UNITED NATIONS

EP

United Nations Environment Programme

Distr.
GENERAL

UNEP/OzL.Pro/ExCom/93/67
20 October 2023

ORIGINAL: ENGLISH

EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Ninety-third Meeting
Montreal, 15-19 December 2023
Item 9(d) of the provisional agenda[1]

PROJECT PROPOSAL: MALAWI

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/93/1

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS

Malawi

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

(II) LATEST ARTICLE 7 DATA (Annex F)	Year: 2022	116.94 mt	199,697 CO_2-eq tonnes

(III) LATEST COUNTRY PROGRAMME SECTORAL DATA (CO_2-eq tonnes)									Year: 2022
Chemical	Aerosol	Foam	Firefighting	AC and refrigeration			Solvent	Other	Total sector consumption
				Manufacturing		Servicing			
				AC	Other				
HFC-32						27			27
HFC-134a						131,274			131,274
R-404A						33,334			33,334
R-407A						9,060			9,060
R-407C						6,741			6,741
R-410A						16,074			16,074
R-507A						3,188			3,188

(IV) AVERAGE 2020-2022 HFC CONSUMPTION IN SERVICING	115.65 mt	197,488 CO_2-eq tonnes

(V) CONSUMPTION DATA (CO_2-eq tonnes)			
Baseline: average 2020-2022 HFC consumption plus 65% of HCFC baseline	428,435	Starting point for sustained aggregate reductions	[n/a]*
CONSUMPTION ELIGIBLE FOR FUNDING			
Already approved	0	Remaining	[n/a]*

*For countries with average 2020-2022 HFC consumption in servicing only and below 360 mt.

(VI) ENDORSED BUSINESS PLAN		2023	2024	2025	Total
UNEP	HFC phase-down (CO_2-eq tonnes)	0.00	0.00	0.00	0.00
	Funding (US $)	47,460	0	0	47,460
UNIDO	HFC phase-down (CO_2-eq tonnes)	0.00	0.00	0.00	0.00
	Funding (US $)	19,260	0	0	19,260

(VII) PROJECT DATA			2023	2024	2025	2026	2027	2028	2029	2030	Total
Consumption (CO_2-eq tonnes)	Montreal Protocol limits		n/a	428,435	428,435	428,435	428,435	428,435	385,591	385,591	n/a
	Maximum allowable		209,337	217,890	214,626	209,580	206,020	203,508	201,736	197,488	n/a
Amounts requested in principle (US $)	UNEP	Project costs	39,000	0	0	48,000	0	0	0	17,000	104,000
		Support costs	5,070	0	0	6,240	0	0	0	2,210	13,520
	UNIDO	Project costs	29,000	0	0	37,000	0	0	0	0	66,000
		Support costs	2,610	0	0	3,330	0	0	0	0	5,940
Amounts recommended in principle (US $)	Total project costs		68,000	0	0	85,000	0	0	0	17,000	170,000
	Total support costs		7,680	0	0	9,570	0	0	0	2,210	19,460
	Total funds		75,680	0	0	94,570	0	0	0	19,210	189,460

(VIII) Request for approval of funding for the first tranche (2023)		
Implementing agency	**Funds recommended (US $)**	**Support costs (US $)**
UNEP	39,000	5,070
UNIDO	29,000	2,610
Total	68,000	7,680

Secretariat's recommendation	Individual consideration – all technical and cost issues resolved

PROJECT DESCRIPTION

1. On behalf of the Government of Malawi, 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 $189,460, consisting of US $104,000, plus agency support costs of US $13,520 for UNEP and US $66,000, plus agency support costs of US $5,940 for UNIDO, as originally submitted.[2]

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

3. The first tranche of stage I of the KIP being requested at this meeting amounts to US $75,680, consisting of US $39,000, plus agency support costs of US $5,070 for UNEP and US $29,000, plus agency support costs of US $2,610 for UNIDO, as originally submitted, for the period of January 2024 to December 2025.

Background

4. The Government of Malawi ratified all amendments to the Montreal Protocol, including the Kigali Amendment on 21 November 2017. Malawi has an HCFC consumption baseline of 10.80 ODP tonnes or 196.40 metric tonnes (mt) and is set to completely phase out consumption of HCFCs by 1 January 2030.

Status of implementation of the HCFC phase-out management plan

5. Stage I of the HCFC phase-out management plan (HPMP) for Malawi was originally approved at the 62nd meeting of the Executive Committee[3] and revised at the 70th meeting[4] to meet the 35 per cent reduction from the baseline by 2020, resulting in the phase-out of 3.78 ODP tonnes of HCFCs, at a total cost of US $350,000, plus agency support costs.

6. Stage II of the HPMP for Malawi was originally approved at the 85th meeting[5] to reduce HCFC consumption by 100 per cent from the baseline by 2030 and revised at the 92nd meeting[6] to include additional activities for the introduction of alternatives to HCFCs with low- or zero-global-warming potential (GWP) and for maintaining energy efficiency in the refrigeration servicing sector, at a total cost of US $770,000, plus agency support costs. Stage II of the HPMP will be completed by 31 December 2031, as stipulated in the Agreement between the Government of Malawi and the Executive Committee.

