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

PROJECT PROPOSAL: PERU

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

¹ UNEP/OzL.Pro/ExCom/93/1

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS

Peru

(I) PROJECT TITLE				AGENCY					
Kigali HFC implementation plan (stage I)				UNDP (lead)					
(II) LATEST ARTICLE 7 DATA (Annex F)			Year: 2022	1,074.09 mt	2,785,607 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				
Substances consumed in pure form:									
HFC-23					134,088			134,088	
HFC-32					54,905			54,905	
HFC-125					987,665			987,665	
HFC-134a					663,077			663,077	
HFC-143a					930,431			930,431	
HFC-152a					3,207			3,207	
HFC-227ea			12,236					12,236	
Substances consumed in pre-blended polyols:									
HFC-227ea		3,832						3,832	
HFC-245fa		268						268	
HFC-365mfc		12,569						12,569	
(IV) AVERAGE 2020-2022 HFC CONSUMPTION IN SERVICING					889.42 mt	2,170,176 CO ₂ -eq tonnes			
(V) CONSUMPTION DATA (CO₂-eq tonnes)									
Baseline: average 2020-2022 HFC consumption plus 65% of HCFC baseline			2,735,721	Starting point for sustained aggregate reductions			TBD		
CONSUMPTION ELIGIBLE FOR FUNDING									
Already approved			0	Remaining			TBD		
(VI) ENDORSED BUSINESS PLAN				2023	2024	2025	Total		
UNDP	HFC phase-down (CO ₂ -eq tonnes)			0	0	0	0		
	Funding (US \$)			0	114,125	0	114,125		
(VII) PROJECT DATA				2023	2024-2025	2026	2027-2028	2029	Total
Consumption (CO ₂ -eq tonnes)	Montreal Protocol limits			n/a	2,735,721	2,735,721	2,735,721	2,462,149	n/a
	Maximum allowable			n/a	2,735,721	2,735,721	2,735,721	2,462,149	n/a
Amounts requested in principle (US \$)	UNDP	Project costs		283,140	0	283,140	0	62,718	628,998
		Support costs		19,820	0	19,820	0	4,390	44,030
Amounts recommended in principle (US \$)	Total project costs			283,140	0	283,140	0	62,718	628,998
	Total support costs			19,820	0	19,820	0	4,390	44,030
	Total funds			302,960	0	302,960	0	67,108	673,028
(VIII) Request for approval of funding for the first tranche (2023)									
Implementing agency			Funds recommended (US \$)			Support costs (US \$)			
UNDP			283,140			19,820			
Total			283,140			19,820			
Secretariat's recommendation:			Individual consideration						

PROJECT DESCRIPTION

1. On behalf of the Government of Peru, UNDP as the designated implementing agency has submitted a request for stage I of the Kigali HFC implementation plan (KIP), in the amount of US \$500,500, plus agency support costs of US \$35,035, as originally submitted.²
2. The implementation of stage I of the KIP will assist Peru 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 \$250,250, plus agency support costs of US \$17,518 for UNDP, as originally submitted, for the period of January 2024 to December 2025.

Background

4. Peru ratified all amendments to the Montreal Protocol, including the Kigali Amendment on 7 August 2019. The country has an HCFC consumption baseline of 26.88 ODP tonnes or 470.46 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 Peru was originally approved at the 68th meeting⁴ and revised at the 75th meeting⁵ to meet the 10 per cent reduction from the baseline by 2015 (with implementation extended to 2016), resulting in the phase-out of 3.74 ODP tonnes of HCFCs, at a total cost of US \$282,671, plus agency support costs.
6. Stage II of the HPMP for Peru was approved at the 80th meeting⁶ to reduce HCFC consumption by 67.5 per cent from the baseline by 2025, at a total cost of US \$1,167,000, plus agency support costs. Stage II will be completed by December 2026, as stipulated in the Agreement between the Government of Peru and the Executive Committee.
7. Stage III of the HPMP is currently being prepared, with submission for the Executive Committee's approval planned in 2024.

Status of implementation of HFC-related activities

8. At the 75th meeting, the Government of Peru received funding to carry out a survey on the use of alternatives to ozone-depleting substances (ODSs) (US \$110,000), which was completed in September 2017. At its 80th meeting, the Executive Committee approved US \$150,000, plus agency support costs, for UNDP to support the development of enabling activities for the ratification of the Kigali Amendment. These activities have assisted the Government in assessing the country's legal framework, establishing a roadmap for the ratification of the Kigali Amendment, issuing a decree on the licensing and quota requirements for HFC imports, updating the data on HFC use, and analysing national consumption trends. The enabling activities were completed in June 2020.

² As per the letter of 23 August 2023 from the Ministry of Production of Peru 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 Decision 68/35

⁵ Decision 75/63(a)(v)

⁶ Decision 80/59

Stage I of the Kigali HFC implementation plan

Policy, regulatory and institutional frameworks

9. The General Directorate of Industrial Environmental Affairs (DGAAMI), located within the Ministry of Production (PRODUCE), hosts the national ozone unit (NOU) and is responsible for the implementation of the Montreal Protocol in Peru, including the monitoring of production levels in all industries, reporting Article 7 consumption data to the Ozone Secretariat and country programme (CP) data to the Multilateral Fund Secretariat, and coordinating activities to reduce consumption of controlled substances.

10. The NOU liaises *inter alia* with the Ministry of the Environment, in charge of environmental issues and the implementation of international treaties; the General Directorate of Customs, in charge of providing annual consumption reports, maintaining a database of importers, and submitting import license applications for DGAAMI's approval; and the private sector, including importers and distributors of ozone-depleting substances (ODSs), professional and trade associations, and main technical training institutions, including the University of Lima.

11. Peru has an effective HFC licensing and quota system. Supreme decree 019-2021-PRODUCE incorporates the commitments of the Kigali Amendment into the national legislation. All licensed enterprises must figure in the national register of ODS importers, quotas are assigned by the end of each year based on historical records, with a small margin reserved for contingencies and potential new importers.

