levels shown in the table below.

	Project title	Project funding (US \$)	Support costs (US \$)	Implementing agency
(a)	HCFC phase-out management plan (stage II, third tranche)	55,000	7,150	UNEP
(b)	HCFC phase-out management plan (stage II, third tranche)	21,000	1,470	UNIDO