Status of implementation of HFC-related activities

7. At the 74th meeting, Malawi received funding to conduct a survey on the use of alternatives to ozone-depleting substances (ODSs) (US $70,000), which was completed in August 2017. At the 81st meeting, Malawi received funding to implement the enabling activities for HFC phase-down (US $150,000), which were completed in June 2022. These activities assisted the country *inter alia* in sensitizing policy and decision-makers on the provisions under the Kigali Amendment, including a parliamentary committee on natural resources to support the review of legislations on the inclusion of Kigali Amendment provisions, and raising awareness to consumers and the public on the benefits of using low-GWP alternative technologies; identifying barriers and developing strategies for increased uptake of lower-GWP HFC alternative technologies; updating the country's licensing and reporting system to include HFCs and developing an online registry of all controlled substances under the Montreal Protocol; identifying capacity-building needs of enforcement agencies and the refrigeration servicing sector to

[2] As per the letter of 24 August 2023 from the Environmental Affairs Department of Malawi to the Secretariat.
[3] Decision 62/45
[4] Annex XVII of UNEP/OzL.Pro/ExCom/70/59
[5] Decision 85/26
[6] Annex XI of UNEP/OzL.Pro/ExCom/92/56

support the phase-down of HFCs; and updating regulations on management of controlled substances under the Montreal Protocol where provisions under the Kigali Amendment have been included.

Stage I of the Kigali HFC implementation plan

Policy, regulatory and institutional frameworks

8. The national ozone unit (NOU) was established under the Environmental Affairs Department (EAD) in the Ministry of Natural Resources and Climate Change. The NOU as national lead agency for the implementation of the Montreal Protocol, coordinates all relevant activities and is responsible for collecting and reporting data on the consumption of controlled substances under the Montreal Protocol.

9. The National Ozone Committee, consisting of the EAD, the Bureau of Standards, the Consumers Association, the Ministry of Justice, the Ministry of Finance, the Ministry of Trade and Industry, the Ministry of Agriculture, the Revenue Authority and the Confederations for Chambers of Commerce and Industry, provides guidance and policy direction to effectively monitor the implementation of activities under the Montreal Protocol.

10. Malawi has a national refrigeration association and three regional refrigeration associations as well as an association of Women in Heating, Energy, Ventilation, Air-conditioning, and Refrigeration. These associations provide policy and technical direction to the daily operations of the refrigeration technicians and monitor the implementation of good refrigeration practices and other codes of practice in the refrigeration and air-conditioning (RAC) sector.

11. The Environment Management Act has provisions for the protection and management of the environment and the conservation and sustainable utilisation of natural resources. Section 62 of this Act provides for measures for controlling and monitoring import and use of HFCs and other controlled substances.

12. The existing regulatory and institutional framework and structure will be utilized for the effective implementation of the KIP. Other institutions such as the Ministry of Energy will also take part in the National Ozone Committee to provide oversight on energy efficiency-related issues.

HFC consumption

13. Malawi only imports HFCs for use in the RAC and mobile air-conditioning (MAC) servicing sector. In 2022, Malawi consumed HFC-134a (65.7 per cent of total HFC consumption in CO_2-equivalent (CO_2-eq) tonnes), R-404A (16.7 per cent), R-410A (8.0 per cent), R-407A (4.5 per cent), R-407C (3.4 per cent), and R-507A (1.6 per cent). Table 1 presents the country's HFC consumption as reported to the Ozone Secretariat under Article 7 of the Montreal Protocol.

Table 1. HFC consumption in Malawi (2019–2022 Article 7 data)

HFC	GWP	2019	2020	2021	2022	Share of HFC consumption in 2022 (%)
Mt						
HFC-32	675	0	0	0	0.04	0.0
HFC-134a	1,430	85.0	90.20	91.1	91.80	78.5
R-404A	3,922	8.42	8.10	8.3	8.50	7.3
R-407A	2,107	4.95	4.50	4.1	4.30	3.7
R-407C	1,774	2.31	3.70	3.3	3.80	3.3
R-410A	2,088	6.91	7.20	7.5	7.70	6.6
R-507A	3,985	1.25	1.10	0.9	0.80	0.7
Total (mt)		**108.84**	**114.80**	**115.20**	**116.94**	**100**

HFC	GWP	2019	2020	2021	2022	Share of HFC consumption in 2022 (%)
CO_2-eq tonnes						
HFC-32	675	0	0	0	27	0.0
HFC-134a	1,430	121,550	128,986	130,271	131,274	65.7
R-404A	3,922	33,020	31,765	32,549	33,334	16.7
R-407A	2,107	10,429	9,482	8,639	9,060	4.5
R-407C	1,774	4,098	6,563	5,854	6,741	3.4
R-410A	2,088	14,425	15,030	15,656	16,074	8.0
R-507A	3,985	4,981	4,384	3,587	3,188	1.6
Total (CO_2-eq tonnes)		**188,503**	**196,209**	**196,557**	**199,697**	**100**

14. The consumption of HFC-134a has been increasing over the period 2018–2022 due to increased import of domestic refrigerators based on HFC-134a. For instance, consumption of HFC-134a in 2018 was 74.21 mt which is significantly lower than 91.8 mt in 2022. HFC-134a is mostly used in domestic and commercial RAC appliances rather than the transport sector.

15. During the period 2018–2022, the consumption of R-404A, R-407A, and R-407C has almost remained constant, while that of R-507A has experienced a gradual decrease; this is mainly on account of limited growth in servicing needs of equipment using these refrigerants. Demand for R-410A has seen an increase mainly because of an increase in R-410A-based air-conditioners in the country.

16. Furthermore, consumption of hydrocarbons (HCs) has been steadily increasing over the period 2016–2022 mainly because of faster adoption of these technologies primarily in domestic refrigerators and self-contained commercial refrigeration applications. The survey further established that HFC-32 is slowly penetrating the local markets and very few commercial establishments have equipment dependent on this refrigerant. It is anticipated that its consumption will steadily increase in the coming years to replace R-410A.

