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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 agenda¹

PROJECT PROPOSAL: SIERRA LEONE

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) UNEP and UNIDO

¹ UNEP/OzL.Pro/ExCom/94/1

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS

Sierra Leone

PROJECT TITLE	AGENCY
Kigali HFC implementation plan (stage I)	UNEP (lead), UNIDO

LATEST ARTICLE 7 DATA (Annex F)	Year: 2022	172.83 mt	386,912 CO ₂ -eq tonnes
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SECTORAL HFC CONSUMPTION DATA (CO₂-eq tonnes) AND ACTIVITIES									
	Aerosol	Foam	Fire-fighting	Air-conditioning and refrigeration				Solvent	Other
				Manufacturing			Servicing		
				Refrigeration	AC	Other			
As submitted (2022)							386,912		
Latest CP report (2022)							*422,777		
KIP stage I activities as agreed (Y/N)	N	N	N	N	N	N	Y	N	N

*The correct value is 386,912 CO₂-eq tonnes. The revised CP report will be resubmitted in May 2024.

AVERAGE 2020-2022 HFC CONSUMPTION IN SERVICING	139.06 mt	315,180 CO ₂ -eq tonnes
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BASELINE CONSUMPTION DATA (CO₂-eq tonnes)	2020	2021	2022	Average 2020-2022
HFC annual consumption	250,376	308,252	386,912	315,180
HCFC baseline (65%)				35,725
HFC baseline				350,905

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	350,905	350,905	350,905	350,905	350,905	315,815	n/a	
	Maximum allowable	345,642	339,676	333,711	327,746	321,780	315,815	n/a	
	Maximum allowable (%)	99	97	95	93	92	90	n/a	
Amounts recommended in principle (US \$)	UNEP	Project costs	65,500	0	0	38,817	0	0	104,317
		Support costs	8,515	0	0	5,046	0	0	13,561
	UNIDO	Project costs	21,000	0	0	54,683	0	0	75,683
		Support costs	2,730	0	0	7,109	0	0	9,839
	Total project costs		86,500	0	0	93,500	0	0	180,000
	Total support costs		11,245	0	0	12,155	0	0	23,400
	Total funds		97,745	0	0	105,655	0	0	203,400

* Recommended for approval at the present meeting

Reductions from stage I	35,091 CO ₂ -eq tonnes
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Secretariat's recommendation:	Individual consideration (Secretariat presentation not required)
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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 Sierra Leone, UNEP as the lead implementing agency has submitted a request for stage I of the Kigali HFC implementation plan (KIP), at a total cost of US \$203,400, consisting of US \$109,850, plus agency support costs of US \$14,280, for UNEP and US \$70,150, plus agency support costs of US \$9,120, for UNIDO, as originally submitted.²

3. The implementation of stage I of the KIP will assist the Government of Sierra Leone in meeting the target of 10 per cent reduction from its HFC baseline consumption by 1 January 2029.

4. The first tranche of stage I of the KIP requested at this meeting amounts to US \$100,005, consisting of US \$72,750, plus agency support costs of US \$9,458, for UNEP and US \$15,750, plus agency support costs of US \$2,048, for UNIDO, as originally submitted, for the period of June 2024 to June 2026.

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 Sierra Leone as of April 2023.

Table 1. HPMP implementation status for Sierra Leone

	Stage I	Stage II
Meeting when HPMP was approved/updated	65 th	87 th / 93 rd
Reduction from baseline	35% by 2020	85% by 2025 and 100% by 2030
Total project cost (US \$)	210,000	640,000
Date of completion	31 October 2021	31 December 2031 (planned)

Status of implementation of previous HFC-related activities

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

² As per the letter of 2 February 2024 from the Ministry of the Environment and Climate Change of Sierra Leone to the Secretariat.

Table 2. Previously approved HFC-related activities in Sierra Leone

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

III. HFC consumption overview

HFC consumption levels

7. Sierra Leone only imports HFCs for use in the refrigeration and air-conditioning (RAC) servicing sectors. The most consumed substances in 2022 were HFC-134a (29.6 per cent of total HFC consumption in CO₂-equivalent (CO₂-eq) tonnes), R-404A (22.1 per cent), R-508B (13.2 per cent), R-507A (11.1 per cent), R-410A (10.3 per cent) and other HFCs (13.7 per cent). Table 3 presents the country's HFC consumption as reported to the Ozone Secretariat under Article 7 of the Montreal Protocol.

Table 3. HFC consumption in Sierra Leone (2019–2022 Article 7 data)

HFC	GWP	2019	2020	2021	2022	2023*
Metric tonnes (mt)						
HFC-32	675	0	0	0	10.50	6.90
HFC-134a	1,430	40.30	65.96	70.58	80.09	63.47
R-404A	3,922	12.00	14.65	17.85	21.78	18.20
R-407A	2,107	6.30	6.50	10.50	15.00	16.10
R-407C	1,774	5.70	5.10	7.16	8.00	5.30
R-410A	2,087	8.90	14.50	18.34	19.15	23.87
R-507A	3,985	0	6.23	7.23	10.80	9.67
R-508B	6,808	0.02	3.05	5.20	7.50	0
Total (mt)		73.22	115.99	136.86	172.83	143.51
CO₂-eq tonnes						
HFC-32	675	0	0	0	7,088	4,658
HFC-134a	1,430	57,629	94,323	100,929	114,543	90,762
R-404A	3,922	47,059	57,451	70,001	85,412	71,373
R-407A	2,107	13,274	13,696	22,124	31,605	33,923
R-407C	1,774	10,111	9,047	12,701	14,191	9,401
R-410A	2,087	18,579	30,269	38,285	39,976	49,829
R-507A	3,985	0	24,827	28,812	43,038	38,535
R-508B	6,808	136	20,764	35,402	51,060	0
Total (CO₂-eq tonnes)		146,788	250,376	308,252	386,912	298,480

* Estimated CP data values; the report is expected to be submitted by 1 May 2024.

Established HFC baseline

8. The Government of Sierra Leone reported the Article 7 data for 2020-2022. The country's HFC consumption baseline was established at 350,905 CO₂-eq tonnes by adding 65 per cent of its HCFC baseline expressed in CO₂-eq tonnes to its average HFC consumption in 2020-2022, as shown in table 4.

Table 4. HFC baseline calculation for Sierra Leone (CO₂-eq tonnes)

Baseline calculation components	2020	2021	2022
HFC annual consumption	250,376	308,252	386,912
HFC average consumption in 2020-2022			315,180
HCFC baseline (65%)			35,725
HFC baseline			350,905

Country programme implementation report

9. The HFC consumption data provided by the Government of Sierra Leone in its country programme (CP) implementation report for 2022 was not consistent with Article 7 data due to an error made in recording R-507A consumption. Once the 2022 CP report is accordingly revised, the Government of Sierra Leone will resubmit it to the Secretariat in May 2024, along with the 2023 CP report.

HFC consumption trends

10. Due to the implementation of the HPMP and associated regulations regarding the imports of both new and second-hand RAC equipment containing HCFCs, the country has seen an accelerated phase-out of HCFCs. This progress has been facilitated by the registration and certification of servicing workshops, the introduction of a certification scheme for technicians, and the establishment of an import/export licensing system. HCFCs have been largely replaced by HFCs in Sierra Leone, contributing to a steady growth in HFC consumption since 2016.

HFC consumption by sector

11. HFCs are consumed for servicing in the residential and commercial air-conditioning (AC) subsectors (31.5 per cent in mt and 24.6 per cent in CO₂-eq tonnes), followed by commercial and industrial refrigeration (23.6 per cent in mt and 43.5 per cent in CO₂-eq tonnes), domestic refrigeration (21.7 per cent in mt and 13.9 per cent in CO₂-eq tonnes), mobile air-conditioning (MAC) (20.2 per cent in mt and 12.9 per cent in CO₂-eq tonnes), and marine and transport refrigeration (3.0 per cent in mt and 5.2 per cent in CO₂-eq tonnes), as shown in tables 5 and 6.

Table 5. HFC consumption in RAC servicing subsectors in Sierra Leone in mt (2022)

Sector	HFC-32	HFC-134a	R-404A	R-407A	R-407C	R-410A	R-507A	R-508B	Total	Share of total (%)
Refrigeration subsectors										
Domestic	0	37.55	0	0	0	0	0	0	37.55	21.7
Commercial	0	3.22	10.41	0	0	0.32	5.72	7.50	27.17	15.7
Industrial	0	2.23	7.44	0	0	0	3.97	0	13.640	7.9
Marine	0	0	1.15	0	0	0	1.11	0	1.11	1.3
Transport	0	0.12	2.78	0	0	0	0	0	2.90	1.7
Air-conditioning subsectors										
Residential	10.50	0	0	0	0	6.74	0	0	17.24	10.0
Commercial	0	2.04	0	15.00	8.00	12.09	0	0	37.13	21.5
Mobile	0	34.94	0	0	0	0	0	0	34.94	20.2
Total (mt)	10.50	80.10	21.78	15.00	8.00	19.15	10.80	7.50	172.83	100

Table 6. HFC consumption in RAC servicing subsectors in Sierra Leone in CO₂-eq tonnes (2022)

Sector	HFC-32	HFC-134a	R-404A	R-407A	R-407C	R-410A	R-507A	R-508B	Total	Share of total (%)
Refrigeration subsectors										
Domestic	0	53,697	0	0	0	0	0	0	53,697	13.9
Commercial	0	4,606	40,824	0	0	668	22,794	51,060	119,952	31.0
Industrial	0	3,189	29,177	0	0	0	15,820	0	48,186	12.5
Marine	0	0	4,510	0	0	0	4,423	0	8,933	2.3
Transport	0	172	10,902	0	0	0	0	0	11,074	2.9
Air-conditioning subsectors										
Residential	7,088	0	0	0	0	14,078	0	0	21,166	5.5
Commercial	0	2,917	0	31,605	14,191	25,230	0	0	73,943	19.1

Sector	HFC-32	HFC-134a	R-404A	R-407A	R-407C	R-410A	R-507A	R-508B	Total	Share of total (%)
Mobile	0	49,963	0	0	0	0	0	0	49,963	12.9
Total	7,088	114,543	85,412	31,605	14,191	39,976	43,038	51,060	386,912	100

Refrigeration and air-conditioning servicing sector

12. There are approximately 2,400 RAC technicians and over 300 servicing workshops consuming HFCs in Sierra Leone. About 84 per cent of all technicians are informal. Out of the total of 377 formal (registered) technicians, 204 (including 21 women) have graduated from recognized training institutes. Technical training programmes are offered by five technical schools and four universities across the country and range in duration from two to five years; graduates obtain suitable national certificates or diplomas. A technician certification scheme is being implemented through the HPMP.

Domestic, commercial, industrial and transport refrigeration

13. The domestic refrigeration subsector includes refrigerators, chest freezers, and portable cooling systems used in residential households, commercial and office buildings, restaurants, and supermarkets. Sixty per cent of the inventory is charged with HFC-134a, 35 per cent with R-600, and 5 per cent with R-290. In terms of metric tonnage, it has the highest HFC consumption of all RAC sectors in the country.

14. The commercial and industrial refrigeration subsectors collectively have the largest HFC consumption in terms of CO₂-eq tonnes. Commercial refrigeration includes stand-alone display cabinets and dispenser units, as well as condensing units used in cold stores and supermarkets, with R-508B and R-404A being the most frequently used refrigerants. There is no evidence of independent enterprises performing the installation and assembly of large RAC systems, which are assembled, installed and charged onsite by the local representatives of equipment manufacturers.

15. Industrial refrigeration comprises centralised systems and process chillers, commonly used in industrial processes and cold-storage applications of the brewery and fishing industries, with R-404A and R-507A being the most consumed refrigerants. Within the marine refrigeration subsector, R-404A and R-507A are used mostly in ice-making facilities, whereas fishing vessels consume predominantly ammonia and HCFC-22 in their on-board cooling systems. Regarding transport refrigeration, R-404A is prevalent in the cooling systems of refrigerated trucks and trailers, with very small use of HFC-134a and HCFC-22.

Residential and commercial air-conditioning

16. The residential AC subsector is dominated by single-split units charged with HFC-32, R-410A and HCFC-22 which are used in all types of households, including large residential blocks, as well as in commercial entities of all sizes. In the commercial AC subsector, multi-split, ducted split and rooftop units, chillers and centralized systems are commonly used to cool commercial buildings, large office spaces, airports, shopping malls, large hotels, hospitals, and large supermarkets. The HFCs most commonly used in multi-split, split ducted and rooftop units are R-410A, R-407C and R-407A, while chillers are mainly charged with R-410A and HFC-134a.

Mobile air-conditioning

17. The MAC subsector in Sierra Leone relies solely on HFC-134a-based systems used in small vehicles, sports utility vehicles and light commercial trucks, as well as in large vehicles such as buses.

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

Institutional, policy and regulatory framework

18. The national ozone unit (NOU), established under the Environmental Protection Agency (EPA) of the Ministry of the Environment and Climate Change, coordinates and monitors activities related to the phase-out of substances controlled by the Montreal Protocol. The National Chemicals Management Committee, including the representatives of the Government, private sector, and non-governmental organizations (NGOs), serves as an advisory body to the NOU and is responsible for reviewing and approving the annual HFC import quota. There are seven registered refrigerant importers who can obtain HFC import permits from the EPA upon request. The Customs Department monitors the implementation of the licensing and quota systems, and the National Ozone Steering Committee advises the Government in formulating and implementing policies, as well as in creating and enforcing regulations to prohibit, control and monitor the import, use, disposal and export of HFCs.

19. In 2011, the Regulation on ozone-depleting substances (ODSs) came into force, targeting the imports of new and used RAC equipment containing banned or controlled substances. In 2022, EPA passed an Act on ozone-related issues, covering *inter alia* the registration and certification of servicing workshops, the establishment of a certification scheme for technicians, and the import /export licensing system. The HFC import quota system was established on 1 April 2024 based on the 2022 Act. The EPA has further reviewed the ozone regulations and a new instrument (Regulation on the Protection of the Ozone Layer and on the Substances Covered by the Montreal Protocol 2024), which includes the HFC quota system, is expected to come into force in May 2024.

20. The country has also been implementing minimum energy performance standards (MEPS) for domestic RAC equipment.

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

Overarching strategy

21. The Government of Sierra Leone aims to follow the established Montreal Protocol reduction targets for HFCs to define the stages of its KIP. Accordingly, stage I will target a 10 per cent reduction from the HFC consumption baseline by 2029, eliminating 35,091 CO₂-eq tonnes of HFCs. The strategy for stage I is to establish and enforce the necessary legal framework to support HFC phase-down, build the capacity of technicians and enforcement agencies to address HFC phase-down and handle alternatives with low global-warming potential (GWP), demonstrate low-GWP technologies in one sector, and ensure the stakeholders' engagement in transitioning to low-GWP technologies in the RAC sector.

Proposed activities and total cost

22. The budget for stage I has been proposed at US \$180,000. The costs of activities in the refrigeration servicing sector have been proposed in line with decision 92/37. The proposed activities and their cost are summarized in table 7.

Table 7. Activities planned under stage I of the KIP for Sierra Leone (as submitted)

Activities	Cost (US \$)	
	UNEP	UNIDO
Legal and regulatory measures		
Enhance the HFC quota system with added criteria for quota allocation and monitoring; establish a ban on the use of HFCs in the fire suppression, foam, aerosol and solvent sectors by 1 January 2026; revise building codes to promote low-GWP refrigerants and RAC systems with lower refrigerant charges; update the MEPS to include considerations	40,450	0

Activities	Cost (US \$)	
	UNEP	UNIDO
of refrigerant type; and develop a National Cooling Plan (NCP) to assist the Government in scaling up the adoption of low-GWP alternatives		
Establish a ban on the import of domestic and commercial stand-alone refrigeration units based on HFC-134a by 1 January 2025 and a ban on the import of split AC units based on R-410A by 1 January 2029; and draft regulatory measures to compel commercial and industrial RAC operators to have in-house refrigerant recovery equipment to minimize demand for HFCs	0	12,550
Enforcement of HFC controls		
Revise and update the customs' training curriculum to include HFCs, natural refrigerants and new Harmonized System (HS) codes; and provide updated training to 10 trainers (including 5 women) and 50 customs officers	16,100	0
Capacity building		
Update the curricula of RAC vocational training institutes to include HFCs and natural refrigerants; develop a CO ₂ training programme at a centre of excellence and hold a related training workshop for 30 technicians; hold awareness-raising workshops on HFCs, natural refrigerants and the Kigali Amendment for 50 importers, distributors and retailers of RAC equipment and refrigerants and 50 built-environment professionals and procurement officers; and hold a workshop for 20 major vehicle importers to frame a national policy for the MAC sector to shift from the use of HFC-134a to HFOs or other acceptable alternatives	28,100	0
Provide technical assistance to 6 selected garages across the country selected to become EPA-accredited centres of excellence for MAC technician training	0	6,200
Demonstration project in the commercial refrigeration sector		
Demonstrate the installation, operation, performance, servicing and energy use of two R-290-based monoblock refrigeration units at food preservation enterprises	0	46,000
Gender mainstreaming		
Create awareness on the RAC industry among 100 junior-level and encourage women as role models in the sector by including them as presenters in all KIP implementation workshops	12,600	0
Project coordination and monitoring		
Project monitoring and coordination	12,600	5,400
Subtotal per agency	109,850	70,150
TOTAL		180,000

Project implementation, coordination and monitoring

23. The KIP project coordination and management team also manages and coordinates stage II of the HPMP, with the NOU (comprised of three staff members) responsible for the overall implementation of both Plans in Sierra Leone.

Gender policy implementation

24. In line with decisions 84/92(d), 90/48(c) and 92/40(b), UNEP's and UNIDO's gender mainstreaming policies and the Government's directives regarding a 30 per cent female inclusion rate, the NOU has incorporated gender perspective into all its activities and programmes. Under the HPMP, a budget line has been allotted to specialized training and equipment for female technicians, as well as making the licensing and certification scheme free of charge to all female (and disabled) RAC technicians. During the implementation of stage I of the KIP, the NOU will seek the stakeholders' input on integrating gender-specific indicators into the planning, implementation, and reporting processes of each component, focusing on balanced participation in training and capacity-building activities. Links with relevant Government agencies, NGOs, private sector, community-based organizations and women's associations

will be used to reflect country-specific gender-sensitive actions in the project's components. Meetings and training sessions will sensitize participants through communicating the importance of gender mainstreaming.

25. UNEP confirmed that the Government of Sierra Leone would include the mandatory Multilateral Fund gender mainstreaming indicators³ in the KIP progress reports and tranche requests, including *inter alia* the number of women and men employed through the project, progress of the gender mainstreaming activities included in the plan, sex-disaggregated quantitative data on implemented activities, knowledge products, good practices and lessons learned, and the allocation of financial resources for gender-related activities.

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

26. 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. Whereas activities implemented under the HPMP have zoned in on the training of customs officers, the training and certification of RAC technicians on good servicing practices, the provision of tools and equipment to training centres and associations, and the 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' curricula, the training and awareness-building on HFCs and natural refrigerants, the demonstrations of equipment based on low-GWP alternatives, and the creation of centres of excellence in the MAC sector.

27. 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.

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

28. The first funding tranche of stage I of the KIP, in the total amount of US \$88,500, will be implemented between June 2024 and December 2026 and will include the following activities:

- (a) *Legal and regulatory measures to support HFC phase-down (US \$32,100):*
 - (i) Enhance the HFC quota system with added criteria for quota allocation and monitoring; issue a ban on the use of HFCs in the fire suppression, foam, aerosol and solvent sectors by 1 January 2026; revise building codes to promote low-GWP refrigerants and RAC systems with lower refrigerant charges; and update the MEPS to include considerations of refrigerant type (UNEP) (US \$25,550);
 - (ii) Issue a ban on the import of domestic and commercial stand-alone refrigeration units based on HFC-134a by 1 January 2025; and draft regulatory measures to compel commercial and industrial RAC operators to have in-house recovery equipment (UNIDO) (US \$6,550);
- (b) *Enforcement of HFC controls:* Revise and update the customs' training curriculum to include HFCs, natural refrigerants and new HS codes; and provide updated training to 50 customs officers (UNEP) (US \$12,600);

