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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Ninety-fourth Meeting
Montreal, 27–31 May 2024
Item 9(d) of the provisional agenda[1]

PROJECT PROPOSAL: LIBERIA

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

Phase-down

• Kigali HFC implementation plan (stage I, first tranche)	The Government of Germany

[1] UNEP/OzL.Pro/ExCom/94/1

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS

Liberia

PROJECT TITLE	AGENCY
Kigali HFC implementation plan (stage I)	Germany (lead)

LATEST ARTICLE 7 DATA (Annex F)	Year: 2023	49.32 mt	112,645 CO_2-eq tonnes

SECTORAL HFC CONSUMPTION DATA (CO_2-eq tonnes) AND ACTIVITIES

	Aerosol	Foam	Fire-fighting	Refrigeration and Air Conditioning (RAC)				Solvent	Other
				Manufacturing			Servicing		
				Refrigeration	AC	Other			
As submitted (2022)	0	2,860	23,731	0	0	0	67,976	0	0
Latest CP report (2023)	0	2,860	19,822	0	0	0	89,963	0	0
KIP stage I activities as agreed (Y/N)	N	N	Y	N	N	N	Y	N	N

AVERAGE 2020-2022 HFC CONSUMPTION IN SERVICING	33.93 mt	68,612 CO_2-eq tonnes

BASELINE CONSUMPTION DATA (CO_2-eq tonnes)	2020	2021	2022	Average 2020-2022
HFC annual consumption	73,313	85,249	47,273	68,612
HCFC baseline (65%)				112,297
HFC baseline				180,909
Revised HFC annual consumption	83,998	96,803	73,864	84,888
Revised HFC annual consumption plus HCFC baseline (65%)				197,185

HFC CONSUMPTION ELIGIBLE FOR FUNDING	
Starting point for sustained aggregate reductions	n/a
Previously approved HFC phase-down investment projects	No
Aggregate reductions from previously approved projects (CO_2-eq tonnes)	n/a

PROJECT DATA AS AGREED			2024*	2025-2026	2027	2028	2029	Total
Consumption (CO_2-eq tonnes)	Montreal Protocol limits		180,909	180,909	180,909	180,909	162,818	n/a
	Maximum allowable		180,909	130,532	126,616	122,817	117,904	n/a
	Maximum allowable (%) **		92	66	64	62	60	n/a
Amounts recommended in principle (US $)	Germany	Project costs	81,500	0	83,500	0	0	165,000
		Support costs	10,595	0	10,855	0	0	21,450
	Total project costs		81,500	0	83,500	0	0	165,000
	Total support costs		10,595	0	10,855	0	0	21,450
	Total funds		92,095	0	94,355	0	0	186,450

* Recommended for approval at the present meeting

** Based on the revised data to be approved by the Implementation Committee and the Meeting of the Parties (MOP)

Reduction from stage I in CO_2-eq tonnes*	79,281

* Calculated based on the revised data to be approved by the Implementation Committee and MOP

Secretariat's recommendation:	Individual consideration

PROJECT DESCRIPTION

1. The present document contains the following sections:

I. Summary of the proposal as submitted

II. Background: Implementation status of the country's HCFC phase-out management plan

III. HFC consumption: Overview of the country's HFC consumption levels, trends, and sectoral uses

IV. Stage I of the Kigali HFC implementation plan, as submitted: Overarching strategy and plan of implementation for the first tranche

V. Secretariat's comments, including the agreed cost of activities

VI. Recommendation

I. Summary of the proposal as submitted

2. On behalf of the Government of Liberia, the Government of Germany as the designated implementing agency has submitted a request for stage I of the Kigali HFC implementation plan (KIP), in the amount of US $165,000, plus agency support costs of US $21,450, as originally submitted.[2]

3. The Government of Liberia has demonstrated its commitment to reducing HFCs in advance of the Montreal Protocol targets and the implementation of stage I of the KIP would assist the country in meeting the target of a 35 per cent reduction from its HFC baseline consumption by 1 January 2029,[3] based on decision 92/44, which allows such proposals to be considered on a case-by-case basis.

4. The first tranche of stage I of the KIP being requested at this meeting amounts to US $81,500, plus agency support costs of US $10,595 for the Government of Germany, as originally submitted.

II. Background

Status of implementation of the HCFC phase-out management plan

5. Table 1 presents information on the HCFC Phase-out Management Plan (HPMP) in Liberia as of May 2024.

Table 1. HPMP implementation status for Liberia

	Stage I	Stage II
Meetings when HPMP was approved/updated	63rd/74th	90th
Reduction from baseline	35% by 2020	100% by 2030
Total project cost (US $)	315,000	585,000
Date of completion (actual/planned)	31 December 2021	31 December 2031

[2] As per the letter of 2 February 2024 from the Environment Protection Agency of Liberia to the Secretariat.
[3] The letter from the Environment Protection Agency of Liberia is in the process of being signed and will be submitted before the 94th meeting of the Executive Committee.

Status of implementation of previous HFC-related activities

6. Table 2 presents an overview of activities implemented in Liberia in the context of the Kigali Amendment that have been funded by the Multilateral Fund.

Table 2. Previously approved HFC-related activities in Liberia

Approval meeting	Project title	Implementing agency	Cost (US $)	Date of completion
74	Survey of ODS alternatives	UNEP	40,000	August 2017
80	Enabling activities for HFC phase-down	Germany	95,000	December 2021

III. HFC consumption overview

HFC consumption levels

7. Liberia only imports HFCs for use in the refrigeration and air-conditioning (RAC) servicing, firefighting, and foam sectors. Based on the data resubmitted under Article 7, the most consumed substances in 2023 were R-410A (39.1 per cent of total HFC consumption in CO_2-equivalent (CO_2-eq) tonnes), HFC-134a (23.7 per cent), R-404A (12.5 per cent), HFC-236fa (10.5 per cent), HFC-227ea (7.2 per cent), and others (7 per cent). Table 3 presents the country's HFC consumption as resubmitted to the Ozone Secretariat under Article 7 of the Montreal Protocol on 8 February 2024, subject to the Implementation Committee's consideration about changing the baseline.

Table 3. HFC consumption in Liberia (2018–2023 Article 7 data)

HFC	GWP	2018	2019	2020*	2021*	2022*	2023
Metric tonnes (mt)							
HFC-32	675	0.00	0.00	0.00	0.00	0.00	4.8
HFC-134a	1,430	58.04	8.51	10.36	26.50	14.60	18.70
HFC-227ea	3,220	0.00	0.00	2.43	2.70	2.80	2.50
HFC-236fa	9810	0.00	0.00	0.00	0.00	1.50	1.20
R-404A	3,922	0.00	0.00	8.18	3.28	1.17	3.60
R-407A	2,107	0.00	0.00	0.68	1.36	0.68	2.22
R-410A	2,088	0.00	0.00	13.34	16.52	11.13	21.10
Total (mt)		**58.04**	**8.51**	**34.99**	**50.36**	**31.88**	**54.12**
CO_2-eq tonnes							
HFC-32	675	0.00	0	0	0	0	3,240
HFC-134a	1,430	82,997	12,169	14,815	37,895	20,878	26,741
HFC-227ea	3,220	0.00	0	7,825	8,694	9,016	8,050
HFC-236fa	9810	0.00	0	0	0	14,715	11,772
R-404A	3,922	0.00	0	32,079	12,863	4,588	14,118
R-407A	2,107	0.00	0	1,433	2,866	1,433	4,678
R-410A	2,088	0.00	0	27,847	34,486	23,234	44,046
Total (CO_2-eq tonnes)		**82,997**	**12,169**	**83,998**	**96,803**	**73,864**	**112,645**

*Based on resubmitted data to the Ozone Secretariat

Established HFC baseline

8. The Government of Liberia reported the Article 7 data for 2020–2022. The country's HFC consumption baseline was established at 180,909 CO_2-eq tonnes by adding 65 per cent of its HCFC baseline (expressed in CO_2-eq tonnes) to its average HFC consumption in 2020–2022, as shown in table 4.

Table 4. HFC baseline calculation for Liberia (CO_2-eq tonnes)

Baseline calculation components	2020	2021	2022
HFC annual consumption	73,313	85,249	47,273
HFC average consumption in 2020-2022			68,612
HCFC baseline (65%)			112,297
HFC baseline			**180,909**

9. If the HFC consumption data in the baseline years is revised to the levels indicated in table 3 above, the HFC baseline for Liberia would be revised as 197,185 CO_2-eq tonnes.

Country programme implementation report

10. The sectoral HFC consumption data provided by the Government of Liberia in its country programme (CP) implementation report for 2023 is consistent with the data reported under Article 7 of the Montreal Protocol.

HFC consumption trends

11. Liberia reported HFC data for 2019 on a voluntary basis, based on information from importers since the country did not have an official licensing system for HFCs. From 2020 to 2023, the revised data reported under Article 7 shows a fluctuating but increasing trend in HFC consumption in Liberia. Particularly, in 2021 HFC imports were higher than HFC use due to a slow recovery from the COVID-19 lockdowns. Thus, remaining refrigerants were carried over to 2022, which resulted in lower-than-usual import figures for 2022. However, 2023 has once again seen a significant increase in HFC use due to suppressed demand that is finally is being addressed.

HFC consumption by sector

12. Through a detailed survey and stakeholder consultations, the details on the HFC consumption have been estimated based on use in 2022, which was higher than the reported imports due to carry-over from 2021. In Liberia, HFCs are used primarily in the RAC servicing sector (85.7 per cent of the total consumption for 2022 in mt and 71.9 in CO_2-eq tonnes), followed by the firefighting sector (9.8 per cent in mt and 25.1 per cent in CO_2-eq tonnes) and the foam sector (4.5 per cent in mt and 3.0 per cent in CO_2-eq tonnes). In the RAC servicing sector HFCs are mainly consumed in the commercial refrigeration (29.4 per cent in mt and 28.3 per cent in CO_2-eq tonnes), residential air-conditioning (AC) (25.9 per cent in mt and 19.8 per cent in CO_2-eq tonnes), and commercial AC subsectors (9.9 per cent in mt and 8.8 per cent in CO_2-eq tonnes) and other subsectors, as shown in tables 5 and 6.

Table 5. HFC consumption in Liberia by sector in mt (2022)

Subsector	HFC-32	HFC-134a	HFC-227ea	HFC-236fa	R-404A	R-407A	R-410A	Total	Share of total (%)
Refrigeration and AC servicing									
Domestic refrigeration	0.00	3.93	0.00	0.00	0.00	0.00	0.00	3.93	8.9
Commercial refrigeration	0.00	9.05	0.00	0.00	3.13	0.73	0.00	12.91	29.4
Industrial refrigeration	0.00	1.50	0.00	0.00	0.49	0.13	0.00	2.12	4.8
Residential AC	3.16	0.92	0.00	0.00	0.00	0.00	7.30	11.38	25.9
Commercial AC	0.24	0.63	0.00	0.00	0.00	0.00	3.48	4.35	9.9
Mobile air-conditioning (MAC)	0.00	2.97	0.00	0.00	0.00	0.00	0.00	2.97	6.8

Subsector	HFC-32	HFC-134a	HFC-227ea	HFC-236fa	R-404A	R-407A	R-410A	Total	Share of total (%)
Subtotal for RAC servicing	*3.40*	*19.00*	*0.00*	*0.00*	*3.62*	*0.86*	*10.78*	*37.66*	*85.7*
Other sectors									
Foam	0.00	2.00	0.00	0.00	0.00	0.00	0.00	*2.00*	4.5
Firefighting	0.00	0.00	2.80	1.50	0.00	0.00	0.00	4.30	9.8
Subtotal for other sectors	*0.00*	*2.00*	*2.80*	*1.50*	*0.00*	*0.00*	*0.00*	*6.30*	*14.3*
Total	**3.40**	**21.00**	**2.80**	**1.50**	**3.62**	**0.86**	**10.78**	**43.96**	**100.0**

Note: Differences between the 2022 reported imports shown in table 3 (top-bottom approach) and the use estimated in this table (bottom-up approach) can be attributed to uncertainties associated with field data and the statistical method. Furthermore, the HFC-32 had not been identified as a controlled substance in the customs registers, and consequently was not included in the consumption report for 2022. The country was advised to submit a second revision of 2022 Article 7 and CP data to include the consumption of HFC-32.

Table 6. HFC consumption in Liberia by sector in CO_2-eq tonnes (2022)

Subsector	HFC-32	HFC-134a	HFC-227ea	HFC-236fa	R-404A	R-407A	R-410A	Total	Share of total (%)
Refrigeration and AC servicing									
Domestic refrigeration	0	5,620	0	0	0	0	0	5,620	5.9
Commercial refrigeration	0	12,942	0	0	12,275	1,538	0	26,754	28.3
Industrial refrigeration	0	2,145	0	0	1,922	274	0	4,340	4.6
Residential AC	2,133	1,316	0	0	0	0	15,239	18,687	19.8
Commercial AC	162	901	0	0	0	0	7,265	8,327	8.8
MAC	0	4,247	0	0	0	0	0	4,247	4.5
Subtotal for RAC servicing	*2,295*	*27,170*	*0*	*0*	*14,196*	*1,812*	*22,503*	*67,976*	*71.9*
Other sectors									
Foam	0	2,860	0	0	0	0	0	2,860	3.0
Firefighting	0	0	9,016	14,715	0	0	0	23,731	25.1
Subtotal for other sectors	*0*	*2,860*	*9,016*	*14,715*	*0*	*0*	*0*	*26,591*	*28.1*
Total	**2,295**	**30,030**	**9,016**	**14,715**	**14,196**	**1,812**	**22,503**	**94,567**	**100.0**

Note: Differences between the 2022 reported imports shown in table 3 (top-bottom approach) and the use estimated in this table (bottom-up approach) can be attributed to uncertainties associated with field data and the statistical method. Furthermore, the HFC-32 had not been identified as a controlled substance in the customs registers, and consequently was not included in the consumption report for 2022. The country was advised to submit a second revision of 2022 Article 7 and CP data to include the consumption of HFC-32.

Refrigeration and air-conditioning servicing sector

13. There are approximately 1,500 RAC technicians (of which roughly 5 per cent are women) and 50 workshops consuming HFCs in Liberia. While efforts have been made by the national ozone unit (NOU) to address the situation, informal and semi-qualified technicians are undertaking the repair and servicing of RAC equipment. Their lack of formal training, together with the lack of proper tools and equipment to conduct proper servicing are the main reasons for the poor quality of servicing in the sector.

14. There are nine technical and vocational education and training (TVET) institutions. There is no national qualification framework for RAC training, although the Ministry of Education and other

stakeholders are drafting the Liberia National TVET Qualification Framework. Furthermore, a formal technician licensing system has yet to be developed.

Domestic, commercial, and industrial refrigeration servicing

15. Domestic refrigeration equipment forms the bulk of RAC equipment in Liberia, as such equipment is a basic requirement for storing food and is economically accessible. Approximately 500,000 domestic refrigerators are in use in the country, of which roughly 60 per cent are based on HFC-134a and 40 per cent are based on R-600a. The new and used refrigerator market brings in both R-134a and R-290 units.

16. Commercial refrigeration comprises stand-alone units as well as condensing units and cold rooms. Approximately 100,000 stand-alone units used in small shops for beverage and food storage, and 3,000 condensing units/small cold rooms were identified. The dominant refrigerant for stand-alone units is HFC-134a with some limited use of R-290 and R-600a. There are still a few HCFC-22 systems operational, which will be phased out under the HPMP. The condensing units and cold rooms use primarily HFC-134a with some use of R-404A and R-407A. Much of the equipment stock is old and requires frequent repairs and it has been reported that many systems need to be fully charged once a year due to leakages.

17. Industrial refrigeration is used mainly in the food processing industry. There are 169 large-centralized refrigeration systems identified in the country based mainly on HFC-134a and R-404A with a small number using R-407A. The use of ammonia is not common in this sector. The technicians servicing this equipment are very few and mostly staff working within the relevant enterprises.

Residential and commercial air-conditioning servicing

18. The residential AC subsector has been experiencing extensive growth due to an increase in new construction throughout the country. Single-split AC equipment based on R-410A is the most prevalent in the country with a stock of roughly 150,000 units; a few HFC-32 units have now entered the local market, but these are much more expensive. There is also a large number of single-split units and a limited number of self-contained units based on HCFC-22 installed in the country, which will be replaced in the coming years given the phase-out of this refrigerant.

19. The commercial AC subsector includes large buildings for office space, hotels, shopping centres, etc. New office spaces have been a significant part of the recent growth in construction activities in the country. Multi-split and variable-refrigerant-volume systems functioning on R-410A are being installed in these buildings. This growth explains the considerable jump in the import quantities of R-410A in 2023. Since these systems are relatively new in Liberia, not all technicians are competent to handle these larger systems. Although these systems come pre-charged, often additional refrigerant is added into the system during installation.

Mobile air-conditioning servicing

20. MAC servicing is the smallest servicing subsector in terms of its HFC consumption in 2022 in CO_2-eq tonnes. It is estimated that only a third of all registered vehicles use AC systems and as such there are approximately 30,000 vehicles in the country using HFC-134a-based AC systems. Only a handful of new cars are coming into the country using HFOs, as these are expensive and not easily available. Across the country there are around 1,000 technicians working in MAC servicing, more informal than formal as cheaper service is provided by small roadside technicians. There is a maximum of 200-250 formal MAC servicing workshops throughout the country.

Other sectors

Firefighting

21. The firefighting sector is comprised of two enterprises that have installed and maintained fire-suppressant systems using HFC-227ea and HFC-236fa. The high contribution to total emissions from this sector, primarily due to the high-GWP values of both HFCs, makes it important to address this sector already in stage I of the KIP to prevent it from continuing to increase in the coming years, as that could jeopardize all other efforts to achieve compliance. HFO-1336mmz is also being used in portable extinguishers, so it might also be suitable to replace the currently installed HFCs, but the price differential is not currently known.