12. The country's Technical Committee for Standardization has adopted several standards regarding refrigeration and air-conditioning (RAC), including NTP ISO 5149:2020/2021 on safety and environmental requirements for refrigeration systems and heat pumps, NTP ISO 817:2022 on refrigerant designation and safety classification, and NTP ISO 11650:2023 on the performance of refrigerant recovery and/or recycling equipment.

13. National regulations relating to energy efficiency include measures to establish labeling requirements for all electrical appliances based on energy use; measures to establish energy consumption indicators and monitoring methodologies; and approval of a reference plan for energy efficiency with specific targets for reducing national energy consumption.

HFC consumption

14. The Government of Peru only imports HFCs for use in multiple RAC servicing subsectors, and very small amounts contained in pre-blended polyols for use in the polyurethane (PU) foam sector. In 2022, substances predominantly consumed in the country included R-507A (37 per cent of total HFC consumption in CO₂-equivalent (CO₂-eq) tonnes), HFC-134a (23 per cent), R-404A (21 per cent), R-410A (11 per cent), and other HFCs (5 per cent). Table 1 presents the country's HFC consumption as reported under Article 7 to the Ozone Secretariat.

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

HFC	GWP*	2019	2020	2021	2022	Share of HFC consumption in 2022 (%)
mt						
HFC-23	14,800	0	0.18	0	7.05	1
HFC-134a	1,430	380.68	470.73	337.21	443.67	41
HFC-152a	124	3.36	7.46	10.06	25.86	2
R-404A	3,922	94.76	73.34	84.70	149.31	14
R-407C	1,774	15.79	16.16	21.35	21.30	2

HFC	GWP*	2019	2020	2021	2022	Share of HFC consumption in 2022 (%)
R-410A	2,088	134.15	123.32	80.81	152.88	14
R-507A	3,985	166.44	215.53	140.22	261.02	24
Other**	-	8.02	21.24	8.33	12.99	1
Total (mt)		803.20	927.96	682.68	1,074.09	100
CO₂-eq tonnes						
HFC-23	14,800	0	2,723	0	104,337	4
HFC-134a	1,430	544,367	673,144	482,215	634,453	23
HFC-152a	124	417	925	1,247	3,207	0
R-404A	3,922	371,611	287,610	332,160	585,534	21
R-407C	1,774	28,011	28,668	37,875	37,786	1
R-410A	2,088	280,038	257,431	168,691	319,137	11
R-507A	3,985	663,263	858,887	558,777	1,040,165	37
Other**	-	23,099	69,800	24,251	60,989	2
Total (CO₂-eq tonnes)		1,910,807	2,179,188	1,605,215	2,785,607	100

*Global-warming potential

**R-417A, R-417B, R-407A, HFC-227ea, HFC-236fa, HFC-143a, HFC-32, HFC-125, R-437A, R-438A, R-508B, R-422D

15. HFC consumption in Peru has grown in recent years as a result of increasing demand for RAC appliances paired with HCFC phase-out. Barring the sharp drop in 2021 due to the COVID-19 pandemic, HFC consumption has shown steady growth over the last decade and was boosted in year 2022, especially for R-507A and R-404A used in commercial refrigeration. As the country is currently experiencing economic growth, demand for HFCs is expected to continue rising, posing a challenge to achieving consumption freeze by 2024.

Country programme implementation report

16. The Government of Peru reported its HFC sector consumption data in the 2020-2022 country programme implementation reports that is consistent with the data reported under Article 7 of the Montreal Protocol.

HFC distribution by sector

17. The vast majority (99.6 per cent) of all HFCs imported into the country are used in the RAC servicing subsectors, predominantly in commercial food services, including supermarkets and restaurants (26.5 per cent in mt and 27.7 per cent in CO₂-eq tonnes), followed by industrial subsectors including dairy, fisheries, beverages and textiles (22.2 per cent in mt and 26.1 per cent in CO₂-eq tonnes), mobile air-conditioning (MAC) (20.9 per cent in mt and 11.7 per cent in CO₂-eq tonnes), and others. Small amounts of HFC-227ea were used in the firefighting sector. HFC consumption by sector is shown in table 2, except for the use of HFCs contained in imported pre-blended polyols in PU foam, which is presented separately in table 3.

Table 2. Estimated national HFC consumption by sector (2022)

Subsector	HFC-134a	R-404A	R-407C	R-410A	R-507A	Other	Total	Share (%)
RAC servicing sector (mt)								
Domestic refrigeration	15.80	0	0	0	0	0	15.80	1.5
Domestic AC	0	0	0	12.43	0	1.77	14.20	1.4
MAC	217.70	0	0	0	0	0	217.70	20.9
Commercial and food services	73.13	20.96	3.73	84.02	89.13	5.60	276.57	26.5

Subsector	HFC-134a	R-404A	R-407C	R-410A	R-507A	Other	Total	Share (%)
Food cold chain	35.30	30.50	0	2.10	124.70	1.60	194.20	18.6
Industrial RAC	50.00	90.40	18.00	20.00	41.00	12.16	231.56	22.2
Institutional RAC	25.00	3.00	0	16.00	8.00	0	52.00	5.0
Tourism	20.00	0	0	15.00	2.00	0	37.00	3.5
Total for RAC servicing (mt)	436.93	144.86	21.73	149.55	264.83	21.13	1,039.03	99.6
Non-RAC servicing (mt)								
Firefighting	0	0	0	0	0	3.80	3.80	0.4
Grand total (mt)	436.93	144.86	21.73	149.55	264.83	24.93	1,042.83	100
RAC servicing sector (CO₂-eq tonnes)								
Domestic refrigeration	22,594	0	0	0	0	0	22,594	0.8
Domestic AC	-	0	0	25,954	0	4,830	30,784	1.2
MAC	311,311	0	0	0	0	0	311,311	11.7
Commercial and food services	104,576	82,205	6,617	175,434	355,183	15,282	739,297	27.7
Food cold chain	50,479	119,621	-	4,385	496,930	4,366	675,781	25.3
Industrial RAC	71,500	354,549	31,932	41,760	163,385	33,185	696,310	26.1
Institutional RAC	35,750	11,766	0	33,408	31,880	0	112,804	4.2
Tourism	28,600	0	0	31,320	7,970	0	67,890	2.5
Total for RAC servicing (CO₂-eq tonnes)	624,810	568,141	38,549	312,260	1,055,348	57,664	2,656,772	99.5
Non-RAC servicing (CO₂-eq tonnes)								
Firefighting	0	0	0	0	0	12,236	12,236	0.5
Grand total (CO₂-eq tonnes)	624,810	568,141	38,549	312,260	1,055,348	69,900	2,669,008	100

Note: The 3.5 per cent difference between the reported 2022 imports (top-bottom approach) and the use estimated in this table (bottom-up approach) is due to uncertainties in the use of some substances, and to the fact that the table focuses on the most used HFCs and does not include very small uses of other HFCs.