17. The economy of Malawi has been growing steadily over the recent years which has led to increased disposable incomes of most Malawians who in turn are able to own RAC appliances. According to the Economic Report (Government of Malawi, 2022), the country's gross domestic product growth was at 0.8 per cent in 2020, 3.9 per cent in 2021 and it was projected to grow by 4.1 per cent in 2022. There has been a growth in infrastructure development in the urban areas where modern dwelling houses and other buildings are fitted with RAC equipment using HFCs; this resulted in an increase in consumption of most of the refrigerants for the period 2018[7] to 2022.

Country programme implementation report

18. The sectoral HFC consumption data provided by the Government of Malawi in its country programme implementation report for 2022 is consistent with the data reported under Article 7 of the Montreal Protocol.

HFC distribution by sector

19. HFCs are mainly consumed for servicing in commercial refrigeration (55.8 per cent in mt and 58.2 per cent in CO_2-eq tonnes), followed by domestic refrigeration (25.8 per cent in mt and 21.6 per cent in CO_2-eq tonnes), residential and commercial air-conditioning (9.9 per cent in mt and 11.5 per cent in CO_2-eq tonnes), and other subsectors, as shown in table 2.

[7] HFC consumption in 2018 was 164,459 CO_2-eq tonnes.

Table 2. HFC consumption in the refrigeration and air-conditioning servicing subsectors (2022)

Sector		HFC-32	HFC-134a	R-404A	R-407C	R-410A	R-407A	R-507A	Total	Share of total (%)
mt										
Refrigeration subsectors										
Domestic		0.00	30.20	0.00	0.00	0.00	0.00	0.00	30.20	25.8
Commercial	Stand-alone units	0.00	35.80	4.32	0.00	0.00	2.40	0.50	43.02	36.8
	Condenser units	0.00	10.60	1.79	0.00	0.00	1.90	0.30	14.59	12.5
	Centralized systems	0.00	6.40	1.18	0.00	0.00	0.00	0.00	7.58	6.5
	Subtotal	*0.00*	*52.80*	*7.29*	*0.00*	*0.00*	*4.30*	*0.80*	*65.19*	*55.8*
Subtotal Refrigeration		*0.00*	*83.00*	*7.29*	*0.00*	*0.00*	*4.30*	*0.80*	*95.39*	*81.6*
Air-conditioning subsectors										
Residential		0.00	0.00	0.00	2.60	1.10	0.00	0.00	3.70	3.2
Commercial		0.04	0.00	0.00	1.20	6.60	0.00	0.00	7.84	6.7
Mobile		0.00	8.80	1.21	0.00	0.00	0.00	0.00	10.01	8.6
Subtotal Air-conditioning		*0.04*	*8.80*	*1.21*	*3.80*	*7.70*	*0.00*	*0.00*	*21.55*	*18.4*
Total (mt)		**0.04**	**91.80**	**8.50**	**3.80**	**7.70**	**4.30**	**0.80**	**116.94**	**100**
CO_2-eq tonnes										
Refrigeration subsectors										
Domestic		0	43,186	0	0	0	0	0	43,186	21.6
Commercial	Stand-alone units	0	51,194	16,941	0	0	5,057	1,993	75,185	37.6
	Condenser units	0	15,158	7,020	0	0	4,003	1,195	27,376	13.7
	Centralized systems	0	9,152	4,627	0	0	0	0	13,779	6.9
	Subtotal	*0*	*75,504*	*28,588*	*0*	*0*	*9,060*	*3,188*	*116,340*	*58.2*
Subtotal Refrigeration		*0*	*118,690*	*28,588*	*0*	*0*	*9,060*	*3,188*	*159,526*	*79.8*
Air-conditioning subsectors										
Residential		0	0	0	4,612	2,296	0	0	6,908	3.5
Commercial		27	0	0	2,129	13,778	0	0	15,933	8.0
Mobile		0	12,584	4,745	0	0	0	0	17,329	8.7
Subtotal Air-conditioning		*27*	*12,584*	*4,745*	*6,741*	*16,074*	*0*	*0*	*40,170*	*20.2*
Total (CO_2-eq tonnes)		**27**	**131,274**	**33,334**	**6,741**	**16,074**	**9,060**	**3,188**	**199,697**	**100**

Refrigeration and air-conditioning servicing sector

20. There are approximately 1,840 technicians, 1,200 of whom work in informal workshops. The estimated percentage of technicians servicing domestic refrigeration equipment, commercial refrigeration equipment, air-conditioning equipment and mobile air-conditioners in the informal sector (i.e., as a percentage of technicians servicing different equipment) is 65, 14, 22 and 22 per cent, respectively. There are 83 workshops consuming HFCs registered with the NOU and 28 workshops found operating are yet to be registered. Most of the informal technicians service domestic RAC equipment while formal technicians service all refrigeration equipment. A total of 580 RAC technicians (32 per cent) from both formal and informal set-ups were trained on good servicing practices including safe handling of flammable and toxic refrigerants.

21. Currently, Malawi has two vocational training schools namely, Lilongwe Technical College and Soche Technical College, which train about 40 RAC technicians annually. The training curriculum of RAC technicians in the vocational training schools does not have adequate content of good refrigeration practices covering new refrigerant technologies in different types of equipment; it is therefore necessary to update

the curriculum and build capacity of the graduate trainees with the updated curriculum. It was further established that RAC technicians trained a few years ago require additional training on good servicing practices and to upgrade their skills and knowledge considering the continued changes in technologies in the RAC sector.

