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THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Ninety-third Meeting
Montreal, 15-19 December 2023
Item 9(d) of the provisional agenda¹

PROJECT PROPOSAL: GHANA

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 and UNEP

¹ UNEP/OzL.Pro/ExCom/93/1

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS

Ghana

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

| | | | |
|---|------------|-----------|------------------------------------|
| (II) LATEST ARTICLE 7 DATA (Annex F) | Year: 2022 | 346.79 mt | 646,823 CO ₂ -eq tonnes |
|---|------------|-----------|------------------------------------|

| (III) LATEST COUNTRY PROGRAMME SECTORAL DATA (CO₂-eq tonnes) | | | | | | | | Year: 2022 | |
|--|---------|------|--------------|----------------------|-------|-----------|---------|-------------------|--------------------------|
| Chemical | Aerosol | Foam | Firefighting | AC and refrigeration | | | Solvent | Other | Total sector consumption |
| | | | | Manufacturing | | Servicing | | | |
| | | | | AC | Other | | | | |
| HFC-32 | | | | | | 250,679 | | | 250,679 |
| HFC-134a | | | | | | 21,587 | | | 21,587 |
| R-404A | | | | | | 147,531 | | | 147,531 |
| R-407C | | | | | | 59,956 | | | 59,956 |
| R-410A | | | | | | 114,708 | | | 114,708 |
| R-507A | | | | | | 52,363 | | | 52,363 |

| | | |
|--|-----------|------------------------------------|
| (IV) AVERAGE 2020-2022 HFC CONSUMPTION IN SERVICING | 295.45 mt | 556,119 CO ₂ -eq tonnes |
|--|-----------|------------------------------------|

| | | | |
|---|-----------|---|--------|
| (V) CONSUMPTION DATA (CO₂-eq tonnes) | | | |
| Baseline: average 2020-2022 HFC consumption plus 65% of HCFC baseline | 1,805,702 | 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.

| (V) ENDORSED BUSINESS PLAN | | 2023 | 2024 | 2025 | Total |
|-----------------------------------|---|-------------|-------------|-------------|--------------|
| UNDP | HFC phase-down (CO ₂ -eq tonnes) | 0 | 0 | 0 | 0 |
| | Funding (US \$) | 498,897 | 0 | 0 | 498,897 |
| UNEP | HFC phase-down (CO ₂ -eq tonnes) | 0 | 0 | 0 | 0 |
| | Funding (US \$) | 70,635 | 0 | 0 | 70,635 |

| (VI) PROJECT DATA | | 2023 | 2024-2026 | 2027 | 2028 | 2029 | 2030 | Total | |
|--|--------------------------|---------------|------------------|-------------|-------------|-------------|-------------|--------------|---------|
| Consumption (CO ₂ -eq tonnes) | Montreal Protocol limits | n/a | 1,805,702 | 1,805,702 | 1,805,702 | 1,625,132 | 1,625,132 | n/a | |
| | Maximum allowable | n/a | 1,286,890 | 1,286,890 | 1,286,890 | 1,286,890 | 1,158,201 | n/a | |
| Amounts requested in principle (US \$) | UNDP | Project costs | 132,500 | 0 | 79,000 | 0 | 0 | 20,500 | 232,000 |
| | | Support costs | 11,925 | 0 | 7,110 | 0 | 0 | 1,845 | 20,880 |
| | UNEP | Project costs | 55,500 | 0 | 25,500 | 0 | 0 | 12,000 | 93,000 |
| | | Support costs | 7,215 | 0 | 3,315 | 0 | 0 | 1,560 | 12,090 |
| Amounts recommended in principle (US \$) | Total project costs | 188,000 | 0 | 104,500 | 0 | 0 | 32,500 | 325,000 | |
| | Total support costs | 19,140 | 0 | 10,425 | 0 | 0 | 3,405 | 32,970 | |
| | Total funds | 207,140 | 0 | 114,925 | 0 | 0 | 35,905 | 357,970 | |

| | | |
|---|----------------------------------|------------------------------|
| (VII) Request for approval of funding for the first tranche (2023) | | |
| Implementing agency | Funds recommended (US \$) | Support costs (US \$) |
| UNDP | 132,500 | 11,925 |
| UNEP | 55,500 | 7,215 |
| Total | 188,000 | 19,140 |

| | |
|--------------------------------------|--------------------------|
| Secretariat's recommendation: | Individual consideration |
|--------------------------------------|--------------------------|

PROJECT DESCRIPTION

1. On behalf of the Government of Ghana, 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 \$401,480, consisting of US \$277,000, plus agency support costs of US \$19,390 for UNDP and US \$93,000, plus agency support costs of US \$12,090 for UNEP, as originally submitted.²
2. The implementation of stage I of the KIP will assist Ghana 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 \$232,310, consisting of US \$158,500, plus agency support costs of US \$11,095 for UNDP and US \$55,500, plus agency support costs of US \$7,215 for UNEP, as originally submitted, for the period of January 2024 to December 2029.

Background

4. Ghana has ratified all the amendments to the Montreal Protocol, including the Kigali Amendment on 2 August 2019. Ghana has an HCFC consumption baseline of 57.3 ODP tonnes, or 999.95 metric tonnes (mt), and is set to completely phase out consumption of HCFCs by 1 January 2030.³

Status of implementation of the HCFC phase-out management plan

5. Stage I of the HCFC phase-out management plan (HPMP) for Ghana was originally approved at the 61st meeting⁴ and revised at the 67th meeting⁵ to meet the 35 per cent reduction from the baseline by 2020, resulting in the phase-out of 26.27 ODP tonnes of HCFCs, at a total cost of US \$1,356,311, plus agency support costs. Stage I of the HPMP was completed in December 2021.
6. Stage II of the HPMP for Ghana was approved at the 87th meeting⁶ to reduce HCFC consumption by 100 per cent from the baseline by 2030, at a total cost of US \$1,618,677, plus agency support costs.

Status of implementation of HFC-related activities

7. At the 74th meeting, the Executive Committee approved US \$55,000 for Ghana to conduct a survey on ODS alternatives. The project was completed in August 2017. The survey indicated that four HFCs (HFC-134a, R-410A, R-404A and R-507A) were identified as refrigerants to replace HCFCs. Natural refrigerants have been introduced into the country as alternatives to HCFCs and ammonia has significant use in the country. At the 80th meeting, Ghana received funding to implement enabling activities for HFC phase-down (US \$150,000), which was completed in December 2019. These activities assisted the country *inter alia* in ratifying the Kigali Amendment in 2020; establishing the operational licensing and quota system for HFCs (including blends); reporting the import and export of HFCs under Article 7 of the Montreal Protocol; facilitating coordination among stakeholders; creating awareness among and building the capacity of the NOU, stakeholders, the servicing sector and end-users; and data analysis, regulation review and preparing a national strategy for Kigali Amendment implementation.

