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

PROJECT PROPOSALS: COSTA RICA

This document consists of the comments and recommendation of the Secretariat on the following project proposals:

Phase-out

- | | | |
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| • HCFC phase-out management plan (stage II, third tranche) | UNDP | Blanket approval |
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Phase-down

- | | | |
|---|------|--------------------------|
| • Kigali HFC implementation plan (stage I, first tranche) | UNDP | Individual consideration |
|---|------|--------------------------|

Energy efficiency

- | | | |
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| • Pilot project to demonstrate a transcritical CO ₂ refrigeration system in a supermarket as a low-GWP energy-efficient technology in the context of HFC phase-down | UNDP | Individual consideration |
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¹ UNEP/OzL.Pro/ExCom/95/1

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS

Costa Rica

(I) PROJECT TITLE	AGENCY	MEETING APPROVED	CONTROL MEASURE
HCFC phase-out plan (stage II)	UNDP (lead)	84 th	97.5% phase-out by 2030

(II) LATEST ARTICLE 7 DATA (Annex C, Group I)	Year: 2023	3.84 ODP tonnes
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(III) LATEST COUNTRY PROGRAMME SECTORAL DATA (ODP tonnes)								Year: 2023	
Chemical	Aerosol	Foam	Fire-fighting	Refrigeration		Solvent	Process agent	Lab use	Total sector consumption
				Manufacturing	Servicing				
HCFC-22					3.26				3.26
HCFC-141b						0.67			0.67

(IV) CONSUMPTION DATA (ODP tonnes)			
2009-2010 baseline:	14.10	Starting point for sustained aggregate reductions:	32.19
CONSUMPTION ELIGIBLE FOR FUNDING			
Already approved:	31.84	Remaining:	0.35

(V) ENDORSED BUSINESS PLAN		2024	2025	2026	Total
UNDP	ODS phase-out (ODP tonnes)	2.54	0.00	0.00	2.54
	Funding (US \$)	407,424*	0	0	407,424

*Including US \$91,560 for additional activities to maintain energy efficiency (decision 89/6)

(VI) PROJECT DATA			2019	2020	2021	2022*	2023	2024*	2025-2026	2027	2028-2029	2030	Total
Montreal Protocol consumption limits			12.69	9.17	9.17	9.17	9.17	9.17	4.58	4.58	4.58	0.35	n/a
Maximum allowable consumption (ODP tonnes)			12.69	9.17	9.17	9.17	9.17	9.17	4.58	4.58	4.58	0.35	n/a
Projects costs requested in principle (US\$)	UNDP	Project costs	187,777	0	385,750	0	0	415,200	0	126,450	0	104,000	1,219,177
		Support costs	13,144	0	27,003	0	0	29,064	0	8,852	0	7,280	85,343
Funds approved by ExCom (US \$)		Project costs	187,777	0	0	385,750	0	0	0	0	0	0	573,527
		Support costs	13,144	0	0	27,003	0	0	0	0	0	0	40,147
Total funds requested for approval at this meeting (US\$)		Project costs						415,200					415,200
		Support costs						29,064					29,064

* Funding for 2024 includes US \$120,000, plus agency support costs of US \$8,400, for additional activities to maintain energy efficiency (decision 89/6)

Secretariat's recommendation:	Blanket approval
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PROJECT DESCRIPTION

1. On behalf of the Government of Costa Rica, UNDP, as the designated implementing agency, has submitted a request for funding for the third tranche of stage II of the HCFC phase-out management plan (HPMP), in the amount of US \$415,200, plus agency support costs of US \$29,064.² The submission includes a progress report on the implementation of the second tranche, the verification report on HCFC consumption for 2017 to 2023 and a request for funding additional activities to maintain energy efficiency in the refrigeration servicing sector,³ and the tranche implementation plan for 2025 to 2027.

Report on HCFC consumption

2. The Government of Costa Rica reported a consumption of 3.84 ODP tonnes of HCFCs in 2023, which is 73 per cent below the country's HCFC baseline for compliance. The 2019-2023 HCFC consumption is shown in table 1.