³ As proposed in Annex XXII of UNEP/OzL.Pro/ExCom/92/56

- (c) *Capacity building (US \$31,500):*
 - (i) Update the training curricula for RAC vocational institutions to include HFCs and low/zero-GWP refrigerants; develop a CO₂ training programme at one centre of excellence and hold a related training workshop for 30 technicians; organize awareness-raising workshops on HFCs, low/zero-GWP refrigerants and the Kigali Amendment for 25 importers, distributors and retailers and 25 built-environment professionals and procurement officers; and hold a workshop for 20 vehicle importers to frame a national policy for the MAC sector (UNEP) (US \$25,300);
 - (ii) Assist and licence two selected garages as centres of excellence for MAC technician training (UNIDO) (US \$6,200);
- (d) *Gender mainstreaming:* Create awareness on the RAC industry among 50 junior-level students and encourage women as role models in the sector by including them as presenters in all KIP implementation workshops (UNEP) (US \$5,300); and
- (e) *Project coordination and monitoring (US \$7,000):* Fund staff to support project implementation (UNEP (US \$4,000) and UNIDO (US \$3,000)).

SECRETARIAT'S COMMENTS AND RECOMMENDATION

V. Comments

Overarching strategy

29. The Secretariat noted a significant rise in HFC consumption from 2020 to 2022, more than doubling from the 2019 levels. UNEP attributed this increase both to rapid growth in the industrial and fishing sectors, largely dependent on HFC-based equipment, and to increased imports driven by supply-chain concerns during the COVID-19 pandemic. Acknowledging this growth as atypical, it was challenging to discern whether those imports exceeded the country's regular needs. In the absence of the most recent CP report, UNEP provided a preliminary estimate of the 2023 data (presented in table 3), showing consumption levels lower than in 2022 but still elevated compared to previous years.

30. Stage I of the KIP aims to achieve a maximum allowable consumption level of 315,815 CO₂-eq tonnes by 2029, which is 10 per cent below the HFC baseline but slightly above the average consumption for 2020-2022 (at 315,180 CO₂-eq tonnes). UNEP informed the Secretariat that the Government of Sierra Leone did not consider adopting a lower consumption target for 2029; however, it agreed to adjust the maximum allowable consumption levels between 2024 and 2028 to match the planned reductions in annual HFC import quotas, gradually decreasing them until reaching a 10 per cent reduction in 2029, as reflected in row 1.2 of the first table of annex I.

31. The Secretariat acknowledges that the HFC consumption trends during the baseline years had been distorted by the COVID-19 pandemic and notes with appreciation the gradual reductions proposed by the Government between 2024 and 2028. Noting that an unknown portion of HFC consumption reported during the baseline years might still not be representative of the local market's regular consumption needs, and in line with similar cases of other KIPs considered at the 93rd meeting, the Secretariat and UNEP agreed that the Government of Sierra Leone would continue to monitor the country's HFC consumption to understand the extent to which consumption reported in baseline years was representative of the local market's needs, and to assess what future HFC demand would be, and that it would provide that analysis when submitting the second tranche of its KIP. Based on the information provided, the maximum allowable consumption limits for the remaining years of stage I of the KIP, contained in Appendix 2-A to the future Agreement

between the Government of Sierra Leone and the Executive Committee, would be revised as necessary when the Committee considered the second tranche of the KIP.

Institutional, policy and regulatory framework

HFC licensing and quota system

32. In line with decision 87/50(g), Sierra Leone has an established and enforceable system of licensing HFC imports and exports in place. Noting that the regulation that will include the HFC quota system is expected to enter into force in May 2024, the Secretariat requested clarification on the status of application of the quota system.

33. UNEP explained that the HFC import quota system was based on the currently operating HCFC quotas system, taking advantage of the fact that HCFC and HFC importers were the same enterprises. The EPA, through the National Steering Committee, determines the quotas for all controlled substances including HFCs, and requires importers to list specific substances to be imported in permit applications. The 2024 quota were established at 345,641.50 CO₂-eq tonnes, which is 1.5 per cent below the country's HFC baseline. During stage I of the KIP, import quota will gradually decrease every year, to reach a 10 per cent reduction in 2029. The Regulation on the Protection of the Ozone Layer and on the Substances Covered by the Montreal Protocol, providing legal support to the HFC quota system, will enter into force in May 2024.

Legal and regulatory measures to support HFC phase-down

34. The Secretariat noted with appreciation the proposed bans on the import of domestic and commercial stand-alone refrigeration units based on HFC-134a by 1 January 2025; on the use of HFCs in the fire suppression, foam, aerosol and solvent sectors by 1 January 2026; and on the imports of split AC units based on R-410A by 1 January 2029. These measures are likely to prevent the unforeseen application of high-GWP HFCs in the future and contribute to limiting the stock of HFC-based equipment that will require servicing.