² As per the letter of 24 August 2023 from the Environmental Protection Agency of Ghana to UNDP.

³ Except for those HCFCs allowed for a servicing tail between 2030 and 2040, where required, consistent with the provisions of the Montreal Protocol.

⁴ UNEP/OzL.Pro/ExCom/61/58

⁵ Annex XI of UNEP/OzL.Pro/ExCom/67/39

⁶ Decision 87/39

Stage I of the Kigali HFC implementation plan

Policy, regulatory and institutional frameworks

8. The Environment Protection Agency (EPA) of Ghana is the national body responsible for the implementation of the Montreal Protocol and its Amendments. It delivers its duties through the national ozone unit (NOU). The National Committee on Ozone Depleting Substances (NACODS) was formed to serve as an advisory body on all aspects related to ODS. The NOU is responsible for reporting the consumption of controlled substances under the Montreal Protocol, operating the import licensing system, allocating quotas, keeping records of imports of controlled substances, registering importers and monitoring imports.

9. The Government of Ghana established an operational licensing system for the import and export of HFCs and blends through the Environment Protection Agency Act (1994) in 2020. The approval of the amendment of the country's Management of Ozone Depleting Substances and Products Regulations (2005) to include the Kigali Amendment provisions is at an advanced stage. The national import quota for HFCs will be applied from January 2024 to meet the HFC consumption freeze.

10. In 2016, the EPA issued guidelines on the use of hydrocarbon (HC) refrigerants to facilitate their safe introduction into the country. Mandatory certification of technicians has begun under the HPMP. The Government has implemented a policy initiative to include tax incentive and disincentive features in legal document L.I. 1812 to favour the introduction of low-global-warming-potential (GWP) and zero-ODP refrigerants. This legal document is being reviewed to cover HFCs.

11. The Energy Commission of the Government of Ghana has initiated the adoption of the Minimum Energy Performance Standards (MEPS) that cover RAC equipment and is enforcing a labelling system to control the import of RAC equipment. It also promulgated regulations to prohibit the import of used RAC equipment under the Energy Efficiency Regulation that went into effect in 2012.

HFC consumption

12. Ghana only imports HFCs for use in the refrigeration servicing sector. In 2022, Ghana consumed HFC-134a (38.76 per cent of total HFC consumption in CO₂-eq tonnes), R-404A (22.81 per cent), R-410A (17.73 per cent), R-507A (8.10 per cent), and other HFCs (12.60 per cent). Table 1 presents the country's HFC consumption as reported under Article 7 to the Ozone Secretariat.

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

| HFC | GWP | 2019 | 2020 | 2021 | 2022 | Share in 2022 (%) |
|---------------------------------|-------|---------------|---------------|---------------|---------------|-------------------|
| mt | | | | | | |
| HFC-134a | 1,430 | 126.62 | 118.85 | 159.20 | 175.30 | 50.55 |
| HFC-32 | 675 | 0.00 | 15.54 | 23.65 | 31.98 | 9.22 |
| R-404A | 3,922 | 32.97 | 31.03 | 30.60 | 37.62 | 10.85 |
| R-407C | 1,774 | 26.49 | 24.55 | 28.75 | 33.80 | 9.75 |
| R-410A | 2,088 | 43.38 | 42.41 | 45.45 | 54.95 | 15.85 |
| R-507A | 3,985 | 12.24 | 9.33 | 10.20 | 13.14 | 3.79 |
| Total (mt) | | 241.70 | 241.71 | 297.85 | 346.79 | 100.00 |
| CO₂-eq tonnes | | | | | | |
| HFC-134a | 1,430 | 181,067 | 169,956 | 227,656 | 250,679 | 38.76 |
| HFC-32 | 675 | 0 | 10,490 | 15,964 | 21,587 | 3.34 |
| R-404A | 3,922 | 129,295 | 121,687 | 120,001 | 147,531 | 22.81 |
| R-407C | 1,774 | 46,989 | 43,548 | 50,998 | 59,956 | 9.27 |

| HFC | GWP | 2019 | 2020 | 2021 | 2022 | Share in 2022 (%) |
|---|-------|----------------|----------------|----------------|----------------|-------------------|
| R-410A | 2,088 | 90,556 | 88,531 | 94,877 | 114,708 | 17.73 |
| R-507A | 3,985 | 48,776 | 37,180 | 40,647 | 52,363 | 8.10 |
| Total (CO₂-eq tonnes) | | 496,683 | 471,391 | 550,143 | 646,823 | 100.00 |

13. HFC consumption has been steadily increasing as the HCFC phase-out has progressed, with the exception of 2020 when HFC consumption decreased slightly due to the effects of the COVID-19 pandemic. It is expected that HFC consumption will continue to increase under the business-as-usual scenario, attributable to continued HCFC phase-out and economic growth.

Country programme implementation report

14. The Government of Ghana reported HFC consumption data in the 2020-2022 country programme (CP) implementation reports that is consistent with the data reported under Article 7 of the Montreal Protocol.

HFC distribution by sector

15. In 2022, total HFCs imported by Ghana amounted to 346.79 mt, accounting for 54.34 per cent of the controlled substances in Ghana, with the remaining 45.66 per cent being HCFCs. Based on the survey carried out during preparation of the KIP, HFCs are all used for servicing refrigeration and air-conditioning (RAC) equipment as shown in table 2.