Table 1. HCFC consumption in Costa Rica (2019-2023 Article 7 data)

HCFC	2019	2020	2021	2022	2023	Baseline
Metric tonnes (mt)						
HCFC-22	92.62	58.24	48.78	57.45	57.60	181.88
HCFC-123	0.00	0.00	0.00	0.00	0.00	0.36
HCFC-124	0.00	0.00	0.00	0.00	0.00	3.95
HCFC-141b	10.88	^a 7.65	5.47	6.11	6.11	32.59
HCFC-142b	0.00	0.00	0.00	0.00	0.00	6.17
(Sub-total / Total) (mt)	103.84	65.89	54.25	63.56	63.71	224.94
HCFC-141b in imported pre-blended polyols*	3.31	0.86	0.00	0.00	0.00	164.64**
ODP tonnes						
HCFC-22	5.09	3.20	2.68	3.16	3.17	10
HCFC-123	0.00	0.00	0.00	0.00	0.00	0.01
HCFC-124	0.00	0.00	0.00	0.00	0.00	0.09
HCFC-141b	1.20	0.84	0.60	0.67	0.67	3.58
HCFC-142b	0.00	0.00	0.00	0.00	0.00	0.4
(Sub-total / Total) (ODP tonnes)	6.29	4.04	3.28	3.83	3.84	14.08
HCFC-141b in imported pre-blended polyols*	0.36	0.02	0.00	0.00	0.00	18.11**

* Country programme (CP) data

** Starting point established in the Agreement with the Executive Committee.

^a As verified, the amount is 6.79 mt which is being corrected. The revised A7 will be submitted in November 2024.

3. HCFC consumption has shown a decreasing trend since 2017, attributed to the implementation of the import licensing and quota system, as well as other activities related to the HPMP, such as the capacity building of customs officers and refrigeration technicians. Imports of HCFC-142b, HCFC-123, and HCFC-124 were banned as of 1 January 2020. Following a further reduction in 2020 and 2021 due to the COVID-19 pandemic, HCFC consumption has remained stable in 2022 and 2023. Imports of HCFC-141b contained in pre-blended polyols ceased in 2021.

² As per the letter of 23 September 2024 from the Ministry of Environment and Energy of Costa Rica to UNDP.

³ In line with decision 89/6, low-volume-consuming countries can include in their HPMPs additional activities for the introduction of alternatives to HCFCs with low or zero global-warming potential and for maintaining energy efficiency in the refrigeration servicing sector.

Country programme implementation report

4. The Government of Costa Rica reported HCFC sector consumption data under the 2023 CP implementation report, which is largely consistent with the data reported under Article 7 of the Montreal Protocol. A small difference of 1.6 mt (0.09 ODP tonnes) between the two reports corresponds to HCFCs that were destroyed were properly accounted for in the Article 7 data. While mentioned in the CP report, this amount was not deducted from the HCFCs used in servicing. The country will resubmit a corrected CP report in November 2024.

Verification report

5. The verification report confirmed that the Government is implementing a licensing and quota system for HCFC imports and exports, which has ensured that HCFC consumption between 2017 and 2023 remained below the maximum allowable consumption specified in the Agreement between the Government and the Executive Committee. The verification also concluded that there is good interagency communication for monitoring HCFC imports, and that in 2021, the Costa Rican Government improved the electronic system (VUCE 2.0) to allow for more efficient management of import authorizations.

6. The verification identified a few minor differences between the CP and Article 7 reports associated with the reporting of HCFC-141b pure and contained in imported pre-blended polyols as well as the recording of HCFC destruction. It recommended the correction and resubmission of the CP report for 2017, and the Article 7 reports for 2020 and 2021. These differences represent around one per cent of the total consumption. The Government of Costa Rica confirmed it will resubmit these reports in November 2024.

Progress report on the implementation of the second tranche of stage II of the HCFC phase-out management plan

Legal framework

7. During the reporting period the Government of Costa Rica continued to implement its licensing and quota system for the import and export of ODS (including HCFCs and HFCs) and ODS-containing equipment. Two customs' laboratories were equipped with supplies and spare parts for refrigerant identification tests. Imports of HCFC-142b, HCFC-123 and HCFC-124 and HCFC-based equipment have been banned since 1 January 2020.

Polyurethane foam manufacturing sector

8. The second tranche included the project at Refrigeración Omega S.A. (Omega) to replace the use of 6.24 mt (0.69 ODP tonnes) of HCFC-141b contained in imported pre-blended polyols with HFO-1233zd(E) in the manufacturing of polyurethane (PU) foam panels for commercial refrigerators. Omega, in conjunction with a systems house, concluded the testing of HFO-1233zd(E)-based formulations and adopted the alternative in its manufacturing process in November 2023. While no imports of HCFC-141b in pre-blended polyols have occurred since 2021 and imports are prohibited since 2022,⁴ the executive decree to support the ban is still being drafted and is expected to be completed in 2025.

Refrigeration servicing sector

9. The following activities were implemented during the reporting period:

- (a) *Promotion of good servicing practices:* A total of 101 technicians (including 29 women)

⁴ Regulation 37614 on the licensing and quota system establishes that a controlled substance that has not been imported for one year automatically becomes prohibited for the following year. To implement this ban, the NOU must request a technical note from the Customs Department.

received training on good servicing practices, including recovery, recycling, and reclamation (RRR), the use of nitrogen as an alternative cleaning agent to HCFC-141b, and the handling flammable refrigerants; and six technical tours were conducted with 151 students from technical colleges (including 37 women) to study the operation of refrigeration and air-conditioning (RAC) systems in the country that utilize low-global-warming-potential (GWP) refrigerants;

- (b) *Developing a certification system for RAC servicing:* A total of 907 RAC technicians (including 31 women) have received a card demonstrating that they received training on good servicing practices; the technician certification programme is under development for implementation in 2026;
- (c) *Strengthening of formal education in technical institutes:* Seven technical institutions providing courses in RAC received equipment and tools⁵ to strengthen their capacities to provide training on good servicing practices and the handling of low-GWP alternatives;
- (d) *Strengthening the RRR network:* Training on RRR was provided along with the training in good servicing practices; two enterprises have been identified to become recovery and recycling centres, and one enterprise was identified to become a refrigerant reclamation centre; two new enterprises were incorporated into the management and final disposal of waste refrigerants and 6,110 kg of refrigerant was destroyed;
- (e) *Promoting low-GWP alternatives in supermarkets and hotels:* In cooperation with the National Chamber of Retailers and Allied Trade (CANCODEA), awareness was raised on HCFC alternatives among retailers, and eight supermarkets have been identified as potential beneficiaries for a pilot demonstration on the use of energy-efficient low-GWP technology in one or two stores; RAC technicians working in the hotel sector received training on alternative refrigerants and a demonstration of an R-290-based system in the hotel sector was planned; however, due to limited availability of equipment, a demonstration of an HFC-32-based system was implemented as a temporary transitional option;
- (f) *Phasing out the use of HCFC-141b in the cleaning of RAC equipment:* Training on the use of nitrogen as an alternative cleaning agent was provided along with the training in good servicing practices; however, the acquisition of 20 nitrogen kits has not been completed yet due to conditions imposed by the distributors for the acquisition of nitrogen cylinders; and
- (g) *Public awareness-raising activities on HCFC phase-out:* Twenty-eight awareness-raising events related to the Montreal Protocol control measures and reduction schedules for HCFCs and HFCs were held for a total of 1,386 participants (including 694 women) from the private sector, public institutions and non-governmental organizations; information material on good servicing practices and low-GWP alternatives was prepared and distributed in 60 RAC workshops; and presentations on sustainable RAC equipment were given at several technical seminars organized in the RAC sector, for a total of 314 participants; and an event was organized with four women to present their experience in leading roles in the RAC sector to 345 women both in-person and online.

⁵ Including hand tool for pipe machining, hand tool for RAC system mechanics, equipment and tools for the application of good practices and refrigerant handling and an electrical diagnostic tool.

Project implementation and monitoring

10. Of the funds approved for project monitoring in the first and second tranches, US \$30,374 was disbursed on a project coordinator and local consultants (US \$26,000), meetings with main stakeholders, and the preparation of the annual implementation plan and tranche implementation report (US \$4,374).

Level of fund disbursement

11. As of October 2024, of the US \$573,527 approved so far, US \$348,218 had been disbursed, as shown in table 2. The balance of US \$225,309 will be disbursed during the third tranche.

Table 2. Financial report of stage II of the HPMP for Costa Rica (US \$)

Funding tranche	Funds approved	Funds disbursed	Disbursement rate (%)	Fund balance
First tranche	187,777	187,777	100	0
Second tranche	385,750	160,441	42	225,309
Total	573,527	348,218	61	225,309

Implementation plan for the third tranche of stage II of the HCFC phase-out management plan

12. The following activities will be implemented between January 2025 and December 2027:

- (a) *Strengthening the legal and institutional framework to control HCFCs:* Assignment of a technical note from the Customs Department to the tariff item to implement the ban on the importation of HCFC-141b contained in pre-blended polyols; 10 awareness-raising events and production of information materials on the legal framework for achieving total HCFC phase-out (US \$23,000);
- (b) *Promoting good servicing practices:* Training on good servicing practices and the handling of flammable refrigerants for 40 instructors and 100 RAC servicing technicians (US \$25,000);
- (c) *Developing a certification system for RAC servicing:* Continue consultations and the development of procedures and requirements for the implementation of the technician certification programme; conduct seven awareness workshops to promote the certification of RAC technicians (US \$35,000);
- (d) *Strengthening formal education in technical institutes:* Complete the acquisition and delivery of equipment and tools for the last two technical institutions and conduct two follow-up visits per year to each of the nine centres (US \$20,000);
- (e) *Strengthening the refrigerant recovery, recycling and reclamation (RRR) network:* One training workshop for 40 instructors on recovery and recycling; development of a business model for establishing the recovery and reclaim scheme at the country-level; operationalize two recovery and recycling centres at enterprises identified in the previous tranche including capacity building and procurement of equipment⁶ (i.e., refrigerant storage capacity and gas recycling equipment) and assessment of the need for technical support to strengthen the capacity of one reclamation centre (US \$55,100);
- (f) *Promoting low-GWP alternatives in supermarkets and hotels:* A demonstration project in

⁶ Regarding the refrigerant reclaim, recycling and recovery equipment proposed under the project, UNDP confirmed that the refrigerant reclaiming is only intended for receiving HCFCs.

coordination with CANACODEA to replace equipment at two retail businesses (e.g., a small supermarket) with more energy-efficient equipment based on low-GWP technology and monitor energy consumption to showcase savings in energy use; technical assistance to five hotels and two supermarket chains to create awareness about alternatives to HCFC-based RAC systems (US \$20,000);

- (g) *Phasing out the use of HCFC-141b in the cleaning of RAC equipment:* One training workshop for educators from technical institutions and five workshops for a total of 100 technicians on the use of alternative cleaning agent; procurement of 20 nitrogen kits or an alternative option to eliminate the use of HCFC-141b (US \$23,000);
- (h) *Public awareness-raising activities on HCFC phase-out:* Ten awareness-raising activities and the preparation of information materials (US \$32,100);
- (i) *Activities to maintain energy efficiency:* These activities are described in detail in the following section (US \$120,000); and
- (j) *Project implementation and monitoring:* (US \$62,000) Activities to be conducted include employing consultant/staff (US \$62,000), conducting meetings with stakeholders, and travel (balance from previous tranche).

Activities to maintain energy efficiency in the refrigeration servicing sector

13. The project aims to promote the market acceptance of low-GWP technologies (R-290) in the commercial refrigeration subsector (i.e., cold rooms) through technology demonstrations and to collect information related to energy efficiency for the development of minimum energy efficiency standards (MEPS) for cold rooms.

14. Costa Rica has identified important HCFC use in cold rooms within the food cold chain subsector, mainly in the commercial sector, which provide storage and marketing support for vegetables, dairy, and meat products. The Government of Costa Rica considers it important to introduce low-GWP technologies when phasing out the remaining HCFC consumption to avoid the introduction of HFCs and to demonstrate energy savings from more efficient equipment.

15. The project, submitted in line with decision 89/6, has been designed to promote the adoption of R-290-based refrigeration systems as alternatives to HFC and HCFC-based systems. This project aims to support the elimination of HCFC-22 and a gