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

PROJECT PROPOSAL: NIGERIA

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) | UNDP, UNIDO,
and UNEP | Individual
consideration |
|---|--------------------------|-----------------------------|

¹ UNEP/OzL.Pro/ExCom/95/1

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS

Nigeria

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

LATEST ARTICLE 7 DATA (Annex F)	Year: 2023	14,052.71 mt	22,809,651 CO ₂ -eq tonnes
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SECTORAL HFC CONSUMPTION DATA (CO ₂ -eq tonnes) AND ACTIVITIES									
	Aerosol	Foam	Fire-fighting	AC and refrigeration				Solvent	Other
				Manufacturing			Servicing		
				Refrigeration	AC	Other			
As submitted (survey 2022)	0	454,565	130,410	432,321	1,046,356	0	20,321,694	0	0
Latest CP report (2023)	0	367,225	57,606	417,616	1,100,208	0	20,836,442	0	0
KIP stage I activities as agreed (Y/N)		Y	N	Y	Y	N	Y	N	N

AVERAGE 2020-2022 HFC CONSUMPTION IN SERVICING	8,973.47 mt	15,370,130 CO ₂ -eq tonnes
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BASELINE CONSUMPTION DATA (CO ₂ -eq tonnes)	2020	2021	2022	Average 2020-2022
HFC annual consumption	2,620,048	8,381,305	17,374,682	9,458,678
HCFC baseline (65%)				5,729,101
HFC baseline				15,187,779

HFC CONSUMPTION ELIGIBLE FOR FUNDING	
Starting point for sustained aggregate reductions	TBD
Previously approved HFC phase-down investment projects	Yes
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	15,187,779	15,187,779	15,187,779	15,187,779	15,187,779	13,669,001	n/a
	Maximum allowable	15,187,779	15,187,779	15,187,779	15,187,779	15,187,779	13,649,151	n/a
	Maximum allowable (%)	100	100	100	100	100	89.87	n/a
Amounts recommended in principle (US \$)	UNDP	Project costs	1,902,050		973,370		375,103	3,250,523
		Support costs	133,144		68,136		26,257	227,537
	UNIDO	Project costs	705,510					705,510
		Support costs	49,386					49,386
	UNEP	Project costs	130,800		130,800		65,400	327,000
		Support costs	17,004		17,004		8,502	42,510
	Total project costs		2,738,360		1,104,170		440,503	4,283,033
	Total support costs		199,533		85,140		34,759	319,432
Total funds		2,937,893			1,189,310		475,262	4,602,465

* Recommended for approval at the present meeting

Reduction from remaining consumption eligible for funding stage I in CO ₂ -eq tonnes	1,538,628
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Secretariat's recommendation:	Individual consideration
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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 and previous HFC-related projects
 - 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 Nigeria, UNDP 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 \$8,875,275, consisting of US \$6,833,200, plus agency support costs of US \$478,324 for UNDP, US \$921,268, plus agency support costs of US \$64,489 for UNIDO, and US \$511,500, plus agency support costs of US \$66,495 for UNEP, as originally submitted.²

3. The implementation of stage I of the KIP will assist the Government of Nigeria 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 being requested at this meeting amounts to US \$4,570,492, consisting of US \$3,129,500, plus agency support costs of US \$219,065 for UNDP, US \$921,268, plus agency support costs of US \$64,489 for UNIDO, and US \$209,000, plus agency support costs of US \$27,170 for UNEP, as originally submitted, for the period of January 2025 to December 2029.

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 Nigeria as of November 2024.

Table 1. HPMP implementation status for Nigeria

	Stage I	Stage II	Stage III*
Meetings when HPMP was approved/updated	62 nd /66 th /75 th	81 st /93 rd	91 st /94 th
Reduction from baseline	10% by 2015	35% by 2020	67.5% by 2025
Total project cost (US \$)	4,938,830	8,890,734	3,144,194
Date of completion (actual/planned)	1 December 2018	31 December 2026	31 December 2026

* At its 91st meeting, the Executive Committee decided to allow Nigeria to submit stage IV of its HPMP in 2025 for the complete phase-out of HCFCs by 2030.³

² As per the letter of 22 August 2024 from the Ministry of Environment of Nigeria to UNDP.

³ Decision 91/31(d)

Status of implementation of previous HFC-related activities

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

Table 2. Previously approved HFC-related activities in Nigeria

Approval meeting	Project title	Implementing agency	Cost (US \$)	Date of completion
74 th	Survey of ODS alternatives	UNEP	65,000	May 2017
93 rd	Pilot project to maintain and/or enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down	UNIDO	145,000	Dec 2026
80 th	Enabling activities for HFC phase-down	UNEP	250,000	Jun 2019

III. HFC consumption overviewHFC consumption levels

7. Nigeria only imports HFCs for use in the RAC servicing and manufacturing sectors. The most consumed substances in 2023 were HFC-134a (63.9 per cent of total HFC consumption in CO₂-equivalent (CO₂-eq) tonnes), R-410A (22.0 per cent), R-404A (8.8 per cent), R-407C (3.3 per cent), and other HFCs (2.1 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 Nigeria (2019–2023 Article 7 data)

HFC	GWP	2019	2020	2021	2022	2023
Metric tonnes (mt)						
HFC-32	675	0.00	0.00	0.00	26.90	37.38
HFC-134a	1,430	1801.15	1,829.88	3,232.70	8,401.92	10,185.58
HFC-227ea	3,220	0.00	0.00	0.00	631.88	17.89
HFC-365mfc	794	0.00	0.00	0.00	0.00	462.50
R-404A	3,922	205.89	0.52	0.00	147.91	509.77
R-407A	2,107	0.00	0.00	0.00	7.40	0.00
R-407C	1,774	0.00	0.11	0.00	41.35	429.21
R-410A	2,088	0.00	0.52	1,800.50	1,263.78	2,402.36
R-417A	2,346	0.00	0.00	0.00	0.00	8.02
Total (mt)		2,007.04	1,831.03	5,033.20	10,521.14	14,052.71
CO₂-eq tonnes						
HFC-32	675	0	0	0	18,158	25,232
HFC-134a	1,430	2,575,645	2,616,728	4,622,761	12,014,746	14,565,379
HFC-227ea	3,220	0	0	0	2,034,654	57,606
HFC-365mfc	794	0	0	0	0	367,225
R-404A	3,922	807,418	2,039	0	580,044	1,999,114
R-407A	2,107	0	0	0	15,592	0
R-407C	1,774	0	195	0	73,349	761,354
R-410A	2,088	0	1,086	3,758,544	2,638,141	5,014,927
R-417A	2,346	0	0	0	0	18,815
Total (CO₂-eq tonnes)		3,383,063	2,620,048	8,381,305	17,374,682	22,809,651

8. During the preparation of the KIP, the government identified deficiencies in the reporting of HFC consumption data, which was not consistent with the size of the industry in the country and resulted in an underestimated baseline of 15 million CO₂-eq tonnes, leading to a high risk of non-compliance. In July 2024, UNDP experts undertook a mission to Nigeria and collected more accurate data from the National Agency for Food and Drug Administration and Control (NAFDAC). The updated consumption data is

presented in table 4. Accordingly, the national ozone unit (NOU) has submitted an official request to the Ozone Secretariat for the revision of their baseline.

Table 4. Revised HFC consumption data in Nigeria (2019–2023 Article 7 data)

HFC	GWP	2019	2020	2021	2022	2023
Metric tonnes (mt)						
HFC-32	675	43.60	72.48	97.5	97.90	37.38
HFC-134a	1,430	2,450.10	4,316.12	5,438.75	8,493.88	10,185.58
HFC-227ea	3,220	0.00	36.00	17.89	40.50	17.89
HFC-365mfc	794	0.00	337.50	492.50	572.50	462.50
R-404A	3,922	398.10	471.79	489.31	551.78	509.77
R-407C	1,774	401.70	574.79	594.19	651.96	429.21
R-410A	2,088	949.30	1,699.31	1,895.85	2,784.75	2,402.36
R-417A	2,346	0.00	8.00	9.98	193.76	8.02
Total (mt)		4,242.80	7,515.99	9,035.97	13,387.03	14,052.71
CO₂-eq tonnes						
HFC-32	675	29,430	48,924	65,813	66,083	25,232
HFC-134a	1,430	3,503,643	6,172,052	7,777,413	12,146,248	14,565,379
HFC-227ea	3,220	-	115,920	57,606	130,410	57,606
HFC-365mfc	794	-	267,975	391,045	454,565	367,225
R-404A	3,922	1,561,348	1,850,172	1,918,878	2,163,860	1,999,114
R-407C	1,774	712,616	1,019,591	1,054,004	1,156,479	761,354
R-410A	2,088	1,982,138	3,547,310	3,957,587	5,813,166	5,014,927
R-417A	2,346	-	18,768	23,413	454,561	18,815
Total (CO₂-eq tonnes)		7,789,175	13,040,711	15,245,758	22,385,372	22,809,651

Established HFC baseline

9. The Government of Nigeria reported the Article 7 data for 2020-2022. The country's HFC consumption baseline was established at 15,187,779 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 5.