Foam manufacturing

22. Two foam manufacturing enterprises have been identified in Liberia. One is a foam plate factory using pentane and the other, LIPFOCO, manufactures foam for furniture. LIPFOCO utilises 2 mt of HFC-134a a year. The enterprise is internationally owned and therefore not eligible for support under the KIP. The HFC consumption in the foam manufacturing sector will be addressed through the licensing and quota system.

IV. Stage I of the Kigali HFC implementation plan as submitted

Institutional, policy and regulatory framework

23. Subsequent to the ratification of the Kigali Amendment, the Government of Liberia amended the ODS regulations to include the phase-down timetable for the HFC licensing and quota system, which came into force on 1 January 2024. Currently, the country is issuing quotas to companies that come forward requesting permits while ensuring that the maximum consumption allowed is not exceeded. The quotas are issued in metric tonnes per refrigerant or blend to be imported, and the NOU carefully monitors compliance.

24. The country's regulations also include provisions on HFC data collection; the enforcement of a licensing and quota system where all importers of HFC refrigerants and HFC-based equipment must first be registered with the NOU and receive the necessary permit before importation; the banning of untrained and uncertified persons from carrying out servicing, installation, commissioning and decommissioning of RAC appliances; and penalties in case of non-compliance.

25. Liberia has also developed a National Energy Policy with the objective of ensuring universal access to modern energy services in an affordable, sustainable, and environmentally friendly manner. Furthermore, a National Energy Efficiency Action Plan was developed, which includes energy efficiency standards for power-generation equipment, appliances and lighting devices; standards for appliances such as air conditioners, refrigerators, washing machines, electric water heaters, fans, transformers, power consumption meters, etc.; and energy efficiency labels for electrical-power-generation equipment, electronic equipment, and other appliances that consume electric power. However, these standards have not yet been adopted.

Phase-down strategy for stage I of the Kigali HFC implementation plan

Overarching strategy

26. Under stage I of the KIP, the Government of Liberia has committed to an accelerated HFC phase-down with the target of reducing consumption of HFCs to 34 per cent lower than the estimated revised baseline in 2025 and 2026; and 36 per cent, 38 per cent, and 40 per cent lower than the estimated revised baseline respectively by 2027, 2028 and 2029. These ambitious goals would be achieved by creating

synergies with the ongoing HPMP, and prioritizing the strengthening of the regulatory framework to reduce HFC supply and demand, building the capacity of servicing technicians on containment practices, especially in the residential AC and MAC sectors, developing an incentive scheme for R-290-based AC units to encourage a market change, and providing technical support to limit the use of HFCs in the firefighting sector.

Proposed activities

27. The proposed activities for stage I of the KIP will be delivered under four main components, which are presented below with the related costs.

(a) *Establishing and implementing the regulatory framework in support of low-GWP technologies*: Enhancement of the HFC quota system; creation of a centralized electronic licensing system; assessment of the potential ban on the import of domestic refrigerators using refrigerants with a GWP greater than 150 and single-split AC units using refrigerants with a GWP greater than 750, and drafting the corresponding regulations; encouraging importers of second-hand RAC equipment to shift to R-600a refrigerators; undertaking stakeholder consultations on limiting the installation of HFC-236fa systems in the country; training at least 50 customs forwarding agents; complementing ongoing training for customs officers by incorporating HFCs into the training and training manual and training an additional 100 customs officers at main border posts (US $40,000);

(b) *Capacity building for RAC technicians*: Adding one day of training to the ongoing RAC technician training activities on containment for 50-80 technicians working in the commercial refrigeration and AC sectors with a focus on leak-proofing systems through proper installation; training workshops for a total of 100 MAC servicing technicians related to leak testing and leak proofing the MAC systems; creation of a scholarship for 20 women technicians to attend one-year of courses in the RAC field (US $52,000);

(c) *Developing an incentive scheme for R-290-based air conditioners*: Conduct one workshop for stakeholders to define modalities for the incentive scheme; identify local importers willing to act as distributors for the R-290-based units; procure a consignment of 50 units of R-290-based AC; raise awareness about the programme; undertake a demonstration at a local hospital or public-service building to showcase 10 units, including comparing the energy efficiency gains between old and new units (US $25,000); and

(d) *Awareness raising for the firefighting sector*: Carry out one workshop for enterprises in this sector; identify local experts and enterprises using alternatives; and conduct an awareness-raising campaign demonstrating alternatives already being used in the country to encourage a move away from high-GWP fire suppressants (US $20,000).

Project implementation, coordination, and monitoring

28. The monitoring activities will build upon the HPMP, which will run concurrently with stage I of the KIP. Under the HPMP there is a provision to have a consultant who is assigned to assist the NOU with project implementation activities. The KIP, with its limited budget, will use the existing structure to obtain assistance with the coordination of activities where required, in order to maximize the benefits of available funds. Project monitoring activities are proposed at a cost of US $28,000 to be allotted for hiring consultants (US $12,000), monitoring travels (US $ 6,000), and conducting coordination meetings (US $10,000).

Gender policy implementation

29. The RAC sector in Liberia is well known to be dominated by men with very little participation by women. During the implementation of stage I of the KIP, gender mainstreaming will be applied wherever

feasible, such as by encouraging women to participate in training and workshops. Additionally, women will be attracted into the sector through a scholarship scheme to assist women enrolled at technical institutes to study in the RAC field. The planned scholarship will aim to not only encourage women to participate but also to assist with reducing their financial burden. Furthermore, in line with the Multilateral Fund indicators, gender disaggregated data will be collected for each activity and reported during the submission of the second tranche and in the final reports.

Coordination of activities in the servicing sector under the HCFC phase-out and HFC phase-down plans

30. In line with decision 92/37(b)(i)d, the country is committed to optimizing the simultaneous implementation of stage II of the HPMP and stage I of the KIP while avoiding the duplication of efforts. The ongoing work under the HPMP will be complemented by the planned KIP activities, thus expanding the work's impact to include HFCs.

31. Whereas activities implemented under the HPMP have zoned in on the training of customs officers, the training and certification of RAC technicians in good servicing practices, the provision of tools and equipment to training centres and associations, and refrigerant recovery and reclaim measures, the KIP's focus is on creating an environment conducive to the adoption of low-GWP alternatives and on expanding good servicing practices to sectors not addressed under the HPMP. This includes the adoption of regulatory measures to support HFC phase-down; the inclusion of HFCs and low-GWP alternatives in the customs and RAC vocational institutes' training programmes; training and awareness building on HFCs and natural refrigerants; demonstrations of equipment based on low-GWP alternatives; developing an incentive scheme for R-290-based air conditioners; and technical support for the firefighting sector.

32. Stage I of the KIP will be implemented in two tranches. The schedule of HFC phase-down and HCFC phase-out commitments is presented in annex I to the present document, and the simultaneously implemented activities and associated final costs of the two plans are listed in annex II.

Total cost of stage I of the Kigali HFC implementation plan

33. The budget for stage I has been proposed at US $165,000. The cost of activities in the refrigeration servicing sector have been proposed in line with decisions 92/37 and 92/44.

Implementation of the first tranche of stage I of the Kigali HFC implementation plan

34. The first funding tranche of stage I of the KIP, in the total amount of US $81,500, will be implemented between June 2024 and June 2027 will include the following activities:

(a) *Establishing and implementing the regulatory framework in support of low-GWP technologies*: Enhancement of the HFC quota system; assessment of a potential ban on the import of domestic refrigerators using refrigerants with a GWP greater than 150 and single-split AC units using refrigerants with a GWP greater than 750, and drafting the corresponding regulations; encouraging importers of second-hand RAC equipment to shift to R-600a refrigerators; stakeholder consultations on limiting the installation of HFC-236fa systems in the country; training a total of 50 customs forwarding agents and updating of the customs training manual (US $21,500);

(b) *Capacity building for RAC technicians*: Adding one day of training to the ongoing RAC technician training activities on containment for 35 technicians working in the commercial refrigeration and AC sector, with a focus on leak-proofing systems through proper installation; training workshops for a total of 40 technicians working in MAC servicing; creating a scholarship for 10 women studying one-year courses in the RAC field (US $22,000);

(c) *Developing an incentive scheme for R-290-based air conditioners*: Conduct one workshop for stakeholders to define modalities for the incentive scheme; identify local importers willing to act as distributors for the R-290-based units (US $15,000);

(d) *Awareness raising for the firefighting sector*: Carry out one workshop for enterprises in this sector and identify local experts and enterprises using alternatives (US $12,000); and

(e) *Project coordination and monitoring* (US $11,000), which will be allocated for hiring consultants (US $5,000), monitoring travels (US $2,000), and coordination meetings (US $4,000).

SECRETARIAT'S COMMENTS AND RECOMMENDATION

V. Comments

Overarching strategy

35. In line with decision 92/44, the Government of Liberia has indicated its strong commitment[4] to support and accelerate the HFC phase-down commitment as presented in paragraph 26.

36. The Secretariat appreciates the accelerated reductions proposed by the Government of Liberia between 2025 and 2029, which contemplate a potential increase in HFC consumption while remaining under the Montreal Protocol limits. Despite the efforts made under the HPMP, the trend for the replacement of the HCFC-based installed equipment is towards HFC-based technology since, in some sectors, the low and zero-GWP technologies are not available in Liberia, while in other sectors, the barriers need to be addressed under the KIP.

37. Liberia has reported HFC data since 2018 on a voluntary basis since the country ratified the Kigali Amendment in 2020. The Article 7 data for 2020, 2021 and 2022 were adjusted following an extensive survey conducted during the preparation of the KIP. The Government of Liberia has submitted the corrected data to the Ozone Secretariat, which will communicate it to the Implementation Committee at its 72nd meeting, to be held on 7 July 2024, in line with decisions XIII/15, XIV/27 and XV/19 of the Meeting of the Parties on the consideration of requests for the revision of baseline data. Accordingly, stage I of the KIP is recommended under the established baseline and on the understanding that what the Meeting of the Parties decides on the revised data, it will be incorporated into the Agreement between the Government of Liberia and the Executive Committee.

38. The Secretariat noted a drop in data consumption from 2018 to 2019 and an upward trend from 2019 to 2023. The Government of Germany explained that the country reported its best-estimated consumption from 2018 and 2019 since the license system did not include HFCs at that time, and that those two years were not part of the HFC survey conducted for the KIP preparation. Furthermore, the HFC consumption from 2020 to 2022 was driven by the country's economic situation and the global supply-chain challenges during the COVID-19 pandemic. The Secretariat acknowledges that the HFC consumption trends during the baseline years were distorted by the COVID-19 pandemic. Furthermore, Liberia has resubmitted the Article 7 data (presented in table 3) and CP data for 2023, showing HFC consumption levels higher than in 2022 due to the recovery of the economy and the natural market trends to replace HCFC-based equipment.

[4] Germany indicated that the letter of commitment from the Government will be signed and submitted before the 94th ExCom meeting.

Institutional, policy and regulatory framework

HFC licensing and quota system

39. In line with decision 87/50(g), the Government of Germany has confirmed that Liberia has an established and enforceable system of licensing and quotas for monitoring HFC imports/exports based on the denial of import permits by the Government since HFC import controls were included in the national regulations on 1 January 2024. The 2024 HFC quota is aligned with the baseline of 180,909 CO_2-eq tonnes. Furthermore, the Government of Germany stated that to achieve further HFC reduction, a strong enforcement mechanism of the HFC quota should be adopted, using a combination of proportional reductions by refrigerant while encouraging a genuine move away from high-GWP refrigerants.

Legal and regulatory measures to support HFC phase-down

40. The Secretariat noted with appreciation the assessment to be conducted for the purpose of imposing bans on the import of domestic refrigeration and single-split AC units based on respectively high-GWP HFCs for each application by the end of stage I. In response to the Secretariat's enquiries related to a potential ban in HFC-firefighting installations, the Government of Germany responded that imposing a ban on new HFC-firefighting installations was premature. Nevertheless, the HFC quota system would be applied to the firefighting sector.

41. The Secretariat recognized the advantages of controlling HFC imports through a centralized electronic permit system, and consulted when the Single Window for Trade platform would be operational, whether the electronic system for authorizing HFC imports would have a link with the platform, and when the electronic permit system would be launched. The Government of Germany responded that the Single Window for Trade platform should be in place by next year and that the aim is to have an integrated system. The overall objective is for importers to be able to put all relevant information into the portal, and for the HFC and HFC-based equipment import permits to be connected directly with the customs' system.

Technical and cost-related issues

42. Based on decision 92/37, the funding level to reach a 10 per cent reduction of the baseline corresponds to a maximum of US $145,000. The country is requesting additional US $20,000 for technical assistance in the firefighting sector through trainings, awareness-raising and support on alternatives. Understanding that the Government of Liberia is offering additional phase-out commitments, i.e. 40 per cent reduction from the estimated revised HFC revised baseline, the Secretariat considers that the KIP proposal for Liberia meets the case-by-case criteria established by decision 92/44 and that the additional amount requested is justified by the cost of the proposed activity.

End-users, RAC and MAC servicing

43. Regarding the support to the MAC servicing sector, the Government of Germany explained that the proposal focuses on refrigerant containment because finding leaks in MAC units is challenging. Frequently, the MAC technicians cannot locate failure points, which inevitably leads to high leakage of refrigerants. Therefore, the subject of training for MAC technicians will be leak-proofing. Formal and informal MAC technicians will be targeted, and the RAC association will assist the NOU in identifying the technicians for training. Given the limited budget available under the KIP, the provision of tools will only include the more formal workshops with a higher number of annual services.

44. Given the significant use of HFCs in the commercial refrigeration sector and the relevance of training on leak prevention, the Secretariat proposed post-training monitoring of the commercial equipment serviced by the trained technicians. In response, the Government of Germany indicated that the NOU could include a post-training clause on reporting and monitoring to enhance the practical impact of the training.

The Government of Germany further explained that it is a good practice for equipment owners to maintain logbooks for any work done on a system. To ensure appropriate maintenance of the systems, a component could be added requiring these logbooks to be made available to the NOU and RAC association for monitoring.

45. Regarding potential activities to promote the adoption of low-GWP technologies in the commercial refrigeration sector, the Government of Germany indicated that limited funding made it impossible to demonstrate low-GWP technologies in the country, such as R-290 monoblocks[5] or CO_2 systems. Suitable experience with these technologies in the local market would make it easier to encourage a move to those technologies now. Under stage II of the KIP, Liberia will assess and tackle HFC use in the commercial refrigeration sector.

Developing an incentive scheme for R-290-based air conditioners

46. Despite recognizing the relevance of addressing the air-conditioning sector, the Secretariat requested clarification of various points, particularly regarding the timing of doing so, the functioning of the proposed mechanism, the national servicing sector's capacity to manage flammable refrigerants, the origin and availability of the technology, and the lessons learned from other African countries about creating a sustainable market supply chain of R-290-based AC units. The Government of Germany understands that the activities under the HPMP to train trainers and technicians on the use of low-GWP alternative technology in AC, and the green procurement guide under development will provide a valuable basis for encouraging the use of R-290-based AC units in Liberia. Therefore, creating a sustainable market supply chain over time will facilitate the change in the market through increased availability of low-GWP AC equipment that will reduce the country's dependence on R-410A.

47. The Government of Germany explained that the project would support only the first consignment of equipment with an incentive. The units are priced competitively with R-32 and R-410A units, and the only hurdle has been initiating the supply chain, which the incentive scheme aims to achieve. On top of that, the NOU will provide a forum to inform and create awareness about the AC units and their benefits to support the initiative's sustainability. The Government of Germany added that several African countries are embarking on this activity with AC units provided by a Chinese electrical appliance manufacturer, and that despite it being early to share lessons learnt, the local distributors are willing to come forward to supply these units. This increased availability of R-290 in West Africa, with countries like Ghana, Nigeria, Burkina Faso, and Senegal opting for R-290-based AC units, will benefit Liberia with the regional availability of these units. Once the incentive scheme is initiated and experience has been gained on how the market behaves, it would be possible to draft an appropriate strategy to further develop the supply of low and zero-GWP-based technology in further stages of the KIP. In line with decision 92/36(g), the Government of Germany was requested to report, upon completion of this project, on the achieved HFC phase-out and energy-efficiency gains.

Coordination and monitoring

48. The Secretariat sought clarifications regarding the role of the NOU and the agencies in KIP and HPMP implementation and enquired about the allocation of 20 per cent of the KIP budget to project coordination, reporting, and follow-up. In response, the Government of Germany highlighted that the NOU is responsible for carrying out the implementation of both projects on the ground and reporting the progress to the bilateral and implementing agencies, which are responsible for monitoring progress, providing expert guidance and support as deemed necessary, and exercising financial control over expenditures. The Government of Germany also explained that the institutional strengthening project, which covers the basic functioning of the NOU, has limited resources. Furthermore, although the NOU would synchronize the

[5] Refrigeration equipment pre-charged with refrigerant and containing all components required for cooling (compressor, condenser, evaporator, expansion valves and fans) in a single unit.

activities required to monitor the KIP and the HPMP, covering the KIP fixed costs for five years represents a high proportion of a small total project budget.

Total project cost

49. The total cost of stage I of the KIP for Liberia (without agency support costs) amounts to US $165,000, based on the average HFC consumption in the refrigeration servicing sector in the years 2020–2022, in line with the Executive Committee decisions 92/37 and 92/44.

50. The level of funds recommended remains as requested. Stage I of the KIP will be implemented in two tranches, allowing for an effective implementation of activities with longer implementation times per tranche and reduced administrative costs linked to processing fewer tranches.

51. In line with decision 93/105, the Secretariat considered the tranche distribution proposed by the Government of Germany on a case-by-case basis. The dual-tranche modality is consistent with the tranche distribution modalities for KIPs proposed in document UNEP/OzL.Pro/ExCom/94/59. In the event that the country does not comply with the maximum allowable consumption target for any year following the approval of the last tranche, such issues would be considered according to Appendix 7-A of the future KIP agreement ("Reductions in funding for failure to comply with the targets in the Agreement"), noting that any reduction in funding, if applicable, would be applied at the time of approval of stage II of the KIP.

Co-financing

52. Building upon existing initiatives under the HPMP, the KIP will continue and expand co-financing measures to maintain the continuity of activities and achieve their objectives. For instance, local training institutes have been supported regularly under the various projects and these institutes will continue to make available their space at no cost to the project so that the necessary training can be conducted. This collaboration will foster knowledge-sharing and skill development within the industry. Existing websites, social media platforms, forums, and newsletters of both the Government and private stakeholders will be used to spread information about KIP activities, goals, and initiatives. This comprehensive dissemination strategy will ensure a wider reach of the KIP message through multiple channels.

2024–2026 business plan of the Multilateral Fund

53. The Government of Germany is requesting US $165,000, plus agency support costs, for the implementation of stage I of the KIP for Liberia. The total value of US $92,095, including agency support costs, requested for the period of 2024–2026, is not in the business plan.

Sustainability of the HFC phase-down and assessment of risks

54. The main potential risks to the sustainability of HFC phase-down in Liberia include delays in the approval of the regulation supporting the HFC quota system; supply-chain constraints limiting the local availability of low-GWP technologies; growing demand for affordable AC equipment; and the influx of HFC-based RAC equipment into the country. Additionally, the absence of affordable alternative refrigerants or technologies could exacerbate the use of HFCs.

55. To address these risks, the country plans to implement bans on the import of HFC-134a-based domestic and stand-alone commercial refrigeration equipment and R-410A-based AC units, in addition to introducing other regulatory measures and continuing investment in the refrigerant reclaim scheme and the certification and training of technicians under the HPMP. The incentive scheme for R-290-based air conditioners is expected to popularize low-GWP technologies across the country, ensure the long-term sustainability of skills and expertise in the workforce and promote the involvement of country importers and supply-chain stakeholders in the HFC phase-down.

Impact on the climate

56. The activities proposed, including regulatory measures to restrict the use of high-GWP refrigerants, efforts to promote low-GWP alternatives, and training for the containment of refrigerants, indicate that the implementation of stage I of the KIP will reduce refrigerant emissions into the atmosphere, resulting in climate benefits. While the Secretariat is not able to provide an estimate of the avoided emissions from the implementation of the KIP at the present meeting,[6] by 2029 Liberia will have reduced its annual emissions by approximately 79,281 CO_2-eq tonnes of HFCs, calculated as the difference between the estimated revised HFC baseline for compliance and the country's 2029 target, assuming that all HFCs consumed would eventually be emitted.

Draft Agreement

57. A draft Agreement between the Government of Liberia and the Executive Committee for stage I of the KIP has not been prepared as the Agreement template is still under consideration by the Executive Committee.

58. If the Executive Committee so wishes, the funds for stage I of the KIP for Liberia could be approved in principle, and funds for the first tranche could be approved on the understanding that the Agreement would be prepared and presented at a future meeting, before the submission of the second tranche, and once the Agreement template has been approved.

VI. Recommendation

59. The Executive Committee may wish to consider:

(a) Approving, in principle, stage I of the Kigali HFC implementation plan (KIP) for Liberia for the period 2024–2029 to reduce HFC consumption by 40 per cent of the country's estimated revised baseline by 2029, in the amount of US $165,000, plus agency support costs of US $21,450, for the Government of Germany, as reflected in the schedule contained in annex I to the present document; on the understanding that annex I will be revised when the second tranche of the KIP is submitted as follows:

(i) If the revision of the consumption data in the baseline years is approved by the Implementation Committee, the Montreal Protocol targets would be adjusted in consistence with the revised baseline;

(ii) If the revision of the consumption data in the baseline years is not approved by the Implementation Committee, the funding for stage I of the KIP would be adjusted as applicable;

(b) Noting the commitment of the Government of Liberia to reduce HFC consumption from the country's estimated revised baseline by 34 per cent by 1 January 2025, 36 per cent by 1 January 2027, 38 per cent by 1 January 2028, and 40 per cent by 1 January 2029;

(c) Noting also that upon completion of the incentive scheme for R-290-based air conditioners included in stage I of the KIP, the Government of Germany will submit a final report on the implementation of the project, including the HFC phase-out and energy-efficiency gains achieved, in line with decision 92/36(g);

[6] As noted in document 94/14, Overview of issues identified during project review, the Secretariat is in the process of developing a methodology to estimate the avoided emissions from the implementation of HFC phase-down projects supported by the Multilateral Fund.

(d) Approving the first tranche of stage I of the KIP for Liberia and the corresponding tranche implementation plan, in the amount of US $81,500, plus agency support costs of US $10,595, for the Government of Germany; and

(e) Requesting the Government of Liberia, the Government of Germany, and the Secretariat to finalize the draft Agreement between the Government of Liberia and the Executive Committee for the reduction in consumption of HFCs, including the information contained in the annex referred to in subparagraph (a) above, and to submit it to a future meeting once the KIP Agreement template has been approved by the Executive Committee.

Annex I

SCHEDULE OF HFC PHASE-DOWN AND HCFC PHASE-OUT COMMITMENTS AND FUNDING TRANCHES UNDER THE KIGALI HFC IMPLEMENTATION PLAN AND THE HCFC PHASE-OUT MANAGEMENT PLAN FOR LIBERIA

Kigali HFC implementation plan (stage I)

Row	Particulars	2024	2025	2026	2027	2028	2029	Total
1.1	Montreal Protocol reduction schedule of Annex F substances (CO_2-eq tonnes)	180,909	180,909	180,909	180,909	180,909	162,818	n/a
1.2	Maximum allowable total consumption of Annex F substances (CO_2-eq tonnes)	180,909	130,532	130,532	126,616	122,817	117,904	n/a
2.1	Lead IA (the Government of Germany) agreed funding (US $)	81,500	0	0	83,500	0	0	165,000
2.2	Support costs for Lead IA (US $)	10,595	0	0	10,855	0	0	21,450
3.1	Total agreed funding (US $)	81,500	0	0	83,500	0	0	165,000
3.2	Total support costs (US $)	10,595	0	0	10,855	0	0	21,450
3.3	Total agreed costs (US $)	92,095	0	0	94,355	0	0	186,450

HCFC phase-out management plan (stage II)

Row	Particulars	2022	2023-2024	2025	2026-2029	2030	Total
1.1	Montreal Protocol reduction schedule of Annex C, Group I substances (ODP tonnes)	3.45	3.45	1.72	1.72	0.00	n/a
1.2	Maximum allowable total consumption of Annex C, Group I substances (ODP tonnes)	1.70	1.50	0.74	0.74	0.00	n/a
2.1	Lead IA (UNEP) agreed funding (US $)	116,000	0	164,012	0	58,500	338,512
2.2	Support costs for Lead IA (US $)	15,080	0	21,322	0	7,605	44,007
2.3	Cooperating IA (UNIDO) agreed funding (US $)	135,595	0	110,893	0	0	246,488
2.4	Support costs for Cooperating IA (US $)	12,204	0	9,980	0	0	22,184
3.1	Total agreed funding (US $)	251,595	0	274,905	0	58,500	585,000
3.2	Total support costs (US $)	27,284	0	31,302	0	7,605	66,191
3.3	Total agreed costs (US $)	278,879	0	306,207	0	66,105	651,191

Annex II

SIMULTANEOUS IMPLEMENTATION OF THE HCFC PHASE-OUT MANAGEMENT PLAN AND THE KIGALI HFC IMPLEMENTATION PLAN IN LIBERIA

	HPMP – stage II		KIP – stage I		HPMP+KIP combined cost (US $)
Category of activity	**Activity**	**Cost (US $)**	**Activity**	**Cost (US $)**	
Strengthening of quota and licencing system and enforcement of ODS regulation	Ban HCFC- based equipment by 1 January 2024; adopt 2022 HS codes and facilitate border dialogues	33,112	Enhancement of the HFC quota system; creation of a centralised electronic licensing system; assessment for a ban on domestic refrigerators using refrigerants with GWPs greater than 150 and on single-split ACs using GWPs greater than 750, and drafting the corresponding regulations; encouraging importers of second-hand RAC equipment to shift to R-600a refrigerators; undertake stakeholder consultation for limiting installations of HFC-326fa systems in the country	22,000	55,112
Customs training and tools	Training 250 customs and other law enforcers and update training manual; purchase of four refrigerant identifiers	70,000	Training of 50 forwarding agents; complementing ongoing training by incorporating HFCs to the training of 100 customs officers at main border posts; and updating of the customs training manual	18,000	88,000
Revision of standards	Revise the existing technical standards for RAC service sector to incorporate energy efficiency and safety consideration related to the use of low GWP technologies; capacity building workshops for 30 standards officers and environmental inspectors; consultation/awareness raising for 60 importers, industries and the general public inspections at borders, importers' warehouses and other storage facilities to enhance compliance to the technical standards	55,400		0	55,400
Green procurement	Capacity-building for 40 procurement officers on procurement of environmentally friendly technologies	15,000		0	15,000
Certification of technicians/training RAC technicians	Establish RAC certification scheme and awareness raising to stakeholders	25,000		0	25,000

	HPMP – stage II		KIP – stage I		HPMP+KIP combined cost (US $)
Category of activity	**Activity**	**Cost (US $)**	**Activity**	**Cost (US $)**	
Code of practice and training RAC curricula	Revise technicians' national codes of practice and the refrigeration technicians training curricula	15,000		0	15,000
Training RAC technicians	Training and certification of 200 refrigeration technicians	40,000	Adding one day training to the RAC technician training activities ongoing on containment for 50-80 technicians working in the commercial refrigeration and AC sector with a focus on leak proofing systems and proper installations to prevent leaks	17,000	57,000
Training of MA technicians		0	Training workshops for a total of 100 MAC servicing technicians related to leak testing and leak proofing the MAC systems	25,000	25,000
Support for associations and training centres	Two training workshops for 40 participants from the Refrigeration Union through training on administering certification scheme and codes of conduct and provision of tool kits to refrigeration training institutes	16,000		0	16,000
Support for RAC association and training centres	Targeted awareness programmes for end users transition away from HCFCs and new technologies such as natural refrigerants	14,000		0	14,000
Centres of excellence	Strengthening the three centres of excellence by provision of toolkits and upgrade tools for hydrocarbons handling and additional identifiers Establishment of refrigerant recovery and re-use scheme and establish one reclaim centre	107,000		0	107,000
Refrigerant recovery and recycling scheme	Establishment of refrigerant recovery and re-use scheme and establish one reclaim centre	60,000		0	60,000
Awareness raising for firefighting sector		0	Conduct one workshop for enterprises in this sector; identify local experts and enterprises using alternatives; and awareness raising campaign demonstrating alternatives already being used to encourage a move away from the high-GWP fire suppressants	20,000	20,000

	HPMP – stage II		KIP – stage I		HPMP+KIP combined cost (US $)
Category of activity	**Activity**	**Cost (US $)**	**Activity**	**Cost (US $)**	
Promotion of low-GWP alternatives and demonstration	Technical assistance to promote R-290 uptake in the country including an assessment of operation and awareness raising programme; train-the-trainers programme for natural refrigerant based equipment for five trainers	79,488	Conduct one workshop for stakeholders to define modalities for the incentive scheme; procure a consignment of 50 units of R-290-based AC; undertake a demonstration at a local hospital or public service building to show case 10 units including comparing the energy efficiency gains between old and new units; raise awareness of the programme	25,000	104,488
Gender related activities			Creation of a scholarship for women technicians to attend one-year courses conducted at the Monrovia Vocational Training centre in the RAC field based on merits and needs	10,000	10,000
Coordination and monitoring	Project monitoring and follow-up activities, including operational cost for the PMU and meetings with stakeholders	55,000	Project monitoring activities and coordination meetings	28,000	83,000
Total		**585,000**		**165,000**	**750,000**
Percentage of total (%)		**78**		**22**	**100**