Domestic, commercial and industrial refrigeration servicing

22. HFC-134a is dominantly used in the domestic refrigeration servicing sector particularly in refrigerators. In households, refrigeration equipment used include domestic refrigerators, freezers and water coolers, and the other refrigerants used by this equipment are R-410A, R-404A and HCs (R-600a and R-290).

23. The commercial refrigeration sector comprises stand-alone, centralized systems and condenser units which include installations and equipment such as cold rooms, chillers, central air-conditioning plants, and ice-making plants. The latter comprises of large cooling facilities with a large refrigerant charge capacity. Commercial refrigeration equipment is most used in the food processing enterprises such as fisheries, abattoirs, butcheries, supermarkets, and large kitchens run by hotels and hospitals. HFC-404A, HFC-134a and HCFC-22 are the main refrigerants used in the commercial sector.

24. There are about 2 million domestic refrigeration equipment which are dependent on HFCs; however, their charge capacities are very low compared to commercial appliances.

Residential and commercial air-conditioning servicing

25. Residential air-conditioners are mainly used in households and small offices, and they are primarily based on HFC-410A. However, commercial air-conditioning units also dependent on HFC-410A are slowly entering the market. In the last three years, air-conditioners based on HFC-32 are entering the market and the use of this refrigerant is expected to grow in the near future.

Mobile air-conditioning and transport refrigeration servicing

26. The MAC units mainly use HFC-134a as a refrigerant and this consumption is expected to grow with the increase in population of MAC equipment. In transport refrigeration, R-404A is consumed and this consumption is not very high.

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

Overarching strategy

27. The Government of Malawi is proposing three stages for the KIP. Stage I is to be implemented simultaneously with the HPMP until 2030. Stage II is expected to cover a period of 10 years (from 2030 to 2040), and stage III is planned to span a period of five years, until 2045.

Established HFC baseline and proposed reductions

28. The Government of Malawi reported its Article 7 data for 2020-2022. By adding 65 per cent of the HCFC baseline in CO_2-eq tonnes to the average HFC consumption in 2020-2022, the established HFC baseline is 428,435 CO_2-eq tonnes, as shown in table 3.

Table 3. HFC baseline for Malawi (CO_2-eq tonnes)

Baseline calculation components	2020	2021	2022
HFC annual consumption	196,209	196,557	199,697
HFC average consumption in 2020-2022			197,488
HCFC baseline (65%)			230,947
HFC baseline			**428,435**

29. The Government of Malawi and UNEP projected HFC consumption based on annual average economic growth of 6 per cent. In addition, the phase-out of 45.64 mt of HCFCs will result in the phase-in of 142,813 CO_2-eq tonnes of HFCs by 2030; assuming equal distribution in CO_2-eq tonnes each year from 2024-2030, the annual increase in HFC consumption would be 20,402 CO_2-eq tonnes. Table 4 shows the calculated overall increase in HFC consumption in the business-as-usual scenario.

Table 4. Unconstrained scenario of HFC consumption forecast at 6 per cent growth rate and required reductions (CO_2-eq tonnes)

	2022*	2023**	2024	2025	2026	2027	2028	2029	2030
HFC consumption growing at an annual rate of 6%	199,697	209,337	221,897	235,211	249,324	264,283	280,140	296,949	314,766
HFC phased in from HCFC phase-out	0	0	20,402	20,402	20,402	20,402	20,402	20,402	20,402
Total HFC estimated consumption	199,697	209,337	242,299	255,613	269,726	284,685	300,542	317,351	335,168
Montreal Protocol consumption limits	n/a	n/a	428,435	428,435	428,435	428,435	428,435	385,591	385,591
Required HFC reductions	n/a	n/a	0	0	0	0	0	-68,241	-50,424

(*) As per Article 7 data

(**) Growth calculated based on the average HFC consumption in 2020-2022 (197,488 CO_2-eq tonnes) instead of the previous year consumption (199,697 CO_2-eq tonnes).

30. Table 4 shows that in the business-as-usual scenario, Malawi is expected to be in compliance throughout stage I of the KIP. However, without any action, the dependence on HFC-based equipment, mainly in the residential air-conditioning, commercial and industrial RAC and MAC sectors, would continue to grow, posing a challenge in achieving sustained consumption reductions in HFCs.

31. In light of this, stage I of the KIP is being proposed to ensure that HFC consumption remains lower than the Montreal Protocol limits as shown in table 5.

Table 5. HFC consumption limits proposed under stage I of KIP (CO_2-eq tonnes)

		2023	2024	2025	2026	2027	2028	2029	2030
Montreal Protocol consumption limits		n/a	428,435	428,435	428,435	428,435	428,435	385,591	385,591
HFC consumption with freeze at baseline*		209,337	197,488	197,488	197,488	197,488	197,488	197,488	197,488
HFC phased in from HCFC phase-out		0	20,402	17,138	12,092	8,532	6,020	4,248	0
Estimated consumption under the KIP		**209,337**	**217,890**	**214,626**	**209,580**	**206,020**	**203,508**	**201,736**	**197,488**
Difference	CO_2-eq tonnes	n/a	210,545	213,809	218,855	222,415	224,927	183,856	188,104
	%	n/a	-49%	-50%	-51%	-52%	-53%	-48%	-49%

(*) Except 2023 where a 6 per cent growth from the average HFC consumption in 2020-2022 (197,488 CO_2-eq tonnes) included.

32. As shown in table 5, stage I of the KIP would ensure Malawi's compliance with the Montreal Protocol limits and that HFC consumption levels remain 49 per cent below those limits by 2030.

33. Malawi has not seen an increase in its HFC consumption in the post-COVID-19 years due to external factors such as the war in Ukraine in 2022 and internal factors such as Cyclone Freddy that hit the country in early 2023. Malawi might experience a sharp increase in demand in 2024 and it will struggle to decrease demand if no funded activity is taking place. Moreover, the phase-in of HFC from the phase-out of HCFC might accelerate in the coming year as enterprises and technicians will convert to the refrigerants that they are most familiar with, such as high-GWP HFCs.

Proposed activities

34. Malawi developed its overarching strategy and proposed funding based on activities addressing the refrigeration, air-conditioning, and MAC sectors. The proposed interventions include policy and regulatory mechanisms for controlling and monitoring HFCs, capacity building including training and technical capacity building support for the service sector, awareness campaigns and communication with the industry stakeholders on adoption of alternative technologies, technology demonstration in the residential air-conditioning sector, and support to the local associations for continuous engagement and support in sustaining HFC consumption reduction.

35. The overarching strategy consists of six components (including the project monitoring and coordination component). Prioritization of the budget across all components has been done in consideration of the level of consumption, the need for investment in the sectors, and cross-cutting issues within the sectors.

36. The different elements of the KIP for Malawi with their cost breakdown are presented below:

(a) *Regulatory framework and control mechanisms*: Strengthening the HFC licensing and quota system; developing, revising and adopting standards and labeling of refrigerants; five training sessions for 125 customs and enforcement officers; training of 45 participants on strengthening of record-keeping by customs and reporting by enterprises; improving continuous market monitoring, including surveys (UNEP) (US $51,000);

(b) *Cross-sectoral*: Supporting the industry association to formalize the servicing sector; updating codes of practice and training curriculum of refrigeration technicians; five training sessions for 125 refrigeration technicians (UNEP) (US $36,000);

(c) *Refrigeration*: Awareness raising campaign to end-users (UNIDO) (US $12,000);

(d) *Air-conditioning*: Technology demonstration for R-290-based air-conditioners by supplying units to institutional users; awareness raising campaign to end-users (UNIDO) (US $44,000); and

(e) *Mobile air-conditioning*: Planning and promotion of recovery and recycling in the MAC sector (supply of five recovery units to MAC workshops) (UNIDO) (US $10,000).

Project implementation, coordination and monitoring

37. To ensure that KIP project activities are implemented on time and as planned, monitoring and reporting mechanisms will be developed and used. With support from UNEP, the NOU, the National Ozone Committee, and the Refrigeration Associations will be monitoring the implementation of the project activities, and imports of HFCs and HFC-based equipment. The NOU shall be producing quarterly reports on the progress in the implementation of the KIP. The total cost of US $17,000 includes the following

breakdown: staff and consultants (US $6,000), travel (US $5,000), meetings and workshops (US $5,000) and other expenses (US $1,000).

Gender policy implementation

38. The country has been recognizing the importance of gender equality, women empowerment and women involvement during the implementation of the international and national programmes. The Government of Malawi has made good strides in developing policies and strategies to support women's empowerment and the advancement of gender equality, and mechanisms have been instituted to support their implementation. During implementation of stage I of the KIP, the Government will continue to encourage women to participate and contribute to project implementation in different stages of the project cycle. Gender disaggregated data would be collected for different training activities and with support and guidance from the implementing agencies.

Total cost of stage I of the Kigali HFC implementation plan

39. The budget for stage I has been established at US $170,000. The cost of activities in the refrigeration servicing sector are established in line with decision 92/37.

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

40. Stage I of the KIP will be implemented in three tranches. The schedule of HFC phase-down and HCFC phase-out commitments, and the activities and associated cost of stage I of the KIP and stage II of the HPMP are presented in Annexes I and II, respectively, to the present document.

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

41. The first funding tranche of stage I of the KIP, in the total amount of US $68,000, will be implemented between January 2024 and December 2026 and will include the following activities:

(a) *Regulatory framework and control mechanisms*: Strengthening the HFC licensing and quota system; developing, revising, and adopting standards and labeling of refrigerants; training of 25 customs officers and enforcement officers (UNEP) (US $16,000);

(b) *Cross-sectoral*: Supporting the industry association to formalize the sector; updating the code of practice and training curriculum; two training sessions for a total of 50 refrigeration technicians (UNEP) (US $18,000);

(c) *Refrigeration*: Awareness raising campaign to end-users and small and medium enterprises (SMEs) (UNIDO) (US $4,000);

(d) *Air-conditioning*: Technology demonstration for R-290-based air-conditioners by supplying units to institutional users (UNIDO) (US $25,000); and

(e) *Project coordination and monitoring* (UNEP) (US $5,000): Staff and consultants (US $2,000), travel (US $2,000), meetings and workshops (US $1,000).

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

42. The Secretariat reviewed stage I of the KIP for Malawi in light of the existing policies and guidelines of the Multilateral Fund, including decisions 91/38[8] and 92/37,[9] stage II of the HPMP, and the 2023-2025 business plan of the Multilateral Fund.

Overarching strategy

43. The Kigali Amendment allows for growth in HFC consumption up to a baseline level. However, to avoid such a growth, the Government of Malawi is requesting funds for stage I of the KIP to sustainably reduce HFC growth to reach consumption levels of 54 per cent below the HFC baseline; further, when future tranches of stage II of the HPMP are submitted, the Government would take other actions to minimise substitution of HCFCs with high-GWP HFCs during HPMP implementation.