Table 5. HFC baseline calculation for Nigeria (CO₂-eq tonnes)

Baseline calculation components	2020	2021	2022
HFC annual consumption	2,620,048	8,381,305	17,374,682
HFC average consumption in 2020-2022	9,458,678		
HCFC baseline (65%)	5,729,101		
HFC baseline	15,187,779		

10. Based on the updated data for 2020, 2021, and 2022, the revised baseline is calculated as 22,619,713 CO₂-eq tonnes, as shown in table 6.

Table 6. Revised HFC baseline for Nigeria (CO₂-eq tonnes)

Baseline calculation components	2020	2021	2022
HFC annual consumption	13,040,711	15,245,758	22,385,372
HFC average consumption in 2020-2022	16,890,614		
HCFC baseline (65%)	5,729,101		
HFC baseline	22,619,715		

Country programme implementation report

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

Montreal Protocol. As per paragraph 8 above, the Government has requested to revise the consumption data from 2020 to 2022. The Government will also submit revised CP data accordingly.

HFC consumption trends

12. Nigeria started implementing its HFC licensing system in 2022. The low consumption in 2020 and 2021 were due to under reporting as of reporting HFC consumption was voluntary. Another factor attributed to the low level of HFC consumption during those years was the impact of the COVID-19 pandemic. HFC consumption in 2022 is considered a more accurate reflection on the HFC consumption level in the country. HFC consumption is expected to further increase from 2023 onwards along with the economic development under the business-as-usual scenario.

HFC consumption by sector

13. In Nigeria HFCs are used in RAC servicing, RAC manufacturing, foam manufacturing and as a fire suppressant. The survey data for 2022 reveals that consumption in RAC servicing accounts for 72 per cent in mt or 76 per cent in CO₂-eq tonnes of total HFC consumption, followed by mobile air-conditioning (MAC) equipment servicing (18 per cent in mt or 15 per cent in CO₂-eq tonnes), air-conditioning (AC) manufacturing (4 per cent in mt or 5 per cent in CO₂-eq tonnes); and smaller uses in foam manufacturing, refrigeration equipment manufacturing; and fire suppressant, as shown in table 7 below.

Table 1: HFC consumption sector distribution (based on 2022 survey data)

Subsector	Total (mt)	Share (%)	Total (CO ₂ -eq tonnes)	Share (%)
<i>Manufacturing and assembly subsectors</i>				
AC manufacturing	505.23	3.8	1,046,356	4.7
Refrigeration manufacturing	175.54	1.3	432,321	1.9
Foam manufacturing	572.50	4.3	454,565	2.0
Subtotal manufacturing	1,253.27	9.4	1,933,241	8.6
<i>Servicing subsectors</i>				
RAC servicing	9,702.28	72.5	16,902,593	75.5
MAC servicing	2,390.98	17.9	3,419,101	15.3
Subtotal servicing	12,093.26	90.6	20,321,694	91.4
Firefighting	40.50	0.3	130,410	0.6
Total	13,387.03	100.0	22,385,372	100.0

Manufacturing sector

Refrigeration and air-conditioning

14. A total of 707.99 mt of HFCs are used in the RAC manufacturing sector in 2023. Of this total, 174.81 mt were used for manufacturing refrigeration equipment, while 533.63 mt were used for manufacturing air-conditioning (AC) equipment, as shown in table 8.

Table 8: 2023 HFC consumption in the manufacturing sector (mt)

Substance	RAC manufacturing subsector		Total	Share (%)
	Refrigeration	Air-conditioning		
HFC-32	0.00	5.16	5.16	0.7
HFC-134A	90.77	8.39	99.16	14.0
R-404A	73.91	0.00	73.91	10.4
R-407C	10.13	0.00	10.13	1.4
R-410A	0.00	519.63	519.63	73.4
Total	174.81	533.18	707.99	100

15. A total of 256 RAC manufacturing enterprises were identified, including primarily small ice block-making enterprises, cold room assemblers and AC manufacturers. Together the consumption of these companies accounted for 257.72 mt. Because some large foreign-owned companies did not respond to the survey potentially due to ineligibility for funding and numerous small enterprises involved in assembly of cold rooms and ice-making machines were not covered by the survey, the remaining 437.04 mt of HFCs could not be allocated to specific companies.

16. Out of the 256 enterprises identified in the survey, 226 were consuming less than 1.00 mt each of HFCs. Among these, 212 companies were using HFC-134a for manufacturing ice-making machines and cold rooms, while the remaining companies were mostly involved in the AC sector, using R-410A. Stage I of the KIP will include conversion of one domestic AC manufacturer, Haier Paterson Zochonis Nigeria Limited (HPZ) which had an average R-410A consumption of 48.90 mt from 2020 to 2022, as well as 15 small enterprises in manufacturing refrigeration equipment (ice making machines and cold rooms) with a total HFC-134a consumption of 8.97 mt during the same period.

Foam

17. In the foam sector, only two foam manufacturing enterprises⁴ still use HFCs for manufacturing discontinuous polyurethane (PU) foam panels; the remaining foam enterprises have been converted to low-GWP alternatives under the HPMP. The consumption figures for these two companies are shown in table 9 below. A technical assistance programme has been proposed in stage I of the KIP to support their transition from HFC to low-GWP technology.

Table 9: HFC consumption in the foam sector (mt)

Enterprise	2020	2021	2022	2023
Vitapur Nigeria Ltd.	200.00	278.00	300.00	262.50
Lange and Grants Commodities Ltd.	200.00	200.00	200.00	210.00
Total	400.00	478.00	500.00	472.50

Firefighting

18. There is limited knowledge and understanding on HFC use in the fire-fighting sector. The Federal Fire Services of Nigeria is responsible for risk assessment and enforcement of fire safety norms. HFC-227ea has been imported and used as a fire suppressant. There is no evidence indicating that HFC-227ea is used in manufacturing fire-fighting equipment. Therefore, it is most likely used for servicing or refilling fire suppressant cylinders. Detailed data of all fire-fighting installations was still not available but with increased awareness about HFC controls, any other imports of HFC-227ea would likely be identified in the future.

19. In addition to HFC use in this sector, other substances used include NOVEC and Aqua Film-Forming Foam (AFFF), which can serve as alternative to HFC-227ea. The company, Jk Peez Group limited produces foam based AFFF. The company presently has a capacity of 100,000 litres and has potential to cater for state fire services. However, the fire-fighting sector will not be addressed in stage 1 of the KIP.

Refrigeration and air-conditioning servicing sector

20. HFCs are mainly consumed for servicing in commercial refrigeration (24.3 per cent in mt and 25.5 per cent in CO₂-eq tonnes), followed by industrial refrigeration (21.7 per cent in mt and 20.9 per cent in CO₂-eq tonnes), mobile air-conditioning (19.8 per cent in mt and 16.8 per cent in CO₂-eq tonnes), and other subsectors, as shown in tables 10 and 11.

⁴ Vitapur Nigeria Limited (Vitapur) and Lange and Grants Commodities Limited (Lange and Grants).

Table 10. HFC consumption in Nigeria in the refrigeration and AC servicing subsectors in mt (2022)

Sector	HFC-134a	HFC-32	R-404A	R-407C	R-410A	R-417A	Total	Share of total (%)
Refrigeration subsectors								
Domestic	289.12	0.00	0.00	0.00	0.00	0.00	289.12	2.4
Commercial	2,242.43	0.00	288.53	254.39	0.00	155.01	2,940.36	24.3
Industrial	2,218.55	0.00	139.55	176.53	89.57	0.00	2,624.20	21.7
Transport	0.00	0.00	42.40	0.00	0.00	0.00	42.40	0.4
Subtotal	4,750.10	0.00	470.48	430.92	89.57	155.01	5,896.08	48.8
AC subsectors								
Residential	0.00	51.46	0.00	26.06	1,721.22	0.00	1,798.74	14.9
Commercial	1,257.45	41.48	10.23	185.24	474.31	38.75	2,007.46	16.6
Mobile	2,390.98	0.00	0.00	0.00	0.00	0.00	2,390.98	19.8
Subtotal	3,648.43	92.94	10.23	211.30	2,195.53	38.75	6,197.18	51.2
Total	8,398.53	92.94	480.71	642.22	2,285.10	193.76	12,093.26	100

Table 11. HFC consumption in Nigeria in the refrigeration and AC servicing subsectors in CO₂-eq tonnes (2022)

Sector	HFC-134a	HFC-32	R-404A	R-407C	R-410A	R-417A	Total	Share of total (%)
Refrigeration subsectors								
Domestic	413,442	0	0	0	0	0	413,442	2.0
Commercial	3,206,675	0	1,131,499	451,250	0	363,653	5,153,077	25.5
Industrial	3,172,527	0	547,259	313,138	186,977	0	4,219,901	20.9
Transport	0	0	166,276	0	0	0	166,276	0.8
Subtotal	6,792,643	0	1,845,034	764,387	186,977	363,653	9,952,696	49.2
AC subsectors								
Residential	0	34,736	0	46,227	3,593,047	0	3,674,009	18.1
Commercial	1,798,154	27,999	40,118	328,588	990,122	90,908	3,275,888	16.1
Mobile	3,419,101	0	0	0	0	0	3,419,101	16.8
Subtotal	5,217,255	62,735	40,118	374,815	4,583,169	90,908	10,368,998	51.0
Total	12,009,898	62,735	1,885,152	1,139,202	4,770,146	454,561	20,321,694	100

21. There are approximately 80,000 technicians (including 800 women) and 30,000 workshops consuming HFCs in Nigeria. There are 29 training institutions nationwide training institutes nationwide conducting RAC courses at the diploma and certificate levels, with approximately 78 trainers. Approximately 1,200 students graduate annually from these courses. Under stage I of the HPMP, 250 technicians have been trained on good servicing practices and safe handling flammable refrigerants. The curriculum for RAC courses has been updated to include safe handling of especially natural refrigerants.