35. UNEP considers that the conditions for implementing bans on both domestic and commercial stand-alone refrigeration equipment are favorable, as appliances based on R-600a and R-290 are readily available, and as servicing technicians have been appropriately trained by suppliers. The rapid growth in the use of HFC-32-based residential split AC units has prompted the Government to also consider banning R-410A-based units by the end of stage I of the KIP. A potential ban on R-404A had been discussed as well, but was eventually postponed to stage II due to the acknowledged complexities inherent in the transitioning of larger equipment to low-GWP technologies. The cold-room demonstration project included in stage I will provide further insight into the application of targeted rather than broad measures in the commercial refrigeration sector, given the diversity of RAC systems using R-404A.

36. Regarding the funding request for the preparation of the NCP, the Secretariat noted that it pertained to a broader process that many countries have been pursuing with different sources of available funding. Consequently, UNEP agreed to split the US \$14,900 programmed for that activity between the component to monitor of the use of R-508B in commercial refrigeration and the demonstration project in cold rooms, as explained in more detail below.

Technical and cost-related issues

Consumption of R-508B in the health sector

37. The Secretariat observed an unusually high level of R-508B consumption in Sierra Leone, compared to other Article 5 countries. Only around 10 other Article 5 countries reported the use of this

substance in 2022, and Sierra Leone's consumption surpassed that of some larger, non-low-volume-consuming countries. UNEP explained that R-508B was used in air-cooled condensers within the country's health sector. Primarily imported for use in medical RAC units storing Ebola and other viral samples, R-508B was also stocked in anticipation of supply-chain disruptions due to the COVID-19 pandemic. UNEP confirmed the accuracy of reporting but lacked information on the equipment's providers or on the alternative options for those applications. Despite no imports of R-508B reported for 2023 (based on UNEP's estimation reflected in table 3), it seems likely that future imports may occur as existing equipment continues to operate, and new equipment may be introduced to the market.

38. Given the substance's high GWP, the Secretariat and UNEP agreed that it was important to gain a better understanding of relevant equipment types and to explore alternative technologies to prevent further reliance on R-508B. UNEP agreed to monitor the use of this substance to and seek out alternatives, reallocating to this endeavour a portion of funding initially requested for the development of the NCP.

Demonstration project in the commercial refrigeration sector

39. Stage I of the KIP includes a demonstration project similar to others proposed in the subregion. Its objective is to assess and showcase the effective replacement of HFC-based systems in food preservation and refrigerated storage by monoblocks.⁴ UNEP explained that the demonstration involved replacing two existing R-404A-based systems with single closed R-290-based systems of under 20 kW capacity. The end user will provide the necessary infrastructure and civil works, while the project will fund equipment. UNEP highlighted the project's potential for replication, especially in the food preservation subsector, where approximately 100 similar HFC-based systems were currently operating.

40. Upon discussion, UNEP agreed to include in the demonstration project a comparative analysis of the performance and energy use of both the baseline and newly installed equipment over a one-year period, to ensure the proper monitoring, recording, and documentation of results. For that purpose, a portion of funding has been reallocated from the legal and regulatory measures component (development of the NCP). While UNIDO will focus on system design and installation, UNEP will oversee the monitoring component, as well as information production and dissemination of results among end users and technicians.

41. It was further agreed that the Government would evaluate the feasibility of future regulatory measures aimed at restricting the use of high-GWP HFCs in this particular application to support the transition to low-GWP technologies following the completion of the project.

42. In line with decision 92/36(g), the Secretariat requested UNEP and UNIDO, upon completion of the project, to submit a final report on its implementation, including the HFC phase-out and energy-efficiency gains achieved.

Total project cost

43. The total cost of stage I of the KIP for Sierra Leone (without agency support costs) amounts to US \$180,000, based on the average HFC consumption in the refrigeration servicing sector in the years 2020-2022, in line with decision 92/37. The level of funds recommended remains as requested, with some internal reallocation of funding among activities, explained in relevant sections above and summarized in table 8.

⁴ Refrigeration equipment pre-charged with refrigerant and containing all components required for cooling (i.e., compressor, condenser, evaporator, expansion valves and fans) in a single unit.

Table 8: Activities planned under stage I of the KIP for Sierra Leone and their costs (as agreed)

Project component / Planned activities	Cost of stage I (US \$)		First tranche costs (US \$)	
	UNEP	UNIDO	UNEP	UNIDO
Legal and regulatory measures (funds for the development of the NCP reallocated to other activities)	27,500	12,600	20,100	12,050
Enforcement of HFC controls (no adjustments)	16,100	0	13,100	0
Capacity building (additional funds allocated to the monitoring of R-508B use in the commercial refrigeration sector)	31,400	7,100	18,000	3,100
Demonstration project in the commercial refrigeration sector (additional funds allocated to the monitoring of performance and energy use over one year, recording, documentation and dissemination of results among end users, and feasibility assessment of potential regulatory measures to limit the use of high-GWP HFCs in the demonstrated application)	14,300	43,000	5,000	3,000
Gender mainstreaming (a small portion of the funds reallocated to the demonstration project)	10,000	0	5,300	0
Project coordination and monitoring (overall funding level maintained, with proportions adjusted between UNEP and UNIDO)	5,017	12,983	4,000	2,850
Subtotal per agency	104,317	75,683	65,500	21,000
TOTAL		180,000		86,500

44. 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 of processing fewer tranches.

45. In line with decision 93/105, the Secretariat considered the tranche distribution proposed by UNEP 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, the issues would be considered in line with 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

46. The KIP for Sierra Leone will continue and expand the co-financing measures previously applied under the HPMP, including co-financing of workshops provided by the Government; the use of the selected MAC garages as training facilities for technician training sessions; plumbing, electrical and civil works provided by the beneficiaries of demonstration projects; and the use of the existing websites, social media platforms, forums, and newsletters of both the Government and private stakeholders to build awareness on KIP activities, goals and initiatives.

2024-2026 business plan of the Multilateral Fund

47. UNEP and UNIDO are requesting US \$180,000, plus agency support costs, for the implementation of stage I of the KIP for Sierra Leone. The total value of US \$97,745, including agency support costs, requested for the period of 2024–2026, is US \$12,317 above the amount in the business plan.

Sustainability of the HFC phase-down and assessment of risks

48. The main potential risks to the sustainability of HFC phase-down in Sierra Leone 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.

49. 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 the ongoing investments into the refrigerant reclaim scheme and the certification and training of technicians under the HPMP. The demonstration project on R-290-based monoblocks and related training to be provided to local training institutes, technicians and enterprises is expected to popularize low-GWP technologies across the country, ensure long-term sustainability of skills and expertise in the workforce, and promote the involvement of domestic importers and supply-chain stakeholders in HFC phase-down.

Impact on the climate

50. The activities proposed, including the enforcement of the HFC quota system, measures to restrict the imports of HFC-based equipment in certain applications and to promote in-house recovery by commercial and industrial RAC operators, technician training in good servicing practices and the demonstration of low-GWP technologies in the commercial refrigeration sector, 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,⁵ by 2029 Sierra Leone will have reduced its annual HFC emissions by approximately 35,091 CO₂-eq tonnes, calculated as the difference between the HFC baseline for compliance and the 2029 target, assuming that all consumed HFCs will have eventually been emitted.

Draft Agreement

51. A draft Agreement between the Government of Sierra Leone 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.

52. If the Executive Committee so wishes, the funds for stage I of the KIP for Sierra Leone 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

53. The Executive Committee may wish to consider:

- (a) Approving, in principle, stage I of the Kigali HFC implementation plan (KIP) for Sierra Leone for the period 2024—2029 to reduce HFC consumption by 10 per cent of the country's baseline by 2029, in the amount of US \$203,400, consisting of US \$104,317, plus agency support costs of US \$13,561, for UNEP and US \$75,683, plus agency support costs of US \$9,839, for UNIDO, as reflected in the schedule contained in annex I to the present document;

⁵ As noted in document UNEP/OzL.Pro/ExCom/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.

- (b) Noting:
- (i) The commitment of the Government of Sierra Leone to establish a ban on the import of domestic refrigeration and commercial stand-alone refrigeration units based on HFC-134a by 1 January 2025, a ban on the use of HFCs in the fire suppression, foam, aerosol and solvent sectors by 1 January 2026, and a ban on the import of split air conditioners based on R-410A by 1 January 2029;
 - (ii) That, upon completion of the end-user technology demonstration project in the commercial refrigeration sector included in stage I of the KIP, UNIDO will submit a final report on its implementation, including the HFC phase-out and energy-efficiency gains achieved, in line with decision 92/36(g);
- (c) Noting also:
- (i) That the Government of Sierra Leone will continue to monitor its HFC consumption to understand the extent to which reported consumption in baseline years was representative of the local market's needs and to assess future HFC demand, and that it will provide this analysis when submitting the second tranche of the KIP;
 - (ii) That, on the basis of the information provided in subparagraph (c)(i) above, the maximum allowable consumption limits for the remaining years of stage I of the KIP, as contained in Appendix 2-A to the future Agreement between the Government of Sierra Leone and the Executive Committee, will be revised, if appropriate, when the Committee considers the second tranche of the KIP;
- (d) Approving the first tranche of stage I of the KIP for Sierra Leone and the corresponding tranche implementation plan, in the amount of US \$97,745, consisting of US \$65,500, plus agency support costs of US \$8,515, for UNEP and US \$21,000, plus agency support costs of US \$2,730, for UNIDO; and
- (e) Requesting the Government of Sierra Leone, UNEP, UNIDO and the Secretariat to finalize the draft Agreement between the Government of Sierra Leone 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 SIERRA LEONE**

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)	350,905	350,905	350,905	350,905	350,905	315,815	n/a
1.2	Maximum allowable total consumption of Annex F substances (CO ₂ -eq tonnes)	345,642	339,676	333,711	327,746	321,780	315,815	n/a
2.1	Lead IA (UNEP) agreed funding (US \$)	65,500	0	0	38,817	0	0	104,317
2.2	Support costs for Lead IA (US \$)	8,515	0	0	5,046	0	0	13,561
2.3	Cooperating IA (UNIDO) agreed funding (US \$)	21,000	0	0	54,683	0	0	75,683
2.4	Support costs for Cooperating IA (US \$)	2,730	0	0	7,109	0	0	9,839
3.1	Total agreed funding (US \$)	86,500	0	0	93,500	0	0	180,000
3.2	Total support costs (US \$)	11,245	0	0	12,155	0	0	23,400
3.3	Total agreed costs (US \$)	97,745	0	0	105,655	0	0	203,400

HCFC phase-out management plan (stage II) (only remaining tranches)

Row	Particulars	2024	2025	2026	2027	2028	2029	2030	Total
1.1	Montreal Protocol reduction schedule of Annex C, Group I substances (ODP tonnes)	1.10	0.55	0.55	0.55	0.55	0.55	0	n/a
1.2	Maximum allowable total consumption of Annex C, Group I substances (ODP tonnes)	0.56	0.26	0.26	0.26	0.26	0.26	0	n/a
2.1	Lead IA (UNEP) agreed funding (US \$)	0	0	70,000	0	0	0	58,000	128,000
2.2	Support costs for Lead IA (US \$)	0	0	9,100	0	0	0	7,540	16,640
2.3	Cooperating IA (UNIDO) agreed funding (US \$)	0	0	0	0	0	0	0	0
2.4	Support costs for Cooperating IA (US \$)	0	0	0	0	0	0	0	0
3.1	Total agreed funding (US \$)	0	0	70,000	0	0	0	58,000	128,000
3.2	Total support costs (US \$)	0	0	9,100	0	0	0	7,540	16,640
3.3	Total agreed costs (US \$)	0	0	79,100	0	0	0	65,540	144,640

Annex II

**SIMULTANEOUS IMPLEMENTATION OF THE HCFC PHASE-OUT MANAGEMENT PLAN
AND THE KIGALI HFC IMPLEMENTATION PLAN IN SIERRA LEONE**

HPMP – stage II		KIP – stage I		HPMP+KIP combined cost (US \$)
Activity	Cost (US \$)	Activity	Cost (US \$)	
Legal and regulatory measures and enforcement of control measures				
Finalization of an online HCFC licensing and quota system	200,000	Enhancing of the HFC quota system	56,200	256,200
Banning the imports of HCFC-based equipment by January 2025; reviewing and enforcing penalties for illegal trade in ODSs as of January 2023; annual inspections of imported RAC equipment		Banning the imports of domestic and commercial stand-alone refrigeration units based on HFC-134a by 1 January 2025 and of split AC units based on R-410A by 1 January 2029; banning the use of HFCs in the fire suppression, foam, aerosol and solvent sectors by 1 January 2026; regulatory measures to compel commercial and industrial RAC operators to have in-house refrigerant recovery equipment to minimise demand for HFC; and revision of building codes and MEPS to include refrigerant considerations		
Revision of the customs' training manual and training of 10 trainers and 190 customs and other enforcement officers		Additional revisions and validation of the customs' training curriculum and training of 10 trainers (including 5 women) and 50 customs officers		
Border dialogue with customs officers from neighbouring countries				
Adoption of a “green” procurement policy for RAC systems by the public sector; training of 40 government officials on the policy and awareness for 200 importers and end users on the revised ODS policy, safety standards and “green” procurement				
Development of safety standards for low-GWP technologies and training of 150 government officials and stakeholders on the standards				
Strengthening the capacity of the RAC servicing sector				
Updating of the national refrigeration codes of practice and the technician training manual	113,000	Revision of the curricula of RAC vocational training institutions	38,500	151,500
Formulation and implementation of a revised mandatory technician certification scheme, building the capacity of 60 stakeholders on the certification process, and training and certification of 300 refrigeration technicians in good servicing practices				

HPMP – stage II		KIP – stage I		HPMP+KIP combined cost (US \$)
Activity	Cost (US \$)	Activity	Cost (US \$)	
Strengthening the RAC association with toolkits for safe servicing with flammable refrigerants				
Informing 200 end users on the latest developments in alternative technologies		Awareness-building workshops for 50 RAC importers, distributors and retailers and 50 built-environment professionals and procurement officers		
		Development of a training programme on CO ₂ at a centre of excellence		
		Licensing of 6 garages as MAC centres of excellence and policy workshop for 20 vehicle importers (MAC sector)		
Refrigerant recovery, recycling and reclaiming (RRR), tools and demonstration projects				
Development of a business model to set up a refrigerant RRR infrastructure, setting up of one reclaiming centre and provision of equipment and tools to 5 RAC training centres	187,000		57,300	244,300
Training of 10 trainers in the safe handling of flammable refrigerants and servicing HC-based equipment				
Study to assess the comparative performance of AC equipment charged with different refrigerants				
Awareness raising to promote R-290 uptake among end users		Demonstration project on R-290-based monoblocks in commercial refrigeration		
Gender mainstreaming				
Ensuring a 30 per cent female participation rate in training workshops and other activities, provision of training and equipment for female technicians, and making the licensing and certification scheme free of charge for female (and disabled) technicians	0	Awareness-building on the RAC sector for 100 female students and promoting women as role models in KIP workshops	10,000	10,000
Additional activities to maintain energy efficiency in the servicing sector				
Development of the MEPS and capacity building	100,000	Revision of building codes and MEPS to include refrigerant considerations (included in the legal and regulatory component)	0	100,000
Outreach and impact assessment				
Energy-efficiency considerations in training and certification materials				
Project management and monitoring				
Project support and coordination	40,000	Project support and coordination	18,000	58,000
Total	640,000		180,000	820,000