44. In line with decision 87/50(g)(iii), the proposal includes the following early actions to limit the growth of HFCs: adoption of better servicing practices including recovery and reuse of HFCs, that would help reduce HFC emissions during servicing, maintenance and end-of-life disposal of equipment; training on the safe use of alternative non-HFC refrigerants; control and monitor HFC consumption level; and reduce demand for HCF-based equipment through a combination of awareness raising and policies for the adoption of low-/lower-GWP refrigerant-based alternatives. Furthermore, the Government would implement policies keeping in view market factors and technology trends relating to alternatives in order to achieve sustainable reductions in HFC consumption, prioritising sectors that have high HFC consumption such as commercial RAC. Specifically, the Government would continue to hold consultations with the national stakeholders on the prohibition of import and sale of equipment based on HFCs and would implement measures to that effect based on technology development and availability of cost-effective low-GWP refrigerant-based equipment in different applications. During each tranche submission request, a status update on these consultations and regulatory interventions, as applicable, would be provided by UNEP.

Established HFC baseline and proposed reductions

45. The baseline for Malawi is 428,435 CO_2-eq tonnes based on the reported HFC consumption for 2020, 2021 and 2022. Based on the estimated values in table 5, the country's HFC consumption will increase from 209,337 CO_2-eq tonnes in 2023 to 217,890 CO_2-eq tonnes in 2024. After that, there would be a sustained reduction of HFC consumption to reach 197,488 CO_2-eq tonnes in 2030. Based on these estimated values, this proposal would help the Government of Malawi reduce the HFC consumption levels from 217,890 CO_2-eq tonnes in 2024 to 203,508 CO_2-eq tonnes by 2028 and to 197,488 CO_2-eq tonnes by 2030; thus, the reduction compared to baseline levels by 2030 would be 54 per cent.

Policy, regulatory and institutional frameworks

HFC licensing and quota system

46. Decision 87/50(g) requests the bilateral and implementing agencies, when submitting stage I of the KIPs, to include confirmation that the country has an established and enforceable national system of licensing and quotas for monitoring HFC imports/exports in place, consistent with decision 63/17. Accordingly, the Government of Malawi has established a licensing system for HFCs, blends and

[8] In the absence of the cost guidelines for HFC phase-down, to consider HFC individual investment projects and stage I of KIPs on a case-by-case basis, without setting a precedent for the cost guidelines or any future HFC individual investment projects and stage I of KIPs.

[9] Decision on the level and modalities of funding for HFC phase-down in the refrigeration servicing sector.

equipment containing them, adopted in April 2021. The Government of Malawi will implement a quota system for allocating HFC quotas to authorized importers in mt and would ensure that the total allocation of quotas is below the targets agreed for HFCs in CO_2-eq tonnes from the year 2024; the quota allocation system would take into consideration the demand for different HFCs and HFC blends and to the extent feasible, promote the adoption of low-/lower-GWP alternatives to different high-GWP HFCs.

Technical and cost-related issues

Support for HFC consumption reduction in the domestic and commercial refrigeration sectors

47. The Secretariat, noting the high levels of HFC consumption in domestic and commercial refrigeration, requested information on the steps that the Government is planning to undertake to reduce consumption in these applications in a sustainable manner. UNEP explained that the Government would undertake activities to create awareness on the availability of non-HFC low-/lower-GWP alternative technologies among end-users for faster adoption of these technologies; in the case of domestic refrigeration and commercial refrigeration applications, the Government would continue to consult different stakeholders for reducing dependence and prohibit import and sales of HFC-based equipment; it would continue to train service technicians on the safe handling of different alternative refrigerants which in turn would promote the adoption of low/lower-GWP technologies. In addition to the above, the Government would implement other necessary actions based on market trends on alternatives available to reduce dependence on high-GWP refrigerant-based equipment. UNEP clarified that while it would be difficult to provide specific dates for the implementation of the prohibition of import and sales of HFC-based equipment, it would take steps to expedite consultations with the Government on the matter and provide a report on the progress on these consultations with every tranche submission. The Secretariat considers that these activities would facilitate reduction in HFC consumption growth in accordance with stage I of the KIP.

Technology demonstration for R-290-based air-conditioners

48. The Secretariat requested additional information on how the technology demonstration project would result in faster adoption of R-290-based air-conditioners in the country. UNEP informed that the level of awareness of the benefits of R-290-based air-conditioners is low in the country; the demonstration project in the amount of US $44,000 would showcase the benefits of the safe use of these air-conditioners and further help the servicing sector understand safe practices for servicing this equipment. The Government is also developing minimum energy performance standards (MEPS) and labelling systems that would include elements to publicise and promote these technologies. During the awareness and information outreach campaigns, the Government will promote R-290-based air conditioners. UNEP also explained that currently, the Government does not prohibit the use of high-GWP refrigerants in air-conditioners; based on the success of this demonstration project and other promotional activities, the Government would consult with stakeholders on the implementation of prohibition of high-GWP refrigerant technologies.

Cooling Facility project under Green Climate Fund

49. A Cooling Facility project was approved under the Green Climate Fund (GCF) for Malawi. The Secretariat requested information from UNEP on how the Government of Malawi would coordinate with other national institutions involved in implementing this project being implemented by the World Bank. UNEP explained that the project is at initial stages of operationalisation and the implementing organisation of the GCF project, which would be identified, would be represented in the national committee monitoring the KIP implementation and through this, complementarity of activities, as needed, with the GCF project would be ensured.

Total project cost

50. In accordance with decision 92/37(b)(ii) and taking into consideration that the country would achieve HFC consumption level 10 per cent below the HFC component of the baseline, the total cost of stage I of the KIP has been agreed as submitted in the amount of US $170,000. This will result in the gradual reduction in HFC consumption for the years 2024 to 2030 to the levels indicated in row 1.2 of the table for stage I of the KIP in Annex I to the present document, to achieve a consumption of 197,488 CO_2-eq tonnes by 2030.