Table 2. HFC consumption in the RAC servicing subsectors (2022)

| Subsector | HFC-134a | HFC-32 | R-404A | R-407C | R-410A | R-507A | Total | Share of HFC use (%) |
|---|----------------|---------------|----------------|---------------|----------------|---------------|----------------|----------------------|
| mt | | | | | | | | |
| Refrigeration subsectors | | | | | | | | |
| Domestic | 26.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 26.30 | 7.58 |
| Commercial | 20.00 | 0.00 | 21.62 | 0.00 | 0.00 | 5.14 | 46.76 | 13.48 |
| Industrial | 20.00 | 0.00 | 10.00 | 0.00 | 0.00 | 3.00 | 33.00 | 9.52 |
| Transport | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.29 |
| Air-conditioning subsectors | | | | | | | | |
| Domestic | 0.00 | 16.98 | 0.00 | 20.80 | 36.95 | 0.00 | 74.73 | 21.55 |
| Commercial | 20.00 | 15.00 | 0.00 | 13.00 | 18.00 | 1.00 | 67.00 | 19.32 |
| Mobile | 89.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 89.00 | 25.66 |
| Fisheries subsector | | | | | | | | |
| Fisheries | 0.00 | 0.00 | 5.00 | 0.00 | 0.00 | 4.00 | 9.00 | 2.60 |
| Total (mt) | 175.30 | 31.98 | 37.62 | 33.80 | 54.95 | 13.14 | 346.79 | 100.00 |
| CO₂-eq tonnes | | | | | | | | |
| Refrigeration subsectors | | | | | | | | |
| Domestic | 37,609 | 0 | 0 | 0 | 0 | 0 | 37,609 | 5.81 |
| Commercial | 28,600 | 0 | 84,785 | 0 | 0 | 20,483 | 133,868 | 20.70 |
| Industrial | 28,600 | 0 | 39,216 | 0 | 0 | 11,955 | 79,771 | 12.33 |
| Transport | 0 | 0 | 3,922 | 0 | 0 | 0 | 3,922 | 0.61 |
| Air-conditioning subsectors | | | | | | | | |
| Domestic | 0 | 11,462 | 0 | 36,896 | 77,133 | 0 | 125,491 | 19.40 |
| Commercial | 28,600 | 10,125 | 0 | 23,060 | 37,575 | 3,985 | 103,345 | 15.98 |
| Mobile | 127,270 | 0 | 0 | 0 | 0 | 0 | 127,270 | 19.68 |
| Fisheries subsector | | | | | | | | |
| Fisheries | 0 | 0 | 19,608 | 0 | 0 | 15,940 | 35,548 | 5.50 |
| Total (CO₂-eq tonnes) | 250,679 | 21,587 | 147,531 | 59,956 | 114,708 | 52,363 | 646,823 | 100.00 |

Refrigeration and air-conditioning servicing sector

16. There are approximately 6,490 technicians (including 40 women) and 1,100 servicing workshops consuming HFCs in Ghana. Under the HPMP, a total of 1,770 technicians have been trained in good servicing practices, including 778 technicians trained in the safe handling of flammable refrigerants in stage I. Training of an additional 1,400 is planned under stage II. There are also 13 training institutions that offer RAC training in their curriculum; three have been provided with equipment to conduct training for handling flammable refrigerants under stage I of the HPMP and an additional five will be supported under stage II. The establishment of two reclamation centres has been planned under stage II to support refrigerant recovery, recycling, and reclamation (RRR).

17. The domestic refrigeration subsector constitutes 7.49 per cent of total consumption in mt and 5.74 per cent in CO₂-eq tonnes. The subsector is growing fast, mainly due to urbanization and increased electricity coverage. Approximately 60 per cent of the refrigerant used in domestic refrigeration is HFC-134a with the rest being R-600a. In addition, enforcement of the ban on the import of second-hand refrigerators appears to be challenging and used refrigerators running on HFC-134a are still arriving in the country. The business-as-usual scenario would see the current number of domestic refrigerators double by 2050. Servicing of domestic refrigerators is often done by technicians in the informal sector.

18. The commercial refrigeration subsector constitutes 13.53 per cent of total HFC consumption in mt and 20.80 per cent in CO₂-eq tonnes. Equipment in the subsector includes stand-alone units (beverage coolers, frozen food storage, display cabinets and island freezers), cold rooms and condensing units. Approximately 49 per cent of stand-alone units use HFC-134a while 17 per cent of them use R-404A, with the remaining using HCFC-22, R-507A and R-290. Internationally renowned enterprises (e.g., Coca Cola) have started introducing R-600a beverage coolers into the Ghanaian market. For cold rooms and condensing units, HFC-134a, R-404A and R-507A are commonly used. Under a business-as-usual scenario, R-404A and HFC-134a are expected to grow at a moderate pace due to the phase-out of HCFC-22 and high leakage rate.

19. The industrial refrigeration subsector constitutes 9.50 per cent of total HFC consumption in mt and 12.31 per cent in CO₂-eq tonnes. Equipment includes centralized systems and process chillers for food and beverage processing. There are also a number of thermoplastic industries that use small-capacity packaged chillers in their production process. HFC-134a is the most-used HFC in the sector followed by R-404A. Ammonia is the most frequently used refrigerant in large cooling load applications and is becoming the refrigerant of choice for large systems. In 2022, approximately 12 per cent of all industrial systems were found running on ammonia. While ammonia is a favoured refrigerant, there is also a possibility of using indirect systems based on R-290 as well as CO₂, which in the future might be relevant for Ghana as these technologies become more accessible.

20. The fisheries subsector constitutes 2.59 per cent of total HFC consumption in mt and 5.48 per cent in CO₂-eq tonnes. In Ghana, fisheries is an important industry as it employs 10 per cent of the population and contributes approximately 3 per cent to the gross domestic product. Industrial fishing vessels are equipped with cold rooms and ice-making machines on board to maintain catch freshness. The main refrigerants used include R-404A, R-507A, HCFC-22 and ammonia. The sector needs to be addressed to reduce emissions through the introduction of new technology, leak-proofing and refrigerant containment.

21. The domestic air-conditioning subsector constitutes 21.59 per cent of total HFC consumption in mt and 19.43 per cent in CO₂-eq tonnes. This subsector comprises self-contained units and single split units. The foremost refrigerants used include HCFC-22 in old equipment and R-410A and HFC-32 in new systems. HFC consumption in the subsector is expected to grow rapidly as the phase-out of HCFC-22 occurs by 2030.

22. The commercial air-conditioning subsector constitutes 19.29 per cent of total HFC consumption in mt and 15.94 per cent in CO₂-eq tonnes. The subsector includes multi-splits, ducted splits, packaged rooftop units, and chillers used to cool commercial buildings, large office spaces, hotels, and hospitals, with the ducted split units and multi-splits as the dominant type of equipment. Refrigerants include R-410A for multi-split units and HFC-134a for large chillers. HFC consumption is growing rapidly in the subsector. Although viable low-GWP alternative technology is not available, there is a need to curb the growth through leak-proofing and refrigerant containment.