Domestic, commercial, industrial and transport refrigeration servicing

22. HFC-134a is the dominant refrigerant and only HFC consumed in the servicing of domestic refrigerators and freezers in Nigeria, upheld by the limited availability of R-600a-based refrigeration and strong second-hand market. There are an estimated 25 million domestic refrigerators and freezers in the country.

23. The commercial refrigeration subsector comprises of stand-alone display cabinets, condensing units, and cold rooms. There are approximately 2.3 million standalone units, of which 80 per cent use HFC-134a and the remaining 20 per cent use R-600a, R-290 (propane), and R-744 (CO₂). The leakage rates of both standalone commercial units and domestic refrigerators and freezers are approximately 5 per cent.

24. There are approximately 267,000 commercial condensing units in the country, primarily serviced by HFC-134a, with a small minority using R-407C or R-404A; at least 25 per cent continue to be serviced using HCFC-22. Due to poor installation practices, the leakage rates of commercial condensing units are high and vary with equipment age, installation quality, and maintenance, with variations estimated from 20 to 50 per cent or higher.

25. The industrial refrigeration subsector includes large, centralized refrigeration systems and process chillers, with an estimated stock of approximately 73,000 units. These units are primarily installed at food processing plants and large warehouse cold stores, with process chillers also used in various manufacturing processes such as plastics. HFC-134a is the predominant refrigerant used in this subsector, with R-404A and R-407C consumed in smaller quantities. Due to poor maintenance practices, the leakage rates in industrial refrigeration are also high, averaging 30 to 40 per cent and resulting in frequent refrigerant top-ups.

26. The refrigerated transport subsector includes an estimated 6,800 units, with R-404A being the dominant refrigerant at 98 per cent.

Residential and commercial air-conditioning servicing

27. Most residential AC units are imported into the country, with an estimated stock of 10 million units. Approximately 67 per cent use HFCs, with R-410A being the dominant HFC, and R-407C used in much smaller quantities along with HFC-32 as a relatively new refrigerant in the subsector. As with domestic refrigeration, a strong second-hand market exists for residential AC; despite the ban on the import of used AC units, second-hand units continue to be imported from several countries, indicating the need for stronger enforcement.

28. The commercial AC subsector comprises split ducted, rooftop ducted, multi-split AC units and chillers. Approximately 55 per cent of commercial AC systems use R-410A. Due to the high cost of HFC-32-based systems, this HFC is used much less frequently. Various HFCs are used to service chillers, with HFC-134a being dominant and R-407C and R-404A in fewer cases. This subsector is a sizeable consumer of HFCs due to recent increases in offices and residential buildings. Due to varied skill levels of servicing technicians across the country, the leakage rates of commercial AC systems are high, leading to significant consumption particularly among multi-split and ducted systems given their large charge size.

Mobile air-conditioning servicing

29. There are approximately 13 million vehicles registered in Nigeria, but only half of the vehicle population has an installed AC. Furthermore, many vehicles, especially public transport and old private cars, have an installed AC that has not been functional for several years. Ninety-nine per cent of the vehicles that have a functioning AC are using HFC-134a but only 60 to 70 per cent of these ACs are serviced annually leading to topping up of refrigerant. Only the most recent models contain HFO-1234yf-based MAC, but the refrigerant is not available locally and is imported on a need basis. This sector is a significant contributor to the HFC-134a use in the country, with an estimate use of 2,390 mt in 2022.

Local installation and assembly subsector

30. While there are many enterprises that could be characterised as assembly enterprises, it was not possible to obtain detailed information on the local installation and assembly subsector in Nigeria. During implementation of the KIP, additional efforts will be made to collect detailed information on the subsector.

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

Institutional, policy and regulatory framework

31. The Government of Nigeria ratified the Kigali Amendment on 20 December 2018. A ban on the imports of HCFC-141b, both pure and in pre-blended polyols, has been in effect since 1 January 2023. In line with decisions 79/25 and 91/46(b), the complete phase-out of HCFCs in the RAC manufacturing sector will be supported by a ban on the imports of HCFC-22-based equipment starting from 1 January 2026, a ban on the use of HCFC-22 in the manufacturing of RAC equipment that will be imposed upon completion of conversion projects included in stage III (no later than 1 January 2027), and tax reductions for equipment using R-290 and HFC-32.

32. The National Environmental (Ozone Layer Protection) regulations, 2009, was amended in 2022 to include HFCs in line with the Montreal Protocol provisions, and stipulate guidelines for the manufacture, import, sale and use of ODS and HFCs in the country. Although the HFC license and quota system became effective from 27 April 2022, the quota system for HFCs has not been effectively enforced. The quota system will be enforced starting from 2025. Nigeria has banned the import of all HCFCs except for HCFC-22.

33. The institutional framework for managing energy efficiency is described in paragraph 33 to 39 of document UNEP/OzL.Pro/ExCom/93/77. In 2017, Nigeria adopted the Minimum Energy Performance Standard (MEPS) for domestic refrigerator and air-conditioners developed by the African Union and the Economic Community of West African States (ECOWAS). The MEPS requires that the manufacturers affix energy labels to products and that the refrigerant used has zero ODP. The government is currently working with UNIDO to facilitate the operationalization and enforcement of the MEPS and Labelling for RAC appliances.

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

Overarching strategy

34. The Government of Nigeria proposes to adopt a staged approach to reduce HFCs, following the Montreal Protocol phase-down schedule. Stage I of the KIP aims to reduce HFC by 10 per cent from the baseline by 2029. This stage builds on ongoing initiatives under the HPMP and will be implemented concurrently with it. All synergies between the KIP and the HPMP will be explored and enhanced. The KIP initiatives will primarily target the servicing sector as that dominates the HFC use, but will also address the RAC manufacturing, foam production, and fire suppressant sectors to further reduce HFC use.

Proposed reductions

35. Nigeria's HFC consumption is expected to continue growing from 2024 to 2029 under a business-as-usual-scenario. UNDP prepared a forecast of HFC consumption with a growth rate of 5 percent driven by the demand for servicing installed RAC equipment and consumption in the manufacturing sectors, as shown in table 13. The forecast shows that if not action is taken, Nigeria would be in non-compliance in 2024 based on the currently reported data as well as using the corrected data.

Table 13. HFC consumption forecast under unconstrained scenario, Montreal Protocol limits and proposed HFC reductions under stage I (CO₂-eq tonnes)

	2023*	2024	2025	2026	2027	2028	2029
HFC consumption forecast (annual growth rate of 5 per cent**)	22,809,651	22,650,483	23,867,343	25,123,575	26,424,845	27,760,501	29,129,058
Montreal Protocol HFC consumption limits	n/a	15,187,779	15,187,779	15,187,779	15,187,779	15,187,779	13,669,001
Revised Montreal Protocol consumption limits	n/a	22,619,713	22,619,713	22,619,713	22,619,713	22,619,713	20,357,742

	2023*	2024	2025	2026	2027	2028	2029
Proposed HFC consumption under the KIP	22,809,651	22,619,713	22,619,713	22,619,713	22,619,713	22,619,713	20,357,742
Proposed reduction in HFC consumption from baseline (%)	n/a	0	0	0	0	0	10

* As reported under Article 7 of the Montreal Protocol.

** Growth calculated based on 5 per cent including HFC phased in from HCFC phase-out.

Proposed activities

Foam manufacturing sector

36. HFCs will be phased out in the PU foam manufacturing subsector through the provision of technical assistance to the two remaining enterprises, Vitapur and Lange and Grants, in the amount of US \$394,000 for UNDP to phase out 472.50 mt of HFC-365mfc as a cost effectiveness of US \$0.86/kg. Activities include technical assistance for conducting tests of HFC alternatives (HFO, cyclopentane, and others) and evaluate performance for selecting alternatives (US \$60,000); material cost for two demonstration tests (US \$300,000); workshops to disseminate results of the tests and promote HFC alternatives (US \$16,000); and monitoring of the use of HFC and its alternatives (US \$18,000).

RAC manufacturing sector

37. HFCs will also be phased out in RAC manufacturing with the conversion of a residential air-conditioning (AC) manufacturing line from R-410A to HFC-32 at the enterprise HPZ and the conversion of 15 small and medium sized enterprises (SME) in commercial refrigeration manufacturing, in the amount of US \$837,516 for UNIDO.

38. HPZ was established in 2000. The AC manufacturing lines using R-410A were established in 2016. The total funding requested in the amount of US \$732,516 includes the incremental capital costs (ICCs) of US \$660,000 covering replacement of manufacturing equipment; safety equipment and certification; general work; trial testing and commissioning; and training; and one-year incremental operating costs (IOCs) of US \$72,516 covering the cost of refrigerants and components.

Table 14: Proposed costs of conversion of two AC manufacturing lines in HPZ

Description	No. of units	Unit cost (US \$/kg)	Total cost (US \$)
Production			
Refrigerant storage	1	40,000	40,000
Refrigerant transfer system	1	25,000	25,000
New refrigerant charging boards incorporating the necessary safety features	2	80,000	160,000
New leaks detectors	3	10,000	30,000
Replacement of vacuum pump	16	5,000	80,000
<i>Subtotal production</i>			<i>335,000</i>
Plant safety			
Ventilation, exhausting system (fans, piping, ductworks, grounding, electrical boards/ connections) for storage, charging and test areas	3	25,000	75,000
Gas sensors, alarm monitoring system for entire plant for storage, charging and test areas	3	25,000	75,000
Fire protection/ control system for the plant	1	10,000	10,000
Lightning protection and grounding	1	10,000	10,000
Safety audit/safety inspection and certification	1	15,000	15,000
<i>Subtotal plant safety</i>			<i>185,000</i>
General work			
Modification of existing layout to accommodate installation of new equipment, grounding, antistatic floor in hazardous area, safety walls around the hazardous areas, explosion proof electrical switches, motor connection etc.	1	50,000	50,000

Description	No. of units	Unit cost (US \$/kg)	Total cost (US \$)
Truck receiving area	1	5,000	5,000
Firefighting water reservoir	1	5,000	5,000
<i>Subtotal general work</i>			60,000
Training and Commissioning			
Training for handling of flammable alternate technology	1	10,000	10,000
Trial, prototyping and commission	1	10,000	10,000
<i>Subtotal training and commission</i>			20,000
Total equipment cost			600,000
Contingencies (10%)			60,000
Total ICC			660,000
One-year of IOC			72,516
Total project cost			732,516
Total phase-out (mt)			48.9
<i>Cost effectiveness of the project (US \$/kg)</i>			14.98

39. The assistance to the 15 SMEs in commercial RAC manufacturing sector includes provision of tools and equipment⁵ to phase out 8.97 mt of HFC-134a (US \$80,000); and three technical assistance workshops (US \$25,000) to support the conversion of 12 SMEs during the implementation period to support the smooth implementation of the conversion projects, resulting in a total cost of US \$105,000.

Refrigeration and air-conditioning servicing sector

40. Proposed activities in the servicing sector include strengthening the legal framework, capacity-building of customs and technicians, refrigerant recovery, awareness-raising and incentives, a commercial refrigeration pilot project, and the development of a plan for the cold chain. A breakdown of activities is listed in table 15.

Table 15. Proposed activities to be implemented in stage I of the KIP for Nigeria

Project component/activity	Agency	Cost (US \$)
<i>Strengthening the legal and regulatory framework to include HFCs (US \$685,000)</i>		
Campaign to promote awareness of the HFC licensing and quota system, including 15 workshops	UNEP	365,000
Develop and implement a quota system for HFC imports	UNDP	120,000
Develop regulations to control the use of HFCs and HFC-based equipment in specific sectors	UNEP	100,000
Support enforcement of the ban on importing used RAC equipment and consult with stakeholders to develop further restrictions and controls	UNDP	50,000
Support the development of a green procurement guideline for users and purchasers of RAC equipment	UNDP	50,000
<i>Customs capacity-building (US \$320,000)</i>		
Update training curriculum at the customs training institute to include HFCs, controls for energy efficiency measures and used RAC equipment	UNDP	30,000
Train 20 trainers on HFC control measures using the updated curriculum	UNDP	20,000
Train 300 customs officers HFC control measures using the updated curriculum	UNDP	150,000
Train 200 clearance agents on HFC control measures	UNDP	120,000
<i>RAC and MAC technician capacity-building (US \$660,000)</i>		
Update MAC training curriculum and include MAC technicians into the RAC certification scheme	UNDP	100,000
Train 60 trainers on good servicing practices using the updated curriculum	UNDP	60,000

⁵ Including refrigerant recovery station and cylinders, vacuum pumps and gauge, hydrocarbon charging equipment, Leak detectors, service manifold, hoses and accessories, tools for installation, brazing equipment, consumables, etc.

Project component/activity	Agency	Cost (US \$)
Train 500 MAC technicians on good practices using the updated curriculum	UNDP	200,000
Technical assistance to 50 large refrigeration systems on leak proof	UNDP	150,000
Scholarship for 40 women in MAC sector to promote women's participation	UNDP	50,000
Provide support to the Nigerian Automobile Technicians Association (NATA)	UNDP	100,000
<i>Equipment procurement⁶ (US \$1,493,000)</i>		
Establish five centres of excellence for MAC sector	UNDP	250,000
Establish 10 HFC-290-based commercial refrigeration training units	UNDP	192,000
Provision of tools and equipment to 100 MAC garages	UNDP	351,000
Equip 13 RAC institutes with safety tools and equipment	UNDP	260,000
Equip two RAC institutes with trans-critical CO ₂ training labs	UNDP	140,000
Provide basic safety tools to 500 RAC technicians	UNDP	300,000
<i>Refrigerant recovery and reuse scheme (US \$300,000)</i>		
Assess practices of single use cylinders disposal	UNDP	35,000
Two workshops with stakeholders to discuss a strategy	UNDP	20,000
Establish a collection and recovery centre for single use cylinders	UNDP	175,000
Establish an incentive scheme for return of cylinders	UNDP	50,000
Evaluation and adjustments	UNDP	20,000
<i>Pilot project for commercial refrigeration sector (US \$1,475,000)</i>		
Identify suitable candidates for the pilots including preliminary assessment	UNDP	50,000
Conduct four pilot projects on R-290 monoblocs in cold rooms for food storage and preservation, including equipment, installation, commissioning and training	UNDP	200,000
Demonstrate the use of natural refrigerants in two indirect glycol/chilled water-cooling systems in large cold room or industrial warehouse cooling application	UNDP	500,000
Demonstration of replacement of a multi-split commercial AC system using R-410A with R-290-based centralized AC system	UNDP	600,000
Monitoring and evaluation of project impacts and energy efficiency improvements, and provide training to technicians and end-users	UNDP	35,000
Create awareness on the demonstrated low-GWP technologies and establish a supply chain for these low-GWP technologies	UNDP	40,000
Site visits for importers to understand new technologies	UNDP	50,000
<i>Cold chain national action plan (US \$180,000)</i>		
Three workshops for cold chain service providers	UNDP	30,000
Collect data through sites visits and consultations	UNDP	70,000
Draft the action plan document	UNDP	50,000
Stakeholder workshop to discuss results and finalize the action plan	UNDP	30,000
<i>Incentive scheme to replace refrigeration equipment in grocery stores (US \$1,170,000)</i>		
Stakeholder workshops for incentive scheme	UNDP	30,000
Promotional activities and materials	UNDP	30,000
Establishing the incentive scheme fund	UNDP	1,035,000
Monitoring and verification of the incentive scheme implementation	UNDP	50,000
Engagement with local HFC banking and refrigerant recovery	UNDP	25,000
Total		6,283,000

Project implementation, coordination and monitoring

41. The project management unit (PMU) established under the HPMP will also support stage I of the KIP, with UNDP, UNIDO, UNEP and the NOU monitoring activities, reporting on progress, and working with stakeholders to phase out HFCs. The cost of those activities amounts to US \$751,452 and includes

⁶ A breakdown of tools and equipment for each activity are listed in annex III.

staff and consultants (US \$601,162) and monitoring travel (US \$150,290). PMU costs are split between UNDP (US \$621,200), UNIDO, (US \$83,752), and UNEP (US \$46,500).

Gender policy implementation

42. Gender has been considered in project activities under the KIP, including gender mainstreaming targets and a scholarship for 40 women. Progress on gender mainstreaming under project implementation will be tracked and reported on in future tranche requests, including mandatory performance indicators.

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

43. Stage I of the KIP was planned to complement the country's HPMPs, and particularly with the activities of stage II of the HPMP. The harmonization of all activities was considered with a special focus on coordinating equipment procurement, and coordination of the PMUs will be done by the national ozone office. An overview of HPMP activities compared to proposed KIP activities can be found in annex II to the present document.

Total cost of stage I of the Kigali HFC implementation plan

44. The budget for stage I has been proposed at US \$8,265,968. The costs of activities in the refrigeration servicing sector have been proposed in line with decision 92/37. In the absence of cost funding guidelines, the funding requested for activities in the in the foam and refrigeration manufacturing subsector is the best available estimate provided by UNDP and UNIDO. The proposed activities and cost of stage I of the KIP are summarized in table 16.

Table 16. Cost of activities to be implemented in stage I of the KIP for Nigeria, as submitted

Sector	Project	Substance	GWP	mt	CO ₂ -eq tonnes	Funding (US \$)	C/E (US \$/kg)
AC manufacturing	Conversion of the AC manufacturing lines at HPZ	R-410A	2087.5	48.90	102,079	732,516	14.98
Commercial refrigeration	TA to 15 SME enterprises	HFC-134a	1430.0	8.96	12,813	105,000	11.72
Foam sector	Assistance to two foam system houses (Vitapur, Lange and Grants)	HFC-365mfc	794.0	472.50	375,165	394,000	0.83
Subtotal manufacturing				530.36	490,057	1,231,516	2.32
Servicing sector activities		Various	1,692	1,232	2,085,094	6,283,000	5.10
Total costs of all sectors without PMU		Various		1,762	2,575,150	7,514,516	4.26
PMU						751,452	
Grand total				1,762	2,575,150	8,265,968	4.69

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

45. The first funding tranche of stage I of the KIP, in the total amount of US \$4,259,768, will be implemented between January 2024 and December 2027. The detailed activities and costs are presented in table 17 below.

Table 17: Proposed activities to be implemented in the first tranche of stage I of the KIP for Nigeria

Project component/activity	Agency	Cost (US \$)
Manufacturing sector		
<i>Foam manufacturing (US \$280,000)</i>		
Material cost for two demonstration tests	UNDP	250,000
Technical assistance for conducting tests of HFC alternatives	UNDP	30,000
<i>RAC manufacturing (US \$837,516)</i>		
Conversion of two manufacturing lines at HPZ	UNIDO	732,516
Provision of tools and equipment to 15 enterprises	UNIDO	80,000

Project component/activity	Agency	Cost (US \$)
Three technical assistance workshops	UNIDO	25,000
Servicing sector		
<i>Strengthening the legal and regulatory framework to include HFCs (US \$285,000)</i>		
Campaign to promote awareness of the HFC licensing and quota system, including 15 workshops	UNEP	150,000
Develop and implement a quota system for HFC imports	UNDP	60,000
Develop regulations to control the use of HFCs and HFC-based equipment in specific sectors	UNEP	40,000
Support enforcement of the ban on importing used RAC equipment and consult with stakeholders to develop further restrictions and controls	UNDP	20,000
Support the development of a green procurement guideline for users and purchasers of RAC equipment	UNDP	15,000
<i>Customs capacity-building (US \$110,000)</i>		
Update training curriculum at the customs training institute to include HFCs, controls for energy efficiency measures and used RAC equipment	UNDP	30,000
Train 40 trainers on HFC control measures using the updated curriculum	UNDP	20,000
Train 300 customs officers HFC control measures using the updated curriculum	UNDP	20,000
Train 200 clearance agents on HFC control measures	UNDP	40,000
<i>RAC and MAC technician capacity-building (US \$305,000)</i>		
Update MAC training curriculum and include MAC technicians into the RAC certification scheme	UNDP	50,000
Train 60 trainers on good servicing practices using the updated curriculum	UNDP	60,000
Train 150 MAC technicians on good practices using the updated curriculum	UNDP	60,000
Technical assistance to 25 large refrigeration systems on leak proof	UNDP	70,000
Scholarship for 20 women in MAC sector to promote women's participation	UNDP	25,000
Provide support to the Nigerian Automobile Technicians Association (NATA)	UNDP	40,000
<i>Equipment procurement (US \$590,000)⁷</i>		
Establish two centres of excellence for MAC sector	UNDP	100,000
Establish two HFC-290-based commercial refrigeration training units	UNDP	100,000
Provision of tools and equipment to 40 MAC garages	UNDP	120,000
Equip seven RAC institutes with safety tools and equipment	UNDP	100,000
Equip two RAC institutes with trans-critical CO ₂ training labs	UNDP	70,000
Provide basic safety tools to 500 RAC technicians	UNDP	100,000
<i>Refrigerant recovery and reuse scheme (US \$15,000)</i>		
Assess practices of single use cylinders disposal	UNDP	15,000
<i>Pilot project for commercial refrigeration sector (US \$815,000)</i>		
Identify suitable candidates for the pilots including preliminary assessment	UNDP	25,000
Conduct four pilot projects on R-290 monoblocs in cold rooms for food storage and preservation, including equipment, installation, commissioning and training	UNDP	200,000
Demonstrate the use of natural refrigerants in an indirect glycol/chilled water-cooling systems in large cold room or industrial warehouse cooling application	UNDP	250,000
Demonstration of replacement of a multi-split commercial AC system using R-410A with R-290-based centralized AC system	UNDP	300,000
Monitoring and evaluation of project impacts and energy efficiency improvements, and provide training to technicians and end-users	UNDP	20,000
Site visits for importers to understand new technologies	UNDP	20,000
<i>Cold chain national action plan (US \$180,000)</i>		
Three workshops for cold chain service providers	UNDP	30,000
Collect data through sites visits and consultations	UNDP	70,000
Draft the action plan document	UNDP	50,000

⁷ A breakdown of tools and equipment for each activity are listed in annex III.

Project component/activity	Agency	Cost (US \$)
Stakeholder workshop to discuss results and finalize the action plan	UNDP	30,000
<i>Incentive scheme to replace refrigeration equipment in grocery stores (US \$455,000)</i>		
Stakeholder workshops for incentive scheme	UNDP	30,000
Promotional activities and materials	UNDP	10,000
Establishing the incentive scheme fund	UNDP	370,000
Monitoring and verification of the incentive scheme implementation	UNDP	20,000
Engagement with local HFC banking and refrigerant recovery	UNDP	25,000
Project coordination and monitoring		
<i>PMU (US \$387,252)</i>		
Staff and consultants	All agencies	309,802
Monitoring travel	All agencies	77,450
Total		4,259,768

SECRETARIAT'S COMMENTS AND RECOMMENDATION

V. Comments

Overarching strategy

46. As discussed in paragraph 8 above, UNDP further informed that the Government of Nigeria had submitted a request to the Ozone Secretariat for revision of the Article 7 data for 2020 to 2022. Data revision for the baseline years needs to be reviewed by the Implementation Committee and the Meeting of the Parties which is currently in the process. The Secretariat's review of the KIP submitted to the 95th meeting is based on the actual reported data under Article 7 of the Montreal Protocol.

Institutional, policy and regulatory framework

HFC licensing and quota system and compliance in 2024

47. Although Nigeria has established an enforceable system of licensing and quotas for monitoring HFC imports/exports in line with decision 87/50(g), the HFC quota system has not been enforced for 2024 and will only be enforced starting from 1 January 2025.

48. Regarding the commitment to meeting the freeze target in 2024, UNDP advised that, due to under reporting of HFC consumption during baseline years, the currently established HFC baseline is well below the actual HFC consumption in Nigeria. The country will not be able to commit to meeting the 2024 freeze target based on the established baseline, as it would need to reduce 33 per cent from 2023 consumption level, which may cause severe disruptions to the economy. However, the NOU will coordinate with key stakeholders (the permit issuance authority (NAFDAC), the Customs, Importers and dealers of HFCs) to ensure that HFC consumption in 2024 does not exceed the freeze target based on the revised baseline data submitted to the Ozone Secretariat.

49. The Secretariat noted that the revision of the baseline for Nigeria was included for consideration by the Implementation Committee at its 73rd meeting. The Implementation Committee agreed to consider the revision of the baseline at its 74th meeting, based on additional information to be provided by the country to the Ozone Secretariat. If all relevant information is made available and the Implementation Committee recommends the revision of the HFC baseline, it would be presented for consideration the 37th Meeting of the Parties. If the Meeting of the Parties approve the change of the HFC baseline in Nigeria, the Montreal Protocol control measure and the maximum allowable consumption in the Agreement for the KIP would need to be updated at the 97th meeting of the Executive Committee.

50. In line with existing practice and precedent, the Secretariat could only recommend the approval of the KIP for Nigeria on the basis of the current Article 7 data. Considering the information provided by the Government of Nigeria, based on the current HFC baseline it is unlikely that the country would be in compliance with the Montreal Protocol targets and the KIP Agreement for the year 2024. However, without the approval of the KIP, the country would not be able to start activities to curb the HFC consumption growth and start achieving reductions.

51. Noting that during the preparation of the KIP it has been corroborated that the reported consumption was underestimated and that the country has already submitted a request to the Ozone Secretariat to revise the HFC consumption data, a possible path forward could be the consideration of the KIP at the present meeting based on current data, on the understanding that any potential reduction in funding for failure to comply with the maximum allowable consumption for the year 2024 (i.e., the established baseline of 15,187,779 CO₂-eq tonnes) would be considered not at the time of the second tranche (in 2027) but at the 97th meeting in December 2025 in light of the result of the consideration of the request for change of baseline by the 74th Implementation Committee and 37th Meeting of the Parties in November 2025, without prejudging any result of the consideration of the issue by the Implementation Committee.

Regulatory measures to ensure the sustainability of phase-out

52. The Secretariat discussed the regulatory measures to ensure the sustainability of the phase-out in foam and RAC manufacturing sectors, in accordance with decision 79/25. UNDP advised that, for the foam sector, no further funding will be requested for HFC phase-out after the technical assistance. The country will consider a ban on production of foam with HFCs once the conversion projects in the foam sector under stage I of the KIP are completed. For the AC and commercial refrigeration manufacturing sector, only part of the sector HFC consumption is being addressed in stage I, therefore, enforcing bans might not be feasible. However, the country is working towards controlling the import of HFC-based energy inefficient equipment through the enforcement of MEPS which will restrict the import of products based on high-GWP refrigerants. Other initiatives, including the creation of local supply chains for R-290 ACs and coordination with multinational AC manufacturers in Nigeria to manufacture low-GWP technology products, will facilitate the supply of the technology. All these efforts will support the sector to transition away from high-GWP refrigerants.

53. The Government is considering the regulatory measures to progressively control the use of HFCs in domestic and commercial refrigeration sector and applying specific bans, before 2029. However, establishment of such regulatory measures would depend on the political and economic situation of the country and subjecting to a legal process. Therefore, it is not possible to set a definite timeline at this moment. Nevertheless, the NOU along with the Energy Commission and NAFDAC will work towards limiting the quantities of HFC-based equipment for which low-GWP alternatives are available. HFC-based domestic refrigerators and small domestic box freezers could be the priority applications to implement such measures. The country will also consider a ban on production of foam with HFCs once the final conversion projects facilitated by the first stage of the KIP are completed.

Technical and cost-related issues

Manufacturing sectors

54. The technical assistance to the foam sector was requested for a total of US \$394,000 and it is recommended for US \$160,000 to phase out 472.50 mt of HFC-365mfc, as shown in table 18.

Table 18. Agreed cost for technical assistance in the PU foam sector

Description of cost items	Total Costs (US\$)
HFO-1233zd about 60USD per kg. 250kg needed	15,000

Description of cost items	Total Costs (US\$)
Preblended polyol CP Based; 2 containers 7,500 each (incl. transport and insurance costs)	15,000
Other alternatives free of HFC such as: Methyl formate, Methylal, water-based (free cost but several tests), other blends with HFO each one for different concentrations	10,000
Formulations for each application for each customer (these is not industrial production; it is a laboratory level- more expensive-)	10,000
Laboratory tests	8,000
Sundries	3,500
Subtotal	61,500
Contingencies (~10%)	6,500
Evaluation of final results	12,000
Total cost per company	80,000
Total adjusted for foam sector project	160,000

55. The cost of conversion of the manufacturing lines for HPZ was discussed. Reductions were applied to production equipment (charging boards, leak detectors) and modification of production lines; and the costs for vacuum pumps, civil work, were removed. The costs of design were added, and contingencies were applied only to equipment. The total ICC was reduced from US \$660,000 to US \$542,250, as shown in table 19.

Table 19: Agreed costs of conversion of two AC manufacturing lines in HPZ

Description of cost items	No. of units	Unit cost (US \$)	Total cost (US \$)
Production lines			
Refrigerant storage	1	40,000	40,000
Refrigerant transfer system	1	25,000	25,000
New refrigerant charging boards incorporating the necessary safety features	2	70,000	140,000
New leaks detectors	2	10,000	20,000
Plant safety			
Ventilation and exhausting system (fans, piping, ductworks, grounding, electrical boards/connections) for storage, charging and test areas	3	25,000	75,000
Monitoring system for entire plant for storage, charging and test areas, including gas sensors, alarm	3	25,000	75,000
Fire protection/ control system for the plant	1	10000	10,000
Lightning protection and grounding	1	10000	10,000
Safety audit/ safety inspection & certification	1	15000	15,000
General work			
Modification of existing layout to accommodate installation of new equipment, grounding, antistatic floor in hazardous area, safety walls around the hazardous areas, explosion proof electrical switches, motor connection	1	32,500	32,500
Firefighting water reservoir	1	5,000	5,000
<i>Subtotal equipment</i>			447,500
Contingencies (10 per cent)			44,750
Total equipment			492,250
Design, prototype, testing of six models with HFC-32 refrigerant	6	5,000	30,000
Training for handling of flammable alternate technology	1	10,000	10,000
Trial, testing and commission of the manufacturing lines	1	10,000	10,000
Total ICC			542,250

56. UNIDO submitted to the 95th meeting, a request to prepare a project to improve energy efficiency under decision 94/60 for HPZ and 15 SMEs to be developed within a 24-month period.⁸ In view of the above, it was agreed that the IOC for the conversion will not be requested for the current project. The total cost for the conversion of two manufacturing lines at HPZ was agreed at US \$542,250, with a cost effectiveness of US \$11.09/kg.

57. The assistance to the 15 SMEs in commercial RAC manufacturing sector is recommended as requested for a total of US \$105,000 to phase out 8.97 mt of HFC-134a.

RAC servicing sector

58. Based on the 10 per cent reduction of the established baseline of 15,187,779 CO₂-eq tonnes, the total reduction from stage I of the KIP would be 1,518,778 CO₂-eq tonnes. This includes the reduction of 490,057 CO₂-eq tonnes from manufacturing conversions (foam and RAC sectors) and 1,028,721 CO₂-eq tonnes from the servicing sector, or 612 mt using the average GWP of 1,680 of the servicing sector. In line with decision 92/37(b)(iii), the total funding for the servicing sector for Nigeria is calculated at US \$3,122,133, at US \$5.1/kg. Subsequently to the correction of the CP data for the years 2020-2022, the average GWP for the servicing sector was adjusted to 1,712.84. Accordingly, the reductions from the servicing sector are 1,048,571 CO₂-eq tonnes and the reduction from the established baseline is 10.13 per cent.

59. In line with the methodology for converting US \$/kg to US \$/CO₂-eq tonne in the servicing sector described in annex I of document UNEP/OzL.Pro/ExCom/92/46, the reduction from the country's remaining HFC consumption eligible for funding from the servicing sector is 1,048,571 CO₂-eq tonnes, as summarized in table 20 below. In light of those agreed reductions, the Government agreed to reduce its 2029 HFC consumption to 13,649,151 CO₂-eq tonnes, a reduction of 10.13 per cent of the country's established HFC baseline for compliance.

Table 20. Agreed costs and reductions from HFC consumption eligible for funding from the servicing sector, and 2029 target

Servicing sector		
Average HFC consumption in the servicing sector in baseline years	mt	8,973.47
	CO ₂ -eq tonnes	15,370,130
Average GWP of HFC consumption in the servicing sector		1,712.84
Agreed funding	US \$	3,122,133
Agreed cost-effectiveness threshold	US \$/kg	5.10
Reductions from remaining HFC consumption in servicing	mt	612.18
	CO ₂ -eq tonnes	1,048,571
Reductions from all sectors and 2029 target		
Established HFC consumption baseline	CO ₂ -eq tonnes	15,187,779
<i>Reductions in remaining HFC consumption eligible for funding from manufacturing sector conversions</i>	CO ₂ -eq tonnes	490,057
<i>Reductions in remaining HFC consumption eligible for funding from the servicing sector</i>	CO ₂ -eq tonnes	1,048,571
2029 target	CO ₂ -eq tonnes	13,649,151

60. Funding for the servicing sector were adjusted from US \$6,283,000 to US \$3,122,133. In order to accommodate the funding change, the incentive scheme to replace refrigeration equipment in grocery stores and development of a National Cold Chain Action Plan were eliminated. Furthermore, components for providing technical support to establishing the HFC regulatory framework, capacity building and procurement of equipment for RAC and MAC servicing sector, along with the demonstration project for low-GWP for commercial and industrial refrigeration were modified. Finally, a gender component on

⁸ UNEP/OzL.Pro/ExCom/95/37

gender mainstreaming was added. As a result, the activities for the servicing sector in the stage I of the KIP are as follows:

- (a) *Strengthening the HFC licensing and quota system*: Conducting 10 workshops to create stakeholders' awareness on HFC licensing system; implementing HFC quotas through the online imports' license registry; and drafting additional controls on imports, fiscal incentives, additional controls (UNEP, US \$300,000 and UNDP, US \$50,000);
- (b) *Enforcement of HFC controls and customs capacity building*: Provide support to the Customs training institute to include HFC controls into their curriculum; update the training of 20 trainers; training of at least 300 Custom Officers under the updated curriculum; and training of 200 clearance agents (UNDP) (US \$320,000);
- (c) *Capacity building of RAC and MAC servicing sectors*: Update MAC training curriculum and include MAC technicians into the RAC certification scheme; train 60 trainers on good servicing practices using the updated curriculum; train 500 MAC technicians on good practices using the updated curriculum; technical assistance to 50 large refrigeration systems on leak proof; provide support to the Nigerian Automobile Technicians Association (UNDP) (US \$610,000);
- (d) *Procurement and distribution of equipment*: Establish five centres of excellence for MAC sector: establish 10 HFC-290-based commercial refrigeration training units; provide sets of tools and equipment to 100 MAC garages; equip 13 RAC institutes with safety tools and equipment; equip two RAC institutes with trans-critical CO₂ training laboratories and provide basic safety tool sets to 450 RAC technicians (UNDP) (US \$874,133)
- (e) *Refrigerant recovery and reuse scheme*; Assess practices of single use cylinders disposal; establish a collection and recovery centre for single use cylinders; establish an incentive scheme for return of cylinders: and evaluation and adjustments of the scheme (UNDP) (US \$123,000)
- (f) *Pilot project for commercial and refrigeration sector*: Identify suitable candidates for the pilots including preliminary assessment; conduct two pilot projects on R-290 monoblocs in cold rooms for food storage and preservation, including equipment, installation, commissioning and training; demonstrate the use of natural refrigerants in one indirect glycol/chilled water-cooling systems in large cold room or industrial warehouse cooling application; demonstration of replacement of a multi-split commercial AC system using R-410A with R-290-based centralized AC system; monitoring and evaluation of project impacts and energy efficiency improvements, and provide training to technicians and end-users during six months; create awareness on the demonstrated low-GWP technologies and establish a supply chain for these low-GWP technologies; organize site visits for importers to understand new technologies (UNDP) (US \$745,000);
- (g) *Gender mainstreaming*: Development of a gender assessment, and training of key stakeholders based on the results and recommendations of the assessment and provide scholarship for 40 women in MAC sector to promote women's participation (UNDP) (US \$100,000).

61. The requested and agreed funds per project components are shown in table 21.

Table 21. Project components in the servicing sector as requested and agreed (US \$)

Project component	Requested	Agreed
Establishing the HFC regulatory framework	685,000	350,000

Project component	Requested	Agreed
Enforcement of HFC controls and customs capacity building	320,000	320,000
Capacity-building of RAC and MAC servicing sectors	660,000	610,000
Procurement of equipment for RAC and MAC servicing sectors	1,493,000	874,133
Refrigerant recovery and reuse scheme	300,000	123,000
Pilot project for commercial and industrial refrigeration sector	1,475,000	745,000
Cold chain national action plan	180,000	0
Incentive scheme to replace refrigeration equipment in grocery stores	1,170,000	0
Gender mainstreaming		100,000
Total	6,283,000	3,122,133

62. Noting that the pilot project for commercial refrigeration was kept in the activities under stage I of the KIP, in line with decision 92/36(g), the Secretariat requested UNDP, upon completion of the pilot project, submit a final report on its implementation, including the HFC phase-out and energy efficiency gains achieved.

Project management unit

63. Noting that the revision of the baseline is under review, the country needs to address significant reduction from the 2023 consumption to meeting the compliance target, and significant coordination is required for addressing conversion in SMEs, funding for the project management unit (PMU) was agreed at US \$353,650 (US \$295,400 for UNDP, US \$58,250 for UNIDO), calculated at 9 per cent of the current project costs, on the understanding that the total amount of the PMU could be increased if the phase-out in the servicing sector is increased after the revision of the baseline.

Total project cost

64. At the total cost of US \$4,283,033, stage I of the KIP for Nigeria will result in a reduction of 1,538,628 CO₂-eq tonnes from the country's HFC consumption eligible for funding, as summarized in table 21.

Table 21. Agreed cost of activities to be implemented during stage I of the KIP in Nigeria

Sector	Substance	Funded phase-out (mt)	Funded phase-out (CO ₂ -eq tonnes)	Cost (US \$)	CE (US \$/kg)	CE (US \$/CO ₂ -eq tonne)	phase-out (%)
Manufacturing sector	R-410A	48.90	102,079	807,250	1.52	1.65	0.67
	R-134a	8.96	12,813				0.08
	HFC-365mfc	472.50	375,165				2.47
Servicing	n/a	612.18	1,048,571	3,122,133	5.10	2.98	6.90
PMU	n/a			353,650			
Total	n/a	1,142.54	1,538,628	4,283,033	3.75	2.78	10.13

65. Stage I of the KIP will be implemented in 3 tranches. The schedule of HFC phase-down and HCFC phase-out commitments and of the KIP and HPMP tranches is presented in annex I to the present document.

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

66. The funding for the first tranche was agreed at US \$2,738,360, plus agency support costs of US \$52,348. For UNDP, under the foam manufacturing component, the activity to hire consultants to provide technical assistance for conducting tests of HFC alternatives (US \$30,000) was removed; under

servicing, activities under the cold chain national action plan (US \$180,000) and incentive scheme to replace grocery store refrigeration (US \$455,000), as well as supporting enforcement of the ban on importing used RAC equipment (US \$20,000), supporting the development of a green procurement guideline for users and purchasers of RAC equipment (US \$15,000), establishing R-290 based commercial refrigeration training units (US \$100,000), and equipping seven RAC institutes with safety tools and equipment (US \$100,000), were also removed. Remaining changes are shown in table 22, which shows the agreed activities and costs for the first tranche (changes are in bold font).

Table 22. Agreed cost of activities to be implemented in the first tranche of stage I of the KIP for Nigeria (US \$)

Project component/activity	Agency	Agreed costs
Manufacturing sector		
Foam manufacturing (US \$160,000)		
Material cost for two demonstration tests	UNDP	160,000
RAC manufacturing (US \$647,250)		
Conversion of two manufacturing lines at HPZ	UNIDO	542,250
Provision of tools and equipment to 15 enterprises ⁹	UNIDO	80,000
Three technical assistance workshops	UNIDO	25,000
Servicing sector		
Strengthening the legal and regulatory framework to include HFCs (US \$150,000)		
Campaign to promote awareness of the HFC licensing and quota system, including six workshops	UNEP	100,000
Develop and implement a quota system for HFC imports	UNDP	30,000
Develop regulations to control the use of HFCs and HFC-based equipment in specific sectors	UNEP	20,000
Customs capacity-building (US \$110,000)		
Update training curriculum at the customs training institute to include HFCs, controls for energy efficiency measures and used RAC equipment	UNDP	30,000
Train 40 trainers on HFC control measures using the updated curriculum		20,000
Train 50 customs officers HFC control measures using the updated curriculum		20,000
Train 80 clearance agents on HFC control measures		40,000
RAC and MAC technician capacity-building (US \$260,000)		
Update MAC training curriculum and include MAC technicians into the RAC certification scheme	UNDP	50,000
Train 60 trainers on good servicing practices using the updated MAC curriculum		60,000
Train 150 MAC technicians on good practices using the updated curriculum		60,000
Technical assistance to 25 large refrigeration systems on leak proof		70,000
Provide support to NATA		20,000
Equipment procurement (US \$390,000) ¹⁰		
Establish two centres of excellence for MAC sector	UNDP	100,000
Provision of tools and equipment to 40 MAC garages		120,000
Equip an RAC institute with trans-critical CO ₂ training labs		70,000
Provide basic safety tools to 50 RAC technicians		100,000
Refrigerant recovery and reuse scheme (US \$20,000)		
Assess practices of single use cylinders disposal	UNDP	20,000
Pilot project for commercial refrigeration sector (US \$720,000)		
Identify suitable candidates for the pilots including preliminary assessment	UNDP	25,000
Conduct two pilot projects on R-290 monoblocs in cold rooms for food storage		100,000

⁹ Including refrigerant recovery station and cylinders, vacuum pumps and gauge, hydrocarbon charging equipment, leak detectors, service manifold, hoses and accessories, tools for installation, brazing equipment, consumables, etc.

¹⁰ A breakdown of tools and equipment for each activity are listed in annex III.

Project component/activity	Agency	Agreed costs
and preservation, including equipment, installation, commissioning and training		
Demonstrate the use of natural refrigerants in an indirect glycol/chilled water-cooling system in large cold room or industrial warehouse cooling application		250,000
Demonstration of replacement of a multi-split commercial AC system using R-410A with R-290-based centralized AC system		300,000
Monitoring and evaluation of project impacts and energy efficiency improvements, and provide training to technicians and end-users		25,000
Site visits for importers to understand new technologies		20,000
Gender mainstreaming (US \$55,000)		
Conduct a gender assessment	UNDP	30,000
Scholarship for 20 women in MAC sector to promote women’s participation	UNDP	25,000
Project coordination and monitoring		
PMU (US \$226,110)		
Staff and consultants	All agencies	180,888
Monitoring travel	All agencies	45,222
Total		2,738,360

Exemption for high-ambient temperature parties

67. Nigeria is one of the countries operating under the high-ambient temperature (HAT) exemption in line with decision XXVIII/2 of the Parties. The decision allows these countries to request exemptions for specific subsectors or uses where suitable alternatives do not exist.¹¹ Additionally paragraph 35 indicates that the amount of Annex F substances subject to the HAT exemption is not eligible for funding under the Multilateral Fund while those substances are exempted for that party. As stated on the Ozone Secretariat website, Nigeria withdrew its notification of intention to use the HAT exemption on 6 September 2024.

Co-financing

68. Co-financing will be an integral part of the demonstration projects where beneficiaries will be required to support with local works. The level of co-financing will be determined by the stakeholders in a transparent and consultative approach.

2024-2026 business plan of the Multilateral Fund

69. UNDP, UNIDO, and UNEP are requesting US \$4,283,033, plus agency support costs, for the implementation of stage I of the KIP for Nigeria. The total value of US \$2,937,893, including agency support costs, requested for the period of 2024–2026, is US \$862,166 above the amount in the business plan.

Sustainability of the HFC phase-down and assessment of risks

70. Achieving and sustaining the HFC phase-down targets in Nigeria presents several risks, particularly due to the country's large size and population. These risks were evaluated based on socio-political, technical, and institutional factors, which could hinder the successful implementation of the KIP Stage 1 objectives. Key challenges include These risks were evaluated based on socio-political, technical, and institutional factors, which could hinder the successful implementation of the KIP Stage 1 objectives. Key challenges include the difficulty in enforcing the newly established licensing and permit system for HFCs;

¹¹ Exempted equipment under the HAT exemption includes multi-split air conditioners (commercial and residential); split-ducted air conditioners (commercial and residential); and ducted commercial packaged (self-contained) air conditioners.

higher-than-expected growth in HFC consumption, necessitating earlier and more significant reductions; increased availability of cheaper HFC-based equipment; supply chain constraints limiting access to low-GWP technologies; and a limited number of stakeholders engaged in reducing HFC uses.

71. To address these risks, concerted efforts will be made to successfully implement quotas and meet the Montreal Protocol's targets as of 2025, establishing regulatory measures to control the influx of low-cost HFC-based equipment and ensuring continuous stakeholder consultation throughout the decision-making processes. Despite these efforts, the most significant challenge remains the supply chain constraints that hinder the shift towards low-GWP technologies. HPMP and KIP projects that demonstrate alternative technologies play a crucial role in strengthening the supply chain. Additionally, local buy-in from importers will be supported initially through external assistance to ensure a successful market transition.

Impact on the climate

72. The activities proposed, including efforts to promote low-GWP alternatives; improve the servicing sectors practices, technical assistance to foam manufacturing from HFC-365mfc to HFOs or cyclopentane, and the conversion of RAC manufacturing equipment from R-410A and HFC-134a to HFC-32 and R-600a would have a positive impact on the overall CO₂ emission reduction. Overall, under stage I the servicing sector aims to reduce CO₂ emissions by 1,048,571 CO₂-eq tonnes. This reduction in HFC use of the servicing sector will be achieved through better leak proofing of large refrigeration systems, regulatory controls on high GWP equipment especially for sectors where low-GWP alternatives are available.

Draft Agreement

73. A draft Agreement between the Government of Nigeria 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.

74. If the Executive Committee so wishes, the funds for stage I of the KIP for Nigeria 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

75. The Executive Committee may wish to consider:

- (a) Approving, in principle, stage I of the Kigali HFC implementation plan (KIP) for Nigeria for the period 2024 to 2029 to reduce HFC consumption by 10.13 per cent of the country's baseline by 2029, in the amount of US \$4,602,465, consisting of US \$3,250,523, plus agency support costs of US \$227,537 for UNDP, US \$705,510, plus agency support cost of US \$49,386 for UNIDO, and US \$327,000, plus agency support costs of US \$42,510 for UNEP, as reflected in the schedule contained in annex I to the present document;
- (b) Noting:
 - (i) That the Government of Nigeria has submitted to the Ozone Secretariat a request to revise the HFC baseline and will provide additional information, as required, to the 74th Implementation Committee for their consideration of the request for revision of the HFC baseline;
 - (ii) That the country's compliance with the maximum allowable consumption established for the year 2024 will be considered at the 97th meeting after the

consideration of the request for the change of HFC baseline by the 74th Implementation Committee and 37th Meeting of the Parties;

- (c) Requesting the Fund Secretariat, in the event that the country's baseline was revised, to update the Appendix of the future Agreement relating to the HFC consumption limits under the Montreal Protocol and HFC agreement targets for stage I of the KIP to include the revised figures for maximum allowable consumption, and to notify the Executive Committee of the resulting levels of maximum allowable consumption, and of any potential related impact on the eligible funding level, with any necessary adjustments being made at the 97th meeting;
- (d) Also noting:
 - (i) That the Government of Nigeria will establish its starting point for sustained aggregate reductions in HFC consumption based on guidance provided by the Executive Committee;
 - (ii) That, once the cost guidelines for HFC phase-down are agreed by the Executive Committee, reductions from the country's remaining HFC consumption eligible for funding will be determined in line with these guidelines;
 - (iii) That the reductions from the country's remaining HFC consumption eligible for funding referred to in subparagraph (b)(ii) above will be deducted from the starting point referred to in subparagraph (b)(i);
 - (iv) That upon completion of the end-user pilot project included in stage I of the KIP, UNDP 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);
- (e) Approving the first tranche of stage I of the HPMP for Nigeria and the corresponding implementation plan, at the amount of US \$2,937,893, consisting of US \$1,902,050, plus agency support costs of US \$133,144 for UNDP, and US \$705,510, plus agency support costs of US \$49,386 for UNIDO and US \$130,800, plus agency support costs of US \$17,004 for UNEP;
- (f) Requesting the Government of Nigeria, UNDP, UNIDO, UNEP and the Secretariat to finalize the draft Agreement between the Government of Nigeria 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 NIGERIA

Kigali HFC implementation plan (stage I)

Row	Particulars	2024	2025	2026	2027	2028	2029	2030	Total
1.1	Montreal Protocol reduction schedule of Annex F substances (CO ₂ -eq tonnes)	15,187,779	15,187,779	15,187,779	15,187,779	15,187,779	13,669,001	13,669,001	n/a
1.2	Maximum allowable total consumption of Annex F substances (CO ₂ -eq tonnes)	15,187,779	15,187,779	15,187,779	15,187,779	15,187,779	13,669,001	13,649,151	n/a
2.1	Lead IA (UNDP) agreed funding (US \$)	1,902,050	0	0	973,370	0	375,103	0	3,250,523
2.2	Support costs for Lead IA (US \$)	133,144	0	0	68,136	0	26,257	0	227,537
2.3	Cooperating IA (UNIDO) agreed funding (US \$)	705,510	0	0		0		0	705,510
2.4	Support costs for Cooperating IA (US \$)	49,386	0	0		0		0	49,386
2.5	Cooperating IA (UNEP) agreed funding (US \$)	130,800	0	0	130,800	0	65,400	0	327,000
2.6	Support costs for Cooperating IA (US \$)	17,004	0	0	17,004	0	8,502	0	42,510
3.1	Total agreed funding (US \$)	2,738,360	0	0	1,104,170	0	440,503	0	4,283,033
3.2	Total support costs (US \$)	199,533	0	0	85,140	0	34,759	0	319,432
3.3	Total agreed costs (US \$)	2,937,893	0	0	1,189,310	0	475,262	0	4,602,465

HCFC phase-out management plan (stages III and IV*)

Row	Particulars	2024	2025	2026	2027	2028	2029	2030	Total
1.1	Montreal Protocol reduction schedule of Annex C, Group I substances (ODP tonnes)	224.19	112.09	TBD	TBD	TBD	TBD	0.00	n/a
1.2	Maximum allowable total consumption of Annex C, Group I substances (ODP tonnes)	167.81	112.09	TBD	TBD	TBD	TBD	0.00	n/a
2.1	Lead IA (UNDP) agreed funding (US \$)	0	0	0	0	0	0	0	0
2.2	Support costs for Lead IA (US \$)	0	0	0	0	0	0	0	0
2.3	Cooperating IA (UNIDO) agreed funding (US \$)	1,199,847	0	0	0	0	0	0	1,199,847
2.4	Support costs for Cooperating IA (US \$)	83,989	0	0	0	0	0	0	83,989
3.1	Total agreed funding (US \$)	1,199,847	0	0	0	0	0	0	1,199,847
3.2	Total support costs (US \$)	83,989	0	0	0	0	0	0	83,989
3.3	Total agreed costs (US \$)	1,283,836	0	0	0	0	0	0	1,283,836

* Nigeria plans to submit stage IV of its HPMP in 2025 for the complete phase-out of HCFCs by 2030 (decision 91/31(d)).

Annex II

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

HPMP stage II + III		KIP stage I		Combined cost
Activities	Cost (US\$)	Activities	Cost (US\$)	US\$
<i>Manufacturing</i>				
PU foam	2,261,318	TA foam production	160,000	2,421,318
Commercial refrigeration manufacturing	7,107,160	Commercial refrigeration manufacturing	105,000	7,212,160
		Conversion of AC manufacturing lines at HPZ	542,450	542,450
<i>Subtotal Manufacturing</i>	<i>9,368,478</i>	<i>Subtotal Manufacturing</i>	<i>807,450</i>	<i>10,175,928</i>
<i>Servicing</i>				
Policy and regulations update	479,946	Establishing the HFC regulatory framework	350,000	829,946
Capacity building of customs and enforcement officers	520,000	Enforcement of HFC controls and customs capacity building	320,000	840,000
Strengthening RAC training capacity and equipment procurement	2,500,500	RAC and MAC servicing sector capacity building and equipment procurement	1,484,133	3,984,633
Refrigerant Recovery and Reclamation	1,754,970	Refrigerant recovery and reuse scheme	123,000	1,877,970
Demonstration on low-GWP technologies	860,000	Pilot Project for commercial and industrial refrigeration	745,000	1,605,000
		Gender Mainstreaming	100,000	100,000
<i>Sub total Servicing</i>	<i>6,115,416</i>	<i>Sub total</i>	<i>3,122,133</i>	<i>9,237,549</i>
Total HPMP Activities	15,483,894	Total KIP Activities	3,929,583	19,413,477
Project Management and coordination	761,000	Project Management and coordination	353,650	1,114,650
Total	16,244,894	Total	4,283,033	20,528,127

Annex III

**AGREED LIST OF EQUIPMENT AND TOOLS TO BE PROCURED IN THE SERVICING
SECTOR OF STAGE I OF THE KIGALI HFC IMPLEMENTATION PLAN**

Project activity	Equipment and tools
Establish five centres of excellence for MAC sector	Didactic trainer; HFC/HFO recycling and charging station; digital gauge manifold, vacuum pump and hose accessories; instruments and leak detectors; reusable cylinders; safety gear; classroom equipment
Provision of tools and equipment to 100 MAC garages	Digital gauge manifold and hoses; HFC/HFO handheld leak detector; HFC/HFO recycling and charging station; basic tools
Equip two RAC institutes with trans-critical CO ₂ training labs	CO ₂ training units; Lokring CO ₂ piping tools; CO ₂ leak detectors; CO ₂ pressure regulators; CO ₂ gauges and hoses; spare parts
Provide basic safety tools to 500 RAC technicians	Refrigerant handling tools such as gauges, manifolds, and hoses; recovery equipment and cylinders, charging and vacuum equipment; instruments; tubing tools; hydrocarbon servicing tools; and safety gear