Table 6. Agreed cost of activities to be implemented in stage I of the KIP for Malawi (US $)

Particulars	**US $**
Strengthening the HFC licensing and quota system	5,000
Developing, revising and adopting standards and labeling of refrigerants	6,000
Training of customs officers and enforcement officers	25,000
Strengthening record keeping by customs and reporting by enterprises	8,500
Improving continuous market monitoring, including surveys	6,500
Sub-total	**51,000**
Supporting the industry association to formalize the sector	5,000
Updating the code of practice and training curriculum	6,000
Five training sessions for 25 refrigeration technicians each (US $5,000 per session)	25,000
Supply of recovery units to MAC workshops	10,000
Sub-total	**46,000**
Awareness raising campaign to end-users and SMEs	12,000
Awareness raising campaign to end-users	4,000
Sub-total	**16,000**
Technology demonstration for R-290-based air-conditioners supplying units to institutional users	**40,000**
Coordination and management of KIP implementation	**17,000**
Total	**170,000**
UNEP	**104,000**
UNIDO	**66,000**

Impact on the climate

51. The activities planned by Malawi, including its efforts to promote low-GWP alternatives, training of technicians in good servicing practice as well as recovery and reuse of refrigerants, indicate that the implementation of stage I of the KIP will reduce the emission of HFCs into the atmosphere, resulting in climate benefits. A calculation of the impact on the climate of the activities in the KIP indicates that Malawi will achieve an annual emission reduction of 230,947 CO_2-eq tonnes of HFCs when the final target in stage I of the KIP is achieved, calculated based on the difference between the HFC baseline and the final target set in stage I.

Sustainability of the HFC phase-down and assessment of risks

52. The commitment and activities under stage I of the KIP will be sustained over time with the implementation and strengthening of the licensing and quota system for HFCs; continuous consultations with importers and other stakeholders on promoting the adoption of low-GWP alternatives to HFCs in different applications; implementation of regulations to reduce import of HFC-based equipment after consultations with the national stakeholders and the continuous monitoring of all implemented activities; awareness and information outreach on HFC phase-down and adoption of low-GWP technologies; and training and capacity building of servicing technicians on installation, maintenance and servicing of low-GWP refrigerant-based RAC equipment.

53. The current HFC consumption is 46.6 per cent of the total HFC baseline; if early actions are adopted for reducing dependence on HFCs, the potential risk of non-compliance is expected to be low and will be further mitigated by the implementation of a robust licensing and quota system for HFCs to control supply, as well as activities implemented under the KIP aimed at reducing demand for HFCs.

54. Although specific regulations to prohibit the use of HFCs and/or HFC-based equipment are yet to be implemented in Malawi, UNEP mentioned that the Government would work closely with different stakeholders to minimize any growth in consumption of high-GWP HFCs and actively examine possibilities of reducing import of high-GWP HFC-based equipment. Furthermore, stage I includes project activities such as training and capacity building for adopting good service practices and safe use of low-GWP alternatives, awareness and information outreach programmes on low-/lower-GWP alternatives and end-user incentive programmes for the accelerated adoption of low-GWP alternatives, which would catalyse the process of adoption of low-GWP technologies.

55. The risk of technologies promoted through the KIP not being accessible to the country will be mitigated by engaging importers and distributors in the awareness and outreach activities on low-/lower-GWP alternatives, and by facilitating their access to these alternative technologies. Training of technicians on good service practices would also minimise the risks relating to adoption of low-GWP technologies.

56. The risk of delays in activities requiring regional coordination (e.g., regional regulations) will be mitigated by the implementing agencies facilitating dialogue among the NOUs of the region including through UNEP's Compliance Assistance Programme network meetings.

Co-financing

57. UNEP explained that co-financing under stage I of the KIP would include counterpart funding for programmes relating to demand-side management for the adoption of low-GWP technologies and in-kind time and resource support from the beneficiaries.

2023-2025 business plan of the Multilateral Fund

58. UNEP and UNIDO are requesting US $170,000, plus agency support costs, for the implementation of stage I of the KIP for Malawi. The total value of US $75,680, including agency support costs, requested for the period of 2023–2025, is US $8,960 above the amount in the business plan.

Draft Agreement

59. A draft Agreement between the Government of Malawi 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.

60. If the Executive Committee so wishes, the funds for stage I of the KIP for Malawi 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.

RECOMMENDATION

61. The Executive Committee may wish to consider:

(a) Approving, in principle, stage I of the Kigali HFC implementation plan (KIP) for Malawi for the period 2023-2030 to reduce HFC consumption by 54 per cent of the country's baseline in 2030, in the amount of US $189,460, consisting of US $104,000, plus agency support costs of US $13,520, for UNEP and US $66,000, plus agency support costs of US $5,940, for UNIDO, as reflected in the schedule contained in Annex I of the present document;

(b) Noting that upon completion of the end-user technology demonstration project included in stage I of the KIP, UNIDO will submit a final report on the implementation of this project, including the HFC phase-out and energy-efficiency gains achieved, in line with decision 92/36(g);

(c) Approving the first tranche of stage I of the KIP for Malawi, and the corresponding tranche implementation plan, in the amount of US $75,680, consisting of US $39,000, plus agency support costs of US $5,070, for UNEP and US $29,000, plus agency support costs of US $2,610, for UNIDO; and