Polyurethane foam manufacturing sector

18. The PU foam sector consumes small amounts of HFCs contained in imported pre-blended polyols. As there are no local systems houses, the sector is supplied by importers of formulated polyols and isocyanates (PU systems), with the main blowing agents being HCFC-141b, HFC-365mfc/227ea, HFC-245fa, HFO, and water-based.

19. There are four importers of pre-blended polyols in Peru: Treda Fega, importing PU systems containing HFC-365mfc/HFC-227ea and, to a lesser extent, HFO and water-based agents; Synthesia Technology (non-Article 5 owned), importing exclusively HFCs and HFOs; Pochteca, marketing PU systems containing HCFC-141b; and Motorex, a Peruvian enterprise representing the multinational BASF.

20. The Government has not yet implemented import controls on polyols but considers phasing them out once a cost-effective and commercially available technology with low GWP makes it possible. The imports of HCFCs and HFCs contained in pre-blended polyols in the 2017-2022 period are presented in table 3.

Table 3. Imports of controlled substances contained in pre-blended polyols in Peru (mt)

Substance	2017	2018	2019	2020	2021	2022
HCFC-141b	381.25	266.22	132.96	43.69	26.54	11.99
HFC-245fa	0	0	0	5.18	3.83	0.26

Substance	2017	2018	2019	2020	2021	2022
HFC-365mfc	0	0	0	0	22.48	15.83
HFC-227ea	0	0	0	0	2.05	1.19

Firefighting sector

21. The firefighting sector represents 0.5 per cent of national HFC consumption. This sector includes imported fire-extinguishing equipment and local maintenance, recharging and training services. Equipment and substances are imported by distributors, end users, and large and medium-sized enterprises that locally design fire-extinguishing systems used *inter alia* in the mining, construction, industrial and residential sectors. The main substances used include HFC-227ea, carbon dioxide (CO₂), HFC-123, HFC-125, HFC-236fa and dry chemical dust. Under stage I of the KIP, awareness-building activities for relevant end users and a plan to reduce HFC consumption in stage II will be developed.

Refrigeration servicing sector

22. There are approximately 6,000 technicians and 1,650 workshops consuming HFCs in Peru. The servicing enterprises are divided into two main groups, the first working with air-conditioning (AC), and the other with refrigeration appliances. About 1,500 workshops employ between one and five technicians, and only 150 workshops nationwide are staffed with more than five technicians.

23. An estimated two out of five technicians employed in the RAC servicing sector are formally trained. RAC servicing is affected by the lack of adequate and accessible technical training, outdated curricula, weak supervision and enforcement capacity of the state, and numerous shortcomings of the legal and regulatory system. General institutional strengthening measures are needed to regularise informal work through compliance with labour competency standards.

24. Technical courses on the construction, installation, maintenance, and adjustment of RAC equipment and systems in compliance with the established safety and quality standards are offered by the main RAC training institutes in Peru.⁷

Domestic refrigeration and air-conditioning sector

25. Accounting for only 3 per cent of the country's estimated demand for HFC consumption in servicing, this sector includes:

- (a) *Domestic refrigeration (15.8 mt)*: as of 2021, 38 per cent of all domestic refrigerators in the country contained HFC-134a, with the remaining ones using R-600a; and
- (b) *Domestic AC (14.2 mt)*: only some upper and middle-upper-class households in major cities make moderate use of wall and window air conditioners, of which 70 per cent are charged with R-410A, 20 per cent with HCFC-22, and 10 per cent with R-422D.

Commercial refrigeration and air-conditioning sector

26. This sector, including supermarkets, convenience stores, small shops, restaurants, and processed food outlets, uses the most RAC appliances in the country. In 2022, the estimated demand for HFCs in the servicing of commercial RAC appliances was 276.57 mt, including 89.13 mt of R-507A, 84.02 mt of R-410A, 73.13 mt of HFC-134a, 20.96 mt of R-404A, and 9.33 mt of other substances, with the following breakdown:

⁷ I.e., SENATI, GAMOR, TECSUP, and Julio Tello Technical Institute.

- (a) *Supermarket and shop refrigeration*: equipment used in this subsector includes ice makers, beverage coolers and preservers, commercial refrigerators, cold rooms, tunnels, and condensing units, with annual demand for HFCs estimated at 137.12 mt;
- (b) *Supermarket and shop AC*: equipment in this subsector includes central (or packaged) unit air conditioners, split-type air conditioners, and air conditioners with chiller-type chillers, consuming an estimated 93.35 mt of HFCs annually; and
- (c) *Restaurants and food preparation*: approximately 220,000 establishments dedicated to meal preparation, including restaurants, use an estimated 46.1 mt of HFCs.

Industrial refrigeration and air-conditioning sector

27. This sector comprises the dairy industry, brewing and beverages, fisheries, and textiles, and in 2022 consumed 231 mt of HFCs, including 90 mt of R-404A, 50 mt of HFC-134a, 41 mt of R-507A, 20 mt of R-410A, 18 mt of R-407C, and 12 mt of other HFCs. Out of this amount, the dairy industry consumed 108 mt; the brewing and beverages sectors consumed 56 mt; the fishing industry, including fishing vessels and frozen fish plants, consumed 25 mt; and the textile industry consumed 43 mt.