23. The MAC subsector constitutes 25.63 per cent of total HFC consumption in mt and 19.63 per cent in CO₂-eq tonnes and is the largest use of HFCs in the country. Ghana imports approximately 100,000 cars annually, of which over 90 per cent are second-hand cars. Currently there are approximately one million cars in the country. HFC-134a is the refrigerant used in vehicles to date. The refrigerant demand for servicing these vehicles is high due to the high leakage rates and frequent refilling. There are also a limited number of vehicles designed for HFO-1234yf, which is available locally through only a couple of refrigerant importers. HFOs are used on a very limited scale due to high price. Efforts to achieve better containment and leak-proofing systems would be important to reduce HFC-134a consumption in this subsector.

24. In summary, the MAC subsector has the highest HFC consumption in mt, whilst the commercial refrigeration and domestic air-conditioning subsectors have the highest emissions in CO₂-eq tonnes. The country highlights the importance of addressing the domestic air-conditioning subsector due to its volume and rapid growth, and the commercial refrigeration subsector due to the high GWP values of the refrigerants used.

Firefighting sector

25. The Ghana National Fire Service (GNFS) is the statutory authority for the management and prevention of fires. The GNFS works in all 17 regions providing fire protection services. It also provides training on fire safety through the Fire Academy and Training School.

26. During the survey for the preparation of stage I of the KIP, FM 200 (HFC-227ea) was found installed in firefighting equipment in the country. As FM 200 was not known as HFC-227ea prior to the survey, HFC-227ea had neither been controlled through the licensing system nor by customs. There are no records that can assist the NOU in estimating the annual imports of HFC-227ea. The NOU coordinated with the GNFS and questionnaires were distributed, but no response was received. The NOU is also aware that HFC-227ea has a considerably high GWP (3,220) and that including large quantities of HFC-227ea in national consumption will have a direct impact on its overall HFC consumption and baseline. In order to effectively control and monitor total HFC consumption in Ghana, the country proposed to address the firefighting sector as part of the KIP strategy, and that the NOU will begin monitoring HFC-227ea through the import licensing system. A fire expert committee is to be created to guide the process of transition from HFCs to alternatives. Therefore, additional funds are requested under stage I of the KIP to create awareness about the phase-down of HFCs and provide training on alternatives to support the phase-down of HFCs in the firefighting sector.

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

Overarching strategy

27. Ghana is proposing four stages for KIP implementation following the Montreal Protocol phase-down schedule to achieve the target of 80 per cent reduction by 2045. Stage I is proposed to achieve 10 per cent reduction of the HFC consumption baseline and will be implemented simultaneously with the HPMP until 2029, aiming to create an enabling environment allowing for the sustainable transition to low- or zero-GWP technologies.

Established HFC baseline and proposed reductions

28. The Government of Ghana reported its Article 7 data for 2020 to 2022. By adding 65 per cent of the HCFC baseline (in CO₂-eq tonnes) to the average HFC consumption from 2020 to 2022, the established HFC baseline is 1,805,702 CO₂-eq tonnes, as shown in table 3.

Table 3. Established HFC baseline for Ghana (CO₂-eq tonnes)

| Baseline calculation | 2020 | 2021 | 2022 |
|-----------------------------------|---------|---------|------------------|
| HFC annual consumption | 471,391 | 550,143 | 646,823 |
| HFC average consumption 2020-2022 | | | 556,119 |
| HCFC baseline (65%) | | | 1,249,583 |
| HFC established baseline | | | 1,805,702 |

29. Ghana has a large HCFC baseline, and the 2022 HCFC consumption amounts to 291.40 mt. The HCFC consumption could, to a large extent, be replaced with HFCs. Under the business-as-usual scenario, the Government predicts an annual HFC consumption growth of 13-18 per cent based on economic growth. In addition, the phase-out of 291.40 mt of HCFCs will result in the phase-in of 542,903 CO₂-eq tonnes of HFCs by 2029; assuming equal distribution in CO₂-eq tonnes each year from 2023 to 2029, the annual increase in HFC consumption would be 77,558 CO₂-eq tonnes. Table 4 shows the calculated overall increase in HFC consumption under the business-as-usual scenario.

Table 4. Unconstrained scenario of HFC consumption forecast and required reductions (CO₂-eq tonnes)

| | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
|---|---------|-----------|-----------|-----------|-----------|-----------|-----------|
| HFC consumption growth based on economic growth | 729,493 | 860,730 | 997,333 | 1,156,725 | 1,328,960 | 1,515,392 | 1,717,660 |
| HFC phased in from HCFC phase-out | 77,558 | 77,558 | 77,558 | 77,558 | 77,558 | 77,558 | 77,558 |
| Total HFC estimated consumption | 807,051 | 938,288 | 1,074,891 | 1,234,283 | 1,406,518 | 1,592,950 | 1,795,218 |
| Montreal Protocol consumption limits | n/a | 1,805,702 | 1,805,702 | 1,805,702 | 1,805,702 | 1,805,702 | 1,625,132 |
| Required HFC reductions | n/a | 0 | 0 | 0 | 0 | 0 | 170,086 |

30. Table 4 shows that in the business-as-usual scenario, Ghana would be in non-compliance in 2029 if no action is taken. In light of this, stage I of the KIP is being proposed to ensure that HFC consumption remains lower than the Montreal Protocol limits during the entire period of stage I, as shown in table 5.

Table 5. HFC consumption limits proposed under stage I of the KIP (CO₂-eq tonnes)

| | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
|--------------------------------------|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Montreal Protocol consumption limits | n/a | 1,805,702 | 1,805,702 | 1,805,702 | 1,805,702 | 1,805,702 | 1,625,132 |
| HFC control target under the KIP | n/a | 1,805,702 | 1,805,702 | 1,805,702 | 1,805,702 | 1,805,702 | 1,625,132 |
| Reduction from the baseline | CO ₂ -eq tonnes | n/a | 0 | 0 | 0 | 0 | 180,570 |
| | % | | | | | | 10 |

Proposed activities

31. The strategy for phasing down HFCs for Ghana was developed considering the phase-out of HCFCs and energy-efficiency issues. Stage I aims to create an enabling environment for sustained reduction of greenhouse gas (GHG) emissions for both HCFCs and HFCs. Activities are developed to control HFC growth by leapfrogging from HCFCs to low-GWP technologies, where feasible, to realize overall GHG emission reductions. The control targets for stage I of the KIP have been set in line with the Montreal Protocol phase-down schedule.

- (a) Establishing and implementing a regulatory framework to support the adoption of low-GWP technologies: Incorporating HFC-227ea into the licensing and quota system; stipulating mandatory recovery of refrigerants in equipment with a charge greater than 2 kg; adopting green procurement guidelines for equipment in the RAC sector; and conducting awareness-raising activities on the regulatory framework (UNEP) (US \$36,000); and applying import quota controls through the Energy Commission on HFC-based RAC equipment (domestic and stand-alone commercial refrigeration equipment) using high-GWP refrigerants (UNDP) (US \$16,000);
- (b) Enforcing HFC import control: Updating the training curriculum and manual in the customs training institute to include HFCs in customs training; and providing training to 30 trainers, 50 customs officers, and 80 clearance agents on HFC import control and on reading the energy-efficiency labelling of RAC equipment (UNEP) (US \$45,000);
- (c) Capacity-building for RAC technicians: Training 13 trainers using the updated curriculum;⁷ establishing a CO₂ training facility, providing training equipment⁸ and enlisting the support of an international expert as a trainer; developing a training module for CO₂ technology; conducting two 3-day workshops to train 24 trainers in handling CO₂ refrigeration systems; establishing a centre of excellence for the MAC subsector in a training institute for automobile mechanics by providing training equipment and tools;⁹ updating the training curriculum, training 20 trainers and 50 technicians in servicing MAC systems including leak detection and leakage control, and providing tools to MAC technicians;¹⁰ and incorporating energy-efficiency measures into training and awareness activities (UNDP) (US \$127,000);
- (d) Technology demonstration for R-290 commercial refrigeration equipment: Identifying two candidates and conducting two pilot projects to demonstrate R-290 monoblock technology in the stand-alone commercial refrigeration subsector (one for medium temperature and one for low temperature), including the installation and commissioning of the two systems, and training of technicians and engineers in troubleshooting during installation, commissioning and operation of the equipment; and awareness-raising and information dissemination about the pilot projects to facilitate the establishment of the supply chain for the equipment (UNDP) (US \$63,000);
- (e) Incorporating gender mainstreaming into all activities in stage I of the KIP through experience-sharing and presentations by female role models (UNDP) (US \$6,000); and
- (f) Activities planned for the firefighting sector: One workshop for enterprises/workshops that import firefighting equipment on the import permit for equipment containing HFC-227ea; establishing an expert group to evaluate HFC uses in the sector and identify suitable alternatives; training for 50 technicians on alternatives to HFCs in the firefighting sector; and awareness-raising activities on alternatives to HFCs in the firefighting sector (UNDP) (US \$45,000).

⁷ Ghana is completely overhauling its RAC curriculum in line with EN13313 to standardize RAC training for competency-based certification. This will ensure that all new graduates from the training institutes will be trained in line with international standards. The standardization of the curriculum and certification system is being finalized through a GIZ project.

⁸ E.g., compact training units, leak detector, CO₂ manifold gauge set, and pressure regulator for charging.

⁹ E.g., recovery and recycling equipment for the MAC sector, a MAC training unit, leak detectors, electrical thermometer with probes, vacuum pumps and gauges, manifold gauge, recovery cylinders, nitrogen regulator, and consumables.

¹⁰ Ten sets of leak detectors, a manifold gauge set with hose and recovery unit, and 14 recovery cylinders.

Project implementation, coordination and monitoring

32. The NOU, in coordination with other Government Ministries and stakeholders, will implement the project, monitor progress and prepare the report. The total cost for the project management unit (PMU) amounts to US \$32,000 (US \$20,000 for UNDP and US \$12,000 for UNEP), which includes: a local consultant, an HFC expert, and a gender specialist to assist the NOU in the implementation of stage I of the KIP; and two coordination meetings.

Gender policy implementation

33. In stage I of the KIP, gender mainstreaming will be integrated into the detailed design, implementation, monitoring and evaluation of the KIP. Gender equality will be emphasized in the implementation of various activities, including policy development, training and the decision-making process. In particular, it is planned to have successful women in the RAC sector act as role models to share their experience during workshops to advocate for women's active involvement in HFC phase-down. The gender mainstreaming activities in stage I of KIP are expected to encourage women to become part of the RAC workforce and promote more equal representation of the genders in RAC industry.

Total cost of stage I of the Kigali HFC implementation plan

34. The budget for stage I has been established at US \$370,000. The cost of activities in the refrigeration servicing sector has been established in line with decision 92/37. In the absence of cost funding guidelines, the funding requested for activities in the firefighting sector is the best available estimate for each activity based on Ghana's experience in implementing similar activities.

35. The proposed activities and costs for stage I of the KIP are summarized in paragraphs 31 to 32 above.

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

36. The first funding tranche of stage I of the KIP, in the total amount of US \$214,000, will be implemented between January 2024 and December 2026 and will include the following activities:

- (a) Establishing and implementing a regulatory framework to support the adoption of low-GWP technologies: Developing import quotas for RAC equipment; adopting green procurement guidelines for equipment in the RAC sector; and conducting one workshop to raise awareness within the industry on the regulatory framework for HFC control (UNEP) (US \$20,000); coordinating with the Energy Commission to apply quota restrictions on the import of specific types of HFC-based RAC equipment using (UNDP) (US \$10,000);
- (b) Enforcing HFC import control: Updating the training curriculum and manual in the customs training institute to include HFCs in customs training; and training 30 trainers, 25 customs officers, and 40 clearance agents on HFC import control and on reading the energy-efficiency labelling of RAC equipment (UNEP) (US \$31,000);
- (c) Capacity-building for RAC technicians: Training 13 trainers using the updated curriculum; identifying an institute to host the CO₂ training facility and purchasing one CO₂ training unit; developing a training module for CO₂ technology; conducting two 3-day workshops to train 24 trainers in handling CO₂ refrigeration systems; identifying an institute to host the MAC training centre and purchasing equipment and tools (one recovery/recycling unit plus tools) to set up a training laboratory; training 20 trainers in servicing MAC systems including leak detection and leakage control, and providing tools to MAC technicians

(five sets of leak detectors); and incorporating energy-efficiency measures in training and awareness activities (UNDP) (US \$85,000);

- (d) Technology demonstration for R-290 commercial refrigeration equipment: Reviewing and identifying suitable sites for the pilot projects; procuring one R-290-based monoblock, and installing and commissioning the monoblock pilot equipment; and organizing one awareness-raising workshop about the pilot projects to facilitate the establishment of the supply chain for the low-GWP technology (UNDP) (US \$27,000);
- (e) Incorporating gender mainstreaming into all activities in stage I of the KIP: Identifying one female role model in the RAC sector, and organizing six forums to share experiences through her presentations (UNDP) (US \$3,000);
- (f) Activities planned for the firefighting sector: One workshop for enterprises/workshops that import firefighting equipment on the import permit for equipment containing HFC-227ea; establishing an expert group to evaluate HFC alternatives; training 50 technicians on alternatives to HFCs in the firefighting sector (UNDP) (US \$26,000); and
- (g) Project coordination, monitoring and reporting at a total of US \$12,000 (US \$7,500 for UNDP and US \$4,500 for UNEP), for consultants (US \$10,000) and monitoring-related travel (US \$2,000).