(d) Requesting the Government of Malawi, UNEP, UNIDO and the Secretariat to finalize the draft Agreement between the Government of Malawi 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 MALAWI

Kigali HFC implementation plan (stage I)

Row	Particulars	2023	2024	2025	2026	2027	2028	2029	2030	Total
1.1	Montreal Protocol reduction schedule of Annex F substances (CO_2-eq tonnes)	n/a	428,435	428,435	428,435	428,435	428,435	385,591	385,591	n/a
1.2	Maximum allowable total consumption of Annex F substances (CO_2-eq tonnes)	209,337	217,890	214,626	209,580	206,020	203,508	201,736	197,488	n/a
2.1	Lead IA (UNEP) agreed funding (US $)	39,000	0	0	48,000	0	0	0	17,000	104,000
2.2	Support costs for Lead IA (US $)	5,070	0	0	6,240	0	0	0	2,210	13,520
2.3	Cooperating IA (UNIDO) agreed funding (US $)	29,000	0	0	37,000	0	0	0	0	66,000
2.4	Support costs for Cooperating IA (US $)	2,610	0	0	3,330	0	0	0	0	5,940
3.1	Total agreed funding (US $)	68,000	0	0	85,000	0	0	0	17,000	170,000
3.2	Total support costs (US $)	7,680	0	0	9,570	0	0	0	2,210	19,460
3.3	Total agreed costs (US $)	75,680	0	0	94,570	0	0	0	19,210	189,460

HCFC phase-out management plan (stage II)

Row	Particulars	2020	2021-2022	2023	2024	2025	2026	2027-2029	2030	Total
1.1	Montreal Protocol reduction schedule of Annex C, Group I substances (ODP tonnes)	7.02	7.02	7.02	7.02	3.51	3.51	3.51	0.27	n/a
1.2	Maximum allowable total consumption of Annex C, Group I substances (ODP tonnes)	7.02	7.02	7.02	7.02	3.51	3.51	3.51	0.00	n/a
2.1	Lead IA (UNEP) agreed funding (US $)	180,000	0	260,000	0	0	65,000	0	65,000	570,000
2.2	Support costs for Lead IA (US $)	23,400	0	32,866	0	0	8,217	0	8,217	72,700
2.3	Cooperating IA (UNIDO) agreed funding (US $)	100,000	0	100,000	0	0	0	0	0	200,000
2.4	Support costs for Cooperating IA (US $)	9,000	0	9,000	0	0	0	0	0	18,000
3.1	Total agreed funding (US $)	280,000	0	360,000	0	0	65,000	0	65,000	770,000
3.2	Total support costs (US $)	32,400	0	41,866	0	0	8,217	0	8,217	90,700
3.3	Total agreed costs (US $)	312,400	0	401,866	0	0	73,217	0	73,217	860,700

Annex II

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

	HPMP – stage II		KIP – stage I		Combined cost for HPMP+KIP (US $)
Category of activity	**Activity**	**Cost (US $)**	**Activity**	**Cost (US $)**	
Support for associations	Strengthening the Refrigeration Association of Malawi (RAM) for active involvement in HPMP activities	40,000	Supporting industry associations in refrigeration sector for strengthening their participation in KIP activities	5,000	45,000
Provision of tools					
Training of refrigeration technicians			Five training sessions for 125 service technicians	25,000	25,000
Training of AC technicians	Training of 360 technicians servicing HCFC refrigeration and air-conditioning (RAC) equipment	70,000			70,000
Training of MAC technicians			Provision of five MAC recovery units	10,000	10,000
Training of firefighting technicians					
Centres of excellence and equipment support	Technical support to three centres of excellence and additional tools to three reclamation centres	160,000			160,000
Development of codes of practice	Development and updating good service practices training modules and safe servicing of equipment using low-global-warming-potential (GWP) technologies	50,000	Updating code of practices for refrigeration sector	6,000	56,000
Small and medium-sized enterprise programmes					
Technology demonstration			Technology demonstration for low-GWP technologies in air-conditioning	40,000	40,000
Strengthening of licensing	Ongoing strengthening of HCFC licensing system	15,000	Strengthening HFC licensing and quota system	5,000	20,000
Strengthening of record-keeping			Strengthening documentation and record keeping for low-GWP refrigerant technologies and monitoring of HFC trade	6,000	6,000
Provision of tools to customs	Procurement of 4 to 5 identifiers	20,000			20,000

	HPMP – stage II		KIP – stage I		Combined cost for HPMP+KIP (US $)
Category of activity	**Activity**	**Cost (US $)**	**Activity**	**Cost (US $)**	
Training of customs officers	Training of about 65 customs and enforcement officers	65,000	Five training sessions for 125 customs and enforcement officers	25,000	90,000
Strengthening of customs records			Training of 45 importers and customs officers on record keeping and reporting	8,500	8,500
Improving monitoring			Market monitoring for determining adoption of low-GWP technology and legal imports of HFCs	6,500	6,500
Workshops					
Certification of technicians	Support for certification of technicians servicing HCFC-based equipment	40,000			40,000
Standards and labeling	Support for standards and labelling adoption for low-/lower-GWP technologies and green procurement standards	120,000			120,000
Awareness	Awareness and information outreach for alternatives to HCFCs in different applications	20,000	Awareness and information outreach on low-GWP technologies in different HFC consuming refrigeration applications	16,000	36,000
Coordination and monitoring	HPMP project management and monitoring	50,000	KIP project management and monitoring	17,000	67,000
Total		**650,000**		**170,000**	**820,000**
Percentage of total (%)		**79.3%**		**20.7%**	**100%**