Food cold chain sector

28. The cold chain sector consumed in 2022 an estimated 194.3 mt of HFCs, including 106 mt for maintenance refilling of refrigerated storage appliances, 64.2 mt used in refrigerated transport, 18.2 mt consumed by large enterprises in the processed fruit and vegetable subsector, and 5.9 mt used in the maintenance of refrigerators for the preservation of meat, poultry and fish. The most widely used HFC in the sector is R-507A, followed by HFC-134a, R-404A, R-410A and R-422D.

Mobile air-conditioning sector

29. There are an estimated 1,912,297 cars and station wagons with MAC installations in the country (not including pickups, buses, trucks, and vans), with an estimated HFC demand for refilling in 2022 of 217.7 mt. This sector requires recovery and recycling as there are currently no reliable, affordable alternatives to HFC-134a in the local market.

Other sectors

30. Consumption of HFCs in the servicing of RAC appliances (chillers, split-type air conditioners and industrial air conditioners) in the institutional sector was estimated at 52 mt per year, consisting mostly of HFC-134a, followed by R-410A, R-507A, and R-404A, while the estimated consumption for servicing RAC appliances installed in hotels, bars, and entertainment centres was 37 mt of HFC-134a, R-410A and R-507A.

Local installation and assembly sector

31. Enterprises carrying out local installation and assembly of RAC systems were identified in the course of project preparation, but a systematic study was not done due to time and financial limitations. For this reason, HFC consumption in local installation and assembly is included as part of the servicing sector.

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

Overarching strategy

32. The Government of Peru is proposing stage I of the KIP to be implemented simultaneously with the HPMP until 2029, and subsequent stages to address the phase-down targets in 2035, 2040 and 2045.

Established HFC baseline and proposed reductions

33. The Government of Peru reported its Article 7 data for 2020-2022. By adding 65 per cent of the HCFC baseline in CO₂-eq tonnes to the average HFC consumption in 2020-2022, the established HFC baseline is 2,735,721 CO₂-eq tonnes, as shown in table 4.

Table 4. HFC baseline for Peru (CO₂-eq tonnes)

Baseline calculation	2020	2021	2022
HFC annual consumption	2,179,188	1,605,215	2,785,607
HFC average consumption 2020-2022			2,190,004
HCFC baseline (65%)			545,717
HFC baseline			2,735,721

34. The Government of Peru and UNDP have projected HFC consumption based on an annual average economic growth of 5 per cent in the period 2023-2027, and 2 per cent thereafter. Noting that HFC consumption in 2022 was already above the baseline level, immediate action is needed to ensure compliance in 2024.

35. The challenges to reducing HFC demand in Peru include consumption growth rates in the RAC sector combined with limited penetration of low-GWP alternatives in major sectors, and the absence of HFC-related policies to support transition to low-GWP alternatives. Stage I of the KIP aims to address these issues and to ensure the country’s compliance with the Montreal Protocol limits between 2024 and 2029.

Proposed activities and total cost of stage I of the Kigali HFC implementation plan

36. The implementation of activities under stage I of the KIP will support the development of an enabling environment for an appropriate and sustainable adoption of low-GWP alternatives, including adjustments to the policy, legal, and regulatory frameworks, creation of economic incentives, strengthening of national capacities for the safe use of natural refrigerants and new RAC technologies, reduction of demand for high-GWP HFCs, and curbing HFC emissions. The budget for stage I had been established at US \$500,500, as submitted, and subsequently revised as explained in paragraphs 56 and 57 below. The proposed activities and their costs are summarized in table 5.

Table 5. Activities proposed for implementation in the servicing sector under stage I of the KIP

KIP component	Cost as submitted (US \$)	Adjusted cost (US \$)
<i>I. Strengthening of the legal framework and inter-institutional coordination</i>		
<i>Legal framework and control mechanisms:</i> update the legal framework, including the licensing and quota system and the harmonised system (HS) codes; strengthen the coordination mechanism between PRODUCE and customs authorities; prepare an inventory of main users and substances consumed in firefighting for monitoring HFC use in the sector; identify importers of pre-blended polyols and main PU foam applications, and the main users and substances used in the cold chain subsectors; organize at least two workshops on HFC control measures for key stakeholders and end users from all consuming sectors	40,000	40,000
<i>Strengthening of customs officers in the control of HFC trade:</i> hold five training workshops for customs and trade control officials on the new standards and regulations regarding HFC control measures and the updated HS codes; and one workshop to exchange experiences with other countries in the region	30,000	37,000
<i>Gender mainstreaming and social environmental safeguards:</i> develop a strategy for gender mainstreaming and the introduction of social and environmental safeguards, including at least two training workshops for institutions and the design and publication	25,000	30,000

KIP component	Cost as submitted (US \$)	Adjusted cost (US \$)
of informative material on gender awareness-building; and awareness campaign for key stakeholders and end users		
Subtotal for I	95,000	107,000
II. Capacity building for the safe use of low-GWP refrigerants in RAC systems		
<i>Strengthening of the training programmes:</i> update the curricula for RAC training programmes, with emphasis on hydrocarbon (HC) refrigerants; six workshops for trainers and nine for technicians on the safe handling of HC refrigerants in domestic and commercial refrigeration; and design and distribute associated awareness materials	105,000	130,000
<i>Strengthening of the labour competency-based certification system for technicians:</i> include the safe handling of HCs in domestic and commercial RAC applications in the certification requirements for technicians; and carry out awareness-raising activities and workshops to promote the updated certification scheme	50,000	50,000
Subtotal for II	155,000	180,000
III. Reduction of demand for high-GWP HFC-based systems		
<i>Awareness-building for end users:</i> organize two workshops to identify relevant RAC end users and their applications, and hold three workshops to promote alternative, low-GWP, energy-efficient technologies in the process of selecting new installations for relevant RAC applications	35,000	35,000
<i>Pilot project to design an HC-based cold room:</i> design two HC-based cold room in two commercial refrigeration applications to be selected, for demonstration and promotion purposes	50,000	80,000
Subtotal for III	85,000	115,000
IV. Reduction of emissions of high-GWP HFCs over refrigerant life cycle		
<i>Evaluation of the impact of good servicing practices:</i> measure the impact of applying good servicing practices at one end user in the commercial refrigeration sector, including leakage reduction, downtime reduction, performance, and savings in energy consumption; hold a results dissemination workshop and produce a results report for dissemination	30,000	40,000
<i>Training on good servicing practices in the MAC sector:</i> develop guidelines and awareness material on best practices in MAC; train 60 technicians from 20 selected MAC servicing workshops on best practices in the management of refrigerant gases in the servicing of MAC equipment	45,000	69,816
<i>Provision of recovery and recycling equipment:</i> strengthen the 20 selected MAC workshops through procurement and delivery of 20 tool kits ⁸ for refrigerant containment	45,000	60,000
Subtotal for IV	120,000	169,816
Total for activities in the servicing sector	455,000	571,816
Project coordination and management: local consultants (US \$20,000), verification reports (US \$24,000), stakeholder meetings (US \$7,000), and production of awareness materials (US \$6,182)	45,500	57,182
Total for stage I of the KIP	500,500	628,998

Project implementation, coordination, and monitoring

37. The NOU employs two staff members for administration and operations, a national coordinator, and an administrative assistant. It ensures that project goals are met through *inter alia* detailed activity design, encouraging stakeholder involvement, providing technical assistance to project beneficiaries, local procurement of goods and services, the monitoring of all activities and technological developments regarding HFC alternatives, and monitoring the application of gender indicators to project outcomes.

⁸ Each kit including at least one portable refrigerant gas recovery unit for MAC, two 30 lb recovery cylinders for storage of recovered gas, one 123 lb canister for storing non-reusable gas that can be recycled or destroyed, electronic leak detector, vacuum pump, valve exchanger, pressure gauge manifold, and digital vacuum gauge.

Gender policy implementation

38. The strategy for gender mainstreaming under the KIP involves an analysis of the potential for increasing the participation of women as technicians, system designers and installers, trainers, and technical managers in the RAC sector enterprises; and the creation of an action plan to promote gender equity and women's inclusion in key areas and programmes, specifying the required resources, goals, and indicators. Relevant institutions will hold training workshops on social and environmental safeguards, as well as workshops to increase interest and open up options for women in the RAC sector and in all HFC phase-down activities. Awareness-raising activities will be included in all KIP components.

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

39. Stage I of the KIP will be implemented in three 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.

40. The main activities of stage II of the HPMP, addressing *inter alia* training in good refrigeration practices for RAC servicing technicians, strengthening of the refrigerant recovery, recycle and reclaim (RRR) network, certification of technicians, and strengthening of training institutions, will be carried out simultaneously with and complemented by analogous activities implemented under stage I of the KIP.

41. Because HFC phase-down involves multiple refrigerants, both pure and blended, that had not been previously controlled under the Montreal Protocol, as well as the adoption of flammable and/or toxic, low-GWP alternatives to HFCs such as HC, CO₂, and ammonia, which require special treatment over their life cycle, the KIP will ensure that RAC technicians receive appropriate training on these technologies in updated standard courses on good refrigeration practices.

42. Stage III of the HPMP, which will address the last reduction step in the total phase-out of HCFCs and is to be submitted within the next year, will be formulated in light of the ongoing activities under both stage II of the HPMP and stage I of the KIP. The activities to be implemented simultaneously under the HPMP and the KIP are listed in annex II.

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

43. The first funding tranche of stage I of the KIP had been established at US \$250,250, as submitted, and adjusted to US \$283,140, as explained in paragraph 60 below. The tranche, as adjusted, will be implemented between January 2024 and December 2025 and will include the following activities:

- (a) *Strengthening of the legal framework and inter-institutional coordination*: organize one workshop and one campaign regarding updates to the country's legal framework, and strengthen inter-institutional coordination on HFC control and monitoring; organize one training workshop for customs and trade control officials on the new standards and regulations regarding HFC control measures; develop a strategy for gender mainstreaming and social and environmental safeguards, including one training workshop, and design and publish informative material on gender (US \$48,150);
- (b) *Capacity building for the safe use of low-GWP refrigerants in RAC systems*: review and update the national curricula for RAC training programmes, with emphasis on HC refrigerants; train 40 trainers on the safe handling of HCs in RAC systems; train 40 trainers on good servicing practices in the MAC sector; develop a labour competency standard for technicians on the safe handling of HCs, and create a programme to promote technician certification (US \$81,000);

- (c) *Reduction of demand for high-GWP HFC-based systems*: organize one workshop to identify relevant end users and one workshop to promote low-GWP, energy-efficient technologies; initiate the pilot project to design of an HC-based cold room in a selected commercial refrigeration application (US \$51,750);
- (d) *Reduction of emissions of high-GWP HFCs over refrigerant life cycle*: measure the impact of applying good servicing practices at one end user in the commercial refrigeration sector, hold a results dissemination workshop, and produce a results report for dissemination; develop guidelines and awareness material on best servicing practices in MAC, and train 60 technicians on best practices in the management of refrigerant gases in the servicing of MAC equipment (US \$76,500); and
- (e) *Project coordination and monitoring*: local consultants (US \$12,500), verification reports (US \$7,000), stakeholder meetings (US \$2,500), local travel (US \$2,240) and production of awareness material (US \$1,500), for a total of US \$25,740.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

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

HFC consumption levels

45. The 2021 HFC consumption decrease to 682.68 mt (1,605,215 CO₂-eq tonnes) was followed by an increase to a level of 1,074.09 mt (2,785,607 CO₂-eq tonnes) in 2022, slightly exceeding the baseline level. The Secretariat enquired whether the recorded increase in imports in 2022 was to serve regular refrigerant needs after the reduction in 2021. In response, UNDP provided historical data showing that HFC consumption in the country had grown steadily over the past decade, except for a sharp drop in 2021 caused by the COVID-19 pandemic. On this basis, UNDP considered that the 2022 spike in consumption served regular refrigerant needs. No information was provided on external factors that might have caused the increase, e.g., shipments delayed from 2021 due to supply chain disruptions, possible additional imports by importers given the shortage of refrigerant in 2021, or stockpiling in preparation for future import restrictions. An estimation of the 2023 consumption level was not available either.

46. The Secretariat considers it important to continue monitoring the country's HFC consumption behavior over the coming years to determine whether the high imports reported in 2022 are representative of the local market's regular consumption needs or were an isolated occurrence, expecting that by the time the next tranche request is submitted in 2026, the availability of data on longer-term HFC consumption trends will allow more clarity on the issue.

Overarching strategy

Starting point for sustained reductions in HFC consumption

47. The estimated baseline for HFC consumption in Peru is 2,735,721 CO₂-eq tonnes, as shown in table 4 above. The methodology for calculating the starting point for sustained reductions in HFC consumption is still under discussion. The Secretariat notes that the starting point for Peru will be established once the Executive Committee agrees on the above-mentioned methodology.

⁹ Level and modalities of funding for HFC phase-down in the refrigeration servicing sector.

Polyurethane foam sector

48. At its 61st meeting, the Executive Committee decided to approve funding for the phase-out of HCFC-141b contained in imported pre-blended polyols used by PU foam enterprises and established the conditions for requesting this funding (decisions 61/47 and 63/15), including for some countries, on an exceptional basis and subject to several conditions, flexibility in the submission of these projects at any time during the ongoing stage of the HPMP, when alternative technologies became available.

49. The Secretariat notes that the Government of Peru intends to submit to a future meeting during stage I of the KIP a project to phase out the use of HFCs contained in pre-blended polyols in the PU foam sector. Noting that there are more countries using HFCs contained in imported pre-blended polyols, the Executive Committee may wish to consider whether it will fund activities to phase out HFCs contained in imported pre-blended polyols in Article 5 countries, as has been done for HCFCs. The consideration of a project in the PU foam sector in Peru would be subject to the consideration of this issue by the Executive Committee, which is presented in document UNEP/OzL.Pro/ExCom/93/31, Overview of issues identified during project review.

50. Given past difficulties in addressing the PU foam sector in Peru during the HPMP, the Executive Committee allowed the Government of Peru to submit, during the implementation of stage II of the HPMP, a project to phase out the use of HCFC-141b contained in imported pre-blended polyols in the PU foam sector, when proven cost-effective and commercially available low-GWP technology made it possible (decision 80/59(e)). If the Executive Committee decided in favor of funding the phase-out of HFCs contained in imported pre-blended polyols, it would be desirable that a project to phase out the use of imported pre-blended polyols in Peru covered both HCFCs and HFCs.

Policy, regulatory and institutional frameworks*HFC licensing and quota system*

51. Decision 87/50(g) requests bilateral and implementing agencies, when submitting stage I of a KIP, to include confirmation that the country has an established and enforceable national system of licensing and quotas for monitoring HFC imports and exports in place, consistent with decision 63/17. Accordingly, the Government of Peru has established a licensing and quota system for HFCs, with import quotas to be provided to importers in CO₂-eq tonnes, with flexibility to import any HFC as long as the quota is not surpassed. UNDP expects that this strategy will allow importers to develop individual strategies to meet the control targets, and may incentivize them to import fewer high-GWP HFCs. HFC import quotas will start being applied in 2024.

Additional regulatory measures

52. Regarding the regulatory framework, the Secretariat enquired whether the Government was considering regulatory measures to either discourage imports of equipment containing high-GWP HFCs to replace HCFC-22-based equipment, or ban the import of HFC-based domestic refrigerators (62 per cent of imported refrigerators already contain R-600a). UNDP explained that due to the characteristics of Peruvian institutions, the implementation of industry-wide regulatory measures was not currently possible, but that it would work closely with the NOU, the Government, importers, and other stakeholders to reduce the introduction of HFC-based equipment through updates to the existing Public Procurement Standards. As the Government is a major buyer nationwide, public procurement initiatives have previously contributed to successfully decreasing the import and installation of HCFC-based equipment.

Technical and cost-related issues

Refrigeration servicing sector

53. The Secretariat notes that activities proposed in the servicing sector are complementary to those being implemented under the ongoing stage II of the HPMP. UNDP reported that stage III of the HPMP would be prepared in light of the activities already included in the KIP.

54. In providing details on the pilot project to design an HC-based cold room for demonstration and promotion purposes, UNDP indicated that the potential replicability of this project was high, given that HFC-based cold rooms were widely used in food storage warehouses, meat industry, frozen products for export, fishing industry, and agricultural application including storage of flowers, fruits, and vegetables. The project aims to replicate the demonstration projects for R-290-based cold rooms that have been successfully implemented in other countries, including Colombia and Ecuador, and to demonstrate that cold rooms in Peru can be efficiently and safely installed with R-290. During the first tranche, one or two end users who are representative of a sector or a specific application and can provide co-financing will be selected. Details regarding equipment capacity and selected user(s) will be provided along with the request for the second tranche of the KIP. The Government of Peru will disseminate the results of the pilot project through a final report and a dissemination workshop. In line with decision 92/36, UNDP was requested to report, upon completion of this project, on the achieved HFC phase-out and energy-efficiency gains.

Total project cost

55. At its 92nd meeting, the Executive Committee agreed on funding at a level up to US \$5.10/kg for countries with HFC consumption in servicing of above 360 mt (decision 92/37(b)(iii)). The average HFC consumption in the refrigeration servicing sector during the baseline years in Peru was 889.42 mt, or 2,170,176 CO₂-eq tonnes. UNDP estimated the funding for stage I of the country's KIP by multiplying 10 per cent of the average HFC consumption in all sectors during the baseline years in mt (894.84 mt) by US \$5.10/kg, for a total of around US \$455,000, plus 10 per cent for project coordination and monitoring (US \$45,500) (grand total of US \$500,500). However, this methodology does not address all the tonnage needed to achieve a 10 per cent reduction from the baseline, only the HFC consumption portion. In addition, it includes in the cost calculation the consumption in the firefighting sector, which is not being addressed under stage I.

56. The Secretariat calculated the cost of stage I of the KIP using the methodology for converting US \$/kg to US \$/CO₂-eq tonne in the servicing sector described in annex I of document 92/46.¹⁰ With an HFC consumption baseline of 2,735,721 CO₂-eq tonnes, a 10 per cent reduction from the baseline is 273,572.10 CO₂-eq tonnes. To determine the cost of reducing 273,572.10 CO₂-eq tonnes in the servicing sector at US \$5.10/kg, the Secretariat converted this consumption to mt using the average GWP of the HFC consumption in the servicing sector in baseline years (HFC consumption in servicing in CO₂-eq tonnes (2,170,176 CO₂-eq tonnes) divided by HFC consumption in servicing in mt (889.42 mt)). The average GWP obtained was 2,440 and the tonnage required to be phased out to reach the 10 per cent reduction is 112.12 mt (or 22.64 mt additional to the amount addressed in the proposal as submitted).

57. The cost of phasing out 112.12 mt at US \$5.10/kg is US \$571,816. By adding the project coordination and monitoring costs, following the approach used for the HPMPs for non-low-volume-consuming (LVC) countries,¹¹ the total cost of stage I of the KIP (without agency support costs) is US \$628,998, as presented in table 6.

¹⁰ Paper on the starting point for sustained aggregate reductions based on discussions at the 91st meeting in the contact group on the cost guidelines for the phase-down of HFCs (decision 91/64(a)).

¹¹ The assistance provided under the Multilateral Fund for the implementation of HPMP stages includes, in addition to the funded reductions, a budget for project coordination and monitoring, amounting to between 5 and 10 per cent of the cost of the stage, based on the size and characteristics of the country.

Table 6. Cost calculation for stage I of the KIP for Peru

<i>HFC consumption in Peru</i>		
Established HFC consumption baseline	CO ₂ -eq tonnes	2,735,721
Average HFC consumption in the servicing sector in baseline years	mt	889.42
	CO ₂ -eq tonnes	2,170,176
Average GWP of HFC consumption in the servicing sector		2,440
<i>Reduction target stage I of the KIP</i>		
10 per cent reduction from the HFC baseline	CO ₂ -eq tonnes	273,572
	mt	112.12
<i>Cost of stage I of the KIP (servicing sector)</i>		
Agreed cost-effectiveness threshold	US \$/kg	5.10
Cost of reducing 112.12 mt at US \$5.10/kg	US \$	571,816
Project coordination and monitoring costs (10% of total cost of stage I)	US \$	57,182
Total project cost	US \$	628,998

58. The Secretariat considers that this methodology ensures equal treatment of non-LVC countries, as each country will receive US \$5.10/kg and address 10 per cent of its baseline in CO₂-eq tonnes. With this approach, countries will have flexibility to phase out or phase in selected HFCs based on national circumstances, as long as their total HFC consumption in CO₂-eq tonnes is 10 per cent below the baseline by 2029. The tonnage addressed, amounting to 273,572 CO₂-eq tonnes in the case of Peru, will be deducted from the starting point once the latter is agreed by the Executive Committee.

59. Upon discussion, UNDP revised its proposal for Peru, using the values calculated by the Secretariat to ensure that all tonnage to be reduced in stage I was addressed. While the strategy and the main components of stage I were maintained, the revised proposal expanded the scope of several of the key activities proposed under stage I, including *inter alia* additional workshops for customs officers on the new harmonized code system, two additional workshops for trainers and two additional workshops for technicians on the safe handling on HCs including additional awareness materials, increase in the number tool kits in the MAC sector from 15 to 20, additional assistance to the two enterprises that will design and test HC-based cold rooms, and an increased number of visits to beneficiary enterprises and training institutes and monitoring meetings with key stakeholders. All activities are reflected in table 5.

60. Stage I of the KIP will include three tranches, the first two tranches, to be released in 2023 and in 2026, at 45 per cent of the total value of the stage each, and the last tranche, to be released in 2029, at a 10 per cent value of the stage. The implementation plan for the first tranche, as agreed, is discussed in paragraph 43.

Impact on the climate

61. The activities proposed, including efforts to promote low-GWP alternatives, refrigerant recovery and reuse, and good servicing practices, indicate that the implementation of stage I of the KIP will reduce refrigerant emissions into the atmosphere, resulting in climate benefits. A calculation of the impact on the climate of the activities in the KIP indicates that Peru will have achieved an annual emission reduction of 273,572 CO₂-eq tonnes of HFC when the final target in stage I of the KIP is achieved, calculated as the difference between the HFC baseline and the final target set in stage I.

Sustainability of the HFC phase-down and assessment of risks

62. The commitments and activities of stage I of the KIP will be sustained over time with the implementation and strengthening of the licensing and quota system for HFCs; the development of policies, standards and a regulatory framework, as well as provision of training, awareness-building and incentives for the safe adoption and use of low-GWP alternatives; development of activities and projects aimed at reducing atmospheric emissions of HFCs in use; and continuous monitoring of all implemented activities.

63. Potential risks to the timely implementation of activities include delays in the procurement of equipment and tools, which will be addressed by planning procurement in advance while making use of UNDP's regional long-term agreement to facilitate and speed up the process, and by conducting regular meetings and following up with decision makers to maintain the political will and expedite decisions. The risk of low market availability of alternative technologies will be addressed by searching for suppliers in the course of field visits, fairs, and technical training, to ensure an ample offer of tools and equipment.

2023-2025 business plan of the Multilateral Fund

64. UNDP is requesting US \$628,998, plus agency support costs, for the implementation of stage I of the KIP for Peru. The total value of US \$302,960 including agency support costs, requested for the period 2023–2025, is US \$188,835 above the amount in the business plan.

Draft Agreement

65. A draft Agreement between the Government of Peru 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.

66. If the Executive Committee so wishes, the funds for stage I of the KIP for Peru 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

67. The Executive Committee may wish to consider:

- (a) Approving, in principle, stage I of the Kigali HFC implementation plan (KIP) for Peru for the period 2023-2029 to reduce HFC consumption by 10 per cent of the country's baseline in 2029, in the amount of US \$628,998, plus agency support costs of US \$44,030 for UNDP, as reflected in the schedule contained in annex I of the present document;
- (b) Noting:
 - (i) That the Government of Peru 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, the 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 a project to phase out HFC contained in imported pre-blended polyols in the polyurethane foam sector in Peru would be subject to the Executive Committee consideration on whether it will fund the phase-out of HFCs contained in imported pre-blended polyols;

- (v) That upon completion of the end-user technology demonstration project in the commercial refrigeration sector 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 Peru, and the corresponding tranche implementation plan, in the amount of US \$283,140, plus agency support costs of US \$19,820 for UNDP; and
- (d) Requesting the Government of Peru, UNDP and the Secretariat to finalize the draft Agreement between the Government of Peru 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 PERU**

Kigali HFC implementation plan (stage I)

Row	Particulars	2023	2024	2025	2026	2027	2028	2029	Total
1.1	Montreal Protocol reduction schedule of Annex F substances (CO ₂ -eq tonnes)	n/a	2,735,721	2,735,721	2,735,721	2,735,721	2,735,721	2,462,149	n/a
1.2	Maximum allowable total consumption of Annex F substances (CO ₂ -eq tonnes)	n/a	2,735,721	2,735,721	2,735,721	2,735,721	2,735,721	2,462,149	n/a
2.1	Lead IA (UNDP) agreed funding (US \$)	283,140	0	0	283,140	0	0	62,718	628,998
2.2	Support costs for Lead IA (US \$)	19,820	0	0	19,820	0	0	4,390	44,030
3.1	Total agreed funding (US \$)	283,140	0	0	283,140	0	0	62,718	628,998
3.2	Total support costs (US \$)	19,820	0	0	19,820	0	0	4,390	44,030
3.3	Total agreed costs (US \$)	302,960	0	0	302,960	0	0	67,108	673,028

HCFC phase-out management plan (stages II and III)

Row	Particulars	2023	2024	2025	2026	2027	2028	2029	2030	Total
1.1	Montreal Protocol reduction schedule of Annex C, Group I substances (ODP tonnes)	17.47	17.47	8.74	8.74	8.74	8.74	8.74	0.00	n/a
1.2	Maximum allowable total consumption of Annex C, Group I substances (ODP tonnes)	17.47	17.47	8.74	TBD	TBD	TBD	TBD	0.00	n/a
2.1	Lead IA (UNDP) agreed funding (US \$)	0	0	116,700	TBD	TBD	TBD	TBD	TBD	TBD
2.2	Support costs for Lead IA (US \$)	0	0	8,169	TBD	TBD	TBD	TBD	TBD	TBD
2.3	Cooperating IA (UNEP) agreed funding (US \$)	0	0	20,800	TBD	TBD	TBD	TBD	TBD	TBD
2.4	Support costs for Cooperating IA (US \$)	0	0	2,704	TBD	TBD	TBD	TBD	TBD	TBD
3.1	Total agreed funding (US \$)	0	0	137,500	TBD	TBD	TBD	TBD	TBD	TBD
3.2	Total support costs (US \$)	0	0	10,873	TBD	TBD	TBD	TBD	TBD	TBD
3.3	Total agreed costs (US \$)	0	0	148,373	TBD	TBD	TBD	TBD	TBD	TBD

Annex II

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

Activities implemented under stage II of the HPMP	Cost (US \$)	No.	Activities planned for implementation under the KIP	Cost (US \$)	Total (US \$)
Strengthening of policies and legal framework to control HCFC consumption (update legal framework and train 160 customs officers)	59,000	1.1	Strengthening the legal framework and inter-institutional coordination for the promotion of public policies for the implementation of the Kigali Amendment	40,000	136,000
		1.2	Strengthening of customs officers in the control of HFC trade and training of customs officers (2 workshops)	37,000	
		1.3	Developing a gender mainstreaming and Social and Environmental Safeguards strategy	30,000	30,000
Adoption and implementation of safety standards/guidelines for flammable refrigerants	50,000				50,000
Strengthening of technical institutes (3 institutes)	125,000	2.1	Review and adapt the curriculum of the Ministry of Public Education's specialty of refrigeration and AC, with emphasis on HC refrigerants	20,000	205,000
		2.3	Strengthening education and technical training in Peru on the safe use of isobutane and propane in RAC system (7 workshops to RAC technicians on the use of HCs)	60,000	
Training programme for RAC technicians (40 trainers and 480 technicians trained in good practices)	124,000	2.2	Training of trainers programme in the MAC sector (4 workshops on HC for domestic and commercial refrigeration)	50,000	335,800
Good refrigeration practices in the use of low-GWP refrigerants (400 technicians trained in HC refrigerants, 35 tool kits)	161,800				
Certification system for technicians in the RAC sector (establish the system and certify 300 technicians)	99,000	2.4	Include the safe handling of HC as a refrigerant in the system of certification of labor competencies for technicians in the RAC maintenance sector	50,000	149,000
Implementation of refrigerant RRR centers (establish one reclaiming center, strengthen 5 R&R centers, train 700 technicians on RRR)	381,200				381,200
Promotion of alternatives for the reduction of HCFC consumption and the use of low-GWP refrigerants in key sectors: supermarkets and hotels (train 240 technicians and RAC end users in assessing technical, economic, and environmental feasibility of converting or replacing HCFC equipment)	100,000	3.1	End-user awareness-raising and training to promote and adopt energy-efficient low-GWP technologies	35,000	255,000
		3.2	Promotion of HC in the manufacture of cold rooms	80,000	
		4.1	Evaluation of the impact of good refrigeration practices on RAC service applied at end-user level	40,000	

Activities implemented under stage II of the HPMP	Cost (US \$)	No.	Activities planned for implementation under the KIP	Cost (US \$)	Total (US \$)
		4.2	MAC: Best practices in the management of refrigerant gases in the servicing of MAC equipment	69,816	69,816
		4.3.	MAC: Support for the reduction of HFCs in the MAC sector in Peru	60,000	60,000
Public awareness to promote HCFC phase-out (annual campaigns)	150,000				150,000
Subtotal	1,250,000		Subtotal	571,816	1,821,816
Project for coordination and management	125,000	5.1.	Project cost management and monitoring	57,182	182,182
Total cost of stage II of the HPMP	1,375,000		Total cost of stage I of the KIP	628,998	2,003,998