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

37. The Secretariat reviewed stage I of the KIP for Ghana in light of the existing policies and guidelines of the Multilateral Fund, including 92/37,¹¹ stage II of the HPMP, and the 2023–2025 business plan of the Multilateral Fund.

Overarching strategy

38. Ghana has a large HCFC baseline (999.95 mt or 1,922,435 CO₂-eq tonnes). The HCFC component of the HFC baseline (65 per cent of the HCFC baseline, or 1,249,583 CO₂-eq tonnes) constitutes 69 per cent of the HFC baseline (1,805,702 CO₂-eq tonnes) for Ghana. This composition of the HFC baseline allows Ghana to grow HFC consumption and remain in compliance with the Montreal Protocol until 2028, as shown in table 4.

39. With respect of the targets for HFC phase-down and whether lower targets could be set in stage I of the KIP to control HFC growth, UNDP explained that Ghana still has significant remaining activities to be implemented under stage II of the HPMP to address the remaining HCFC consumption in the country. The Government proposes to first observe how the HCFC phase-out will impact the overall HFC consumption and the industry, while allowing for low-GWP technologies and natural refrigerants to become more accessible worldwide as well as in Ghana. In order to ensure a smooth transition, the target for stage I of the KIP will be set in line with the Montreal Protocol HFC phase-down schedule.

40. The Secretariat noted that the 2022 HCFC consumption in Ghana was 291.4 mt, or 72 per cent below the HCFC baseline, and the forecasted growth of HFCs in 2023–2029 appears to be high as compared to the economic growth in the country. While understanding the Government's concerns regarding the risk of non-compliance with lower consumption targets, the Secretariat highlighted the importance of taking early action to curb HFC growth and suggested setting lower but achievable targets for stage I of the KIP.

¹¹ Level and modalities of funding for HFC phase-down in the refrigeration servicing sector.

After discussion, the Government proposed lower consumption targets to control HFC growth in stage I of the KIP, as shown in table 6 below.

Table 6: Revised control targets for HFC phase-down in stage I of the KIP (CO₂-eq tonnes)

| Particulars | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
|--|-----------|-----------|-----------|-----------|-----------|-----------|
| Montreal Protocol reduction schedule of Annex F substances | 1,805,702 | 1,805,702 | 1,805,702 | 1,805,702 | 1,805,702 | 1,625,132 |
| Maximum allowable total consumption of Annex F substances | 1,286,890 | 1,286,890 | 1,286,890 | 1,286,890 | 1,286,890 | 1,158,201 |
| Reduction | 518,812 | 518,812 | 518,812 | 518,812 | 518,812 | 647,501 |
| Per cent reduction from the baseline | 29 | 29 | 29 | 29 | 29 | 36 |

41. To address the Government's concern whether the voluntary reduction committed in advance of the Montreal protocol phase-down schedule would put Ghana in disadvantage with respect of future funding eligibility, the Secretariat recognized the Government's commitment to remaining in compliance with the Montreal Protocol and its willingness to take early action to control HFC consumption growth at no additional cost to the Fund, and therefore agreed to recommend, on an exceptional basis, that the Executive Committee consider funding the subsequent stage of the country's KIP in the same manner as other low-volume-consuming countries that have not committed to lower consumption targets.

Policy, regulatory and institutional frameworks

HFC licensing and quota system

42. Pursuant to decision 87/50 and consistent with decision 63/17,¹² the Government of Ghana has established a licensing and quota system for HFCs and blends through the Environmental Protection Agency Act for controlling the import of HFCs. The Government confirmed that the licensing and quota system is operational and is able to ensure the country's compliance with the Montreal Protocol. Meanwhile, regulation L.I. 1812 is being amended to include additional provisions for the control of HFCs and HFC-based equipment.

Technical and cost-related issues

43. Noting that 60 per cent of domestic refrigerators use HFC-134a and 40 per cent use HC-600a, and that R-600a is technically and economically viable in Ghana, the Secretariat enquired whether the Government would consider banning the import of HFC-134a refrigerators to support the market transition to low-GWP technologies. UNDP advised that past experience in Ghana has shown that outright bans are complicated to implement due to the need for a regulatory provision to establish a ban. However, import quotas on certain types of equipment can be implemented through the Energy Commission. The NOU plans to work with the Energy Commission to control the imports of several types of HFC-based equipment for which low-GWP alternative technologies are available, including the domestic refrigeration equipment.

44. The Secretariat noted that the Government requested US \$45,000 to address the firefighting sector, and confirmed that there are workshops that refill equipment with fire suppressant in Ghana. However, HFC consumption data in the sector has neither been included in the submission nor reported under Article 7 data in the baseline years. Taking as reference the cost guidelines that are currently under discussion, the Secretariat considers that funding might not be eligible for Ghana to address the sector until valid data is submitted under Article 7 reporting. To support Ghana in phasing down HFCs in the firefighting sector, the Secretariat recommends to the Executive Committee to consider, once the

¹² 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.

Government has identified the associated consumption and has revised the Article 7 and CP data, a funding request if submitted by the Government in line with the cost guidelines agreed at that time.

45. The submission included US \$15,000 to incorporate energy-efficiency-related issues into training and awareness-raising activities under the KIP. This component was subsequently withdrawn by the Government and the funds will be used to train technicians in CO₂ technology and in the MAC sector with the relevant targets adjusted.

Total project cost

46. After removing the US \$45,000 for the firefighting sector, the total funding requested for Ghana to implement stage I of the KIP to achieve a 36 per cent reduction from the baseline was adjusted to US \$325,000, in line with decision 92/37.

Tranche distribution

47. The funding tranches under the KIP were originally planned for 2023, 2026 and 2029, while the funding tranches in stage II of the HPMP were planned for 2021, 2024, 2027 and 2030. In order to synchronize the tranches under the two multi-year agreements to reduce the administrative cost and workload associated with tranche submissions, the funding tranches under the KIP were adjusted to 2023, 2027 and 2030. After this adjustment, the total number of funding tranches to be requested for stage I of the KIP and stage II of the HPMP will be reduced from six to four tranches. Since the implementation period for the KIP has been extended to 2030 and the first tranche will be four years, the first tranche was agreed at US \$188,000 (58 per cent of the total funding).

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

48. Stage I of the KIP will be implemented in three tranches. The agreed schedules for HFC phase-down and HCFC phase-out commitments, and for the KIP and HPMP tranches are presented in annex I to the present document while the agreed activities and associated cost of stage I of KIP and stage II of the HPMP are presented in annex II.

Impact on the climate

49. The activities proposed, including the training of technicians in good refrigeration servicing practices, the safe handling of flammable refrigerants, the use of CO₂ technologies, the provision of tools and equipment for training and refrigerant recovery and reuse, and the promotion of low-GWP alternatives, indicate that the implementation of stage I of the KIP will reduce refrigerant emissions into the atmosphere, resulting in climate benefits. A preliminary calculation of the impact on the climate of the activities in the KIP indicates that Ghana will achieve an annual emission reduction of 647,501 CO₂-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

50. The KIP strategy in Ghana is closely aligned with ongoing efforts under the HPMP and the Government's initiatives. The focus is on transitioning the cooling sector to environmentally friendly refrigerants while also reducing indirect emissions caused by outdated and inefficient RAC equipment. Ghana has established MEPS and bans on second-hand equipment to ensure sustained reduction in greenhouse gas emissions over time. Moreover, additional controls on HFC equipment and high-GWP-refrigerant-based equipment will reinforce the overall efforts towards sustainability.

51. The transition to low-GWP alternatives is contingent on several factors, including technology availability, costs, know-how and skills. There is the risk associated with the lack of adequate training and tools for handling natural refrigerants that are flammable and toxic and under high pressure. To address this, activities including training, mandatory certification of technicians, support to training institutions, and provision of tools and equipment will be implemented in stage I of the KIP to be mindful of HFC phase-down requirements, preventing an exponential increase in HFC consumption.

Co-financing

52. Several key co-financing measures will be implemented as part of the KIP, including using the facilities in training institutes to host the CO₂ training programme and MAC centre of excellence; contribution of tools by MAC garages and technicians; co-financing from the beneficiary end-users of the demonstration project; and awareness-raising activities on Government and private-sector websites, social media platforms, forums, and newsletters to disseminate information about the KIP's activities, goals and initiatives.

2023–2025 business plan of the Multilateral Fund

53. UNDP and UNEP are requesting US \$325,000, plus agency support costs, for the implementation of stage I of the KIP for Ghana. The total value of US \$207,140, including agency support costs, requested for the period of 2023–2025, is US \$362,392 below the amount in the business plan.

Draft Agreement

54. A draft Agreement between the Government of Ghana 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.

55. If the Executive Committee so wishes, the funds for stage I of the KIP for Ghana 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

56. The Executive Committee may wish to consider:

- (a) Approving, in principle, stage I of the Kigali HFC implementation plan (KIP) for Ghana for the period 2023–2030 to reduce HFC consumption by 36 per cent of the country's baseline in 2030, in the amount of US \$357,970, consisting of US \$232,000, plus agency support costs of US \$20,880 for UNDP, and US \$93,000, plus agency support costs of US \$12,090 for UNEP, as reflected in the schedule contained in annex I to the present document;
- (b) Noting that upon completion of the end-user-technology demonstration 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);
- (c) Approving the first tranche of stage I of the KIP for Ghana, and the corresponding tranche implementation plan, in the amount of US \$207,140, consisting of US \$132,500, plus agency support costs of US \$11,925 for UNDP, and US \$55,500, plus agency support costs of US \$7,215 for UNEP;

- (d) Requesting the Government of Ghana, UNDP, UNEP and the Secretariat to finalize the draft Agreement between the Government of Ghana 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; and
- (e) Allowing the Government of Ghana to submit a funding request for phasing down HFCs in the firefighting sector for consideration by the Executive Committee in line with the agreed cost guidelines for that sector, when the Government has identified the consumption and revised the Article 7 and the country programme data.

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 GHANA**

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 | 1,805,702 | 1,805,702 | 1,805,702 | 1,805,702 | 1,805,702 | 1,625,132 | 1,625,132 | n/a |
| 1.2 | Maximum allowable total consumption of Annex F substances (CO ₂ -eq tonnes) | n/a | 1,286,890 | 1,286,890 | 1,286,890 | 1,286,890 | 1,286,890 | 1,158,201 | 1,158,201 | n/a |
| 2.1 | Lead IA (UNDP) agreed funding (US \$) | 132,500 | 0 | 0 | 0 | 79,000 | 0 | 0 | 20,500 | 232,000 |
| 2.2 | Support costs for Lead IA (US \$) | 11,925 | 0 | 0 | 0 | 7,110 | 0 | 0 | 1,845 | 20,880 |
| 2.3 | Cooperating IA (UNEP) agreed funding (US \$) | 55,500 | 0 | 0 | 0 | 25,500 | 0 | 0 | 12,000 | 93,000 |
| 2.4 | Support costs for Cooperating IA (US \$) | 7,215 | 0 | 0 | 0 | 3,315 | 0 | 0 | 1,560 | 12,090 |
| 3.1 | Total agreed funding (US \$) | 188,000 | 0 | 0 | 0 | 104,500 | 0 | 0 | 32,500 | 325,000 |
| 3.2 | Total support costs (US \$) | 19,140 | 0 | 0 | 0 | 10,425 | 0 | 0 | 3,405 | 32,970 |
| 3.3 | Total agreed costs (US \$) | 207,140 | 0 | 0 | 0 | 114,925 | 0 | 0 | 35,905 | 357,970 |

HCFC phase-out management plan (stage II)

| Row | Particulars | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | Total |
|-----|--|---------|-------|-------|---------|-------|-------|---------|-------|-------|---------|-----------|
| 1.1 | Montreal Protocol reduction schedule of Annex C, Group I substances (ODP tonnes) | 37.21 | 37.21 | 37.21 | 37.21 | 18.61 | 18.61 | 18.61 | 18.61 | 18.61 | 0.00 | n/a |
| 1.2 | Maximum allowable total consumption of Annex C, Group I substances (ODP tonnes) | 20.00 | 16.98 | 15.00 | 15.00 | 12.00 | 8.50 | 8.50 | 8.50 | 5.00 | 0.00 | n/a |
| 2.1 | Lead IA (UNDP) agreed funding (US \$) | 459,820 | 0 | 0 | 236,545 | 0 | 0 | 350,580 | 0 | 0 | 113,025 | 1,159,970 |
| 2.2 | Support costs for Lead IA (US \$) | 32,187 | 0 | 0 | 16,558 | 0 | 0 | 24,541 | 0 | 0 | 7,912 | 81,198 |
| 2.3 | Cooperating IA (UNEP) agreed funding (US \$) | 112,569 | 0 | 0 | 160,569 | 0 | 0 | 135,569 | 0 | 0 | 50,000 | 458,707 |
| 2.4 | Support costs for Cooperating IA (US\$) | 14,634 | 0 | 0 | 20,874 | 0 | 0 | 17,624 | 0 | 0 | 6,500 | 59,632 |
| 3.1 | Total agreed funding (US \$) | 572,389 | 0 | 0 | 397,114 | 0 | 0 | 486,149 | 0 | 0 | 163,025 | 1,618,677 |
| 3.2 | Total support costs (US \$) | 46,821 | 0 | 0 | 37,432 | 0 | 0 | 42,165 | 0 | 0 | 14,412 | 140,830 |
| 3.3 | Total agreed costs (US \$) | 619,210 | 0 | 0 | 434,546 | 0 | 0 | 528,314 | 0 | 0 | 177,437 | 1,759,507 |

Annex II

**IMPLEMENTATION OF BOTH THE HCFC PHASE-OUT MANAGEMENT PLAN
AND THE KIGALI HFC IMPLEMENTATION PLAN IN GHANA**

| HCFC phase-out management plan (HPMP) - Stage II | | Kigali HFC implementation plan (KIP) - Stage I | | |
|---|---------------------|--|---------------------|----------------------|
| Description of activity | Cost (US \$) | Description of activity | Cost (US \$) | Total (US \$) |
| Establishment of the regulatory environment | | Establishing and implementing regulatory framework | | |
| Establishing policy and regulations, updating safety guidelines for the use of HC refrigerants | 25,000 | | | 25,000 |
| | | Implementing quotas for HFC imports, and other control measures | 15,000 | 15,000 |
| | | Cooperating with the Energy Commission to apply restrictions on imports of specific types of HFC-based equipment | 16,000 | 16,000 |
| | | Finalizing and adopting green procurement guidelines | 15,000 | 15,000 |
| | | Creating awareness and encouraging the use of low-GWP technologies through green procurement | 6,000 | 6,000 |
| Focused awareness-raising/capacity-building of target groups | | Enforcement of HFC controls | | |
| Training 20 trainers and 600 customs officers in ODS import control and the prevention of illegal trade | 75,000 | Supporting Ghana's Customs Training School (CEPS) to upgrade the training curriculum and HS code to include HFCs | 10,000 | 85,000 |
| | | Training 30 trainers for CEPS | 8,000 | 8,000 |
| | | Training 80 clearance agents | 12,000 | 12,000 |
| | | Refresher training of 50 customs officers at 6 border posts | 15,000 | 15,000 |
| Purchasing 13 refrigerant identifiers | 62,150 | | | 62,150 |
| Conducting professional workshops/seminars to strengthen the industry associations (NARWOA) and to encourage its members to conduct good servicing practices | 150,000 | | | 150,000 |
| Awareness-raising and training activities on alternative technologies to HCFCs, low-GWP cooling systems, and maintaining/improving the energy efficiency of RAC systems | 100,000 | | | 100,000 |
| Awareness creation and information dissemination on alternative technologies for importers, distributors and retailers of controlled substance and equipment | 90,000 | | | 90,000 |

| Training and certification of technicians in RAC servicing | | Capacity building for RAC sector | | |
|---|------------------|---|----------------|------------------|
| Providing support for five universities by training trainers and providing equipment and tools to facilitate the inclusion in the curriculum of safe handling of flammable refrigerants, and training 1,500 technicians | 239,315 | Training 13 trainers on the new curriculum developed in line with the Ghana Qualification Framework | 15,000 | 282,315 |
| | | Conducting training for 24 trainers on CO ₂ technology | 20,000 | |
| | | Updating curriculum and training 20 trainers in the MAC sector | 8,000 | |
| Providing equipment and tools to four centres of excellence to support training of 1400 technicians in good servicing practices and the safe handling of flammable refrigerants | 100,000 | Establishing a CO ₂ training programme at a local training centre | 30,000 | 184,000 |
| | | Establishing a centre of excellence for the MAC sector with the focus on leak-proofing and refrigerant containment | 17,000 | |
| | | Providing tools to 10 garages and training 50 technicians in the MAC sector | 37,000 | |
| Implementing the certification of RAC technicians | 58,707 | | | 58,707 |
| Recovery, recycling, and training programme | | | | |
| Providing equipment and tools to 50 workshops and training 450 technicians in refrigerant recovery and recycling | 280,500 | | | 280,500 |
| Supporting the Refrigeration and Air-Conditioning Engineers Association of Ghana (RAAG) in participating in international meetings, subscribing to technical literature, and organizing national workshops and seminars | 60,000 | | | 60,000 |
| Establishing two refrigerant reclamation centres | 140,000 | | | 140,000 |
| Facilitating the adoption of R-290 technology and environmentally sound alternative technologies | | Demonstration of pilot projects in the commercial refrigeration sector | | |
| Demonstrating R-290 AC technology by replacing 71 units of HCFC-22 AC with R-290-based ACs in a hostel, communicating and disseminating the results and raising awareness on R-290 technology | 90,000 | Identifying suitable candidates, conducting two pilot projects on R-290 monoblock technology in the commercial refrigeration sector, including installation, commissioning, training, awareness-raising on monoblock technology, and supporting the establishment of a supply chain | 63,000 | 153,000 |
| Gender mainstreaming | | | | |
| | | Role model presentations throughout KIP implementation | 6,000 | 6,000 |
| Project management, monitoring, and reporting | | Project management, monitoring, and reporting | | |
| Project management, monitoring, and reporting on HCFC related activities | 148,005 | Project management, monitoring, and reporting on HFC-related activities | 32,000 | 180,005 |
| Total | 1,618,677 | | 325,000 | 1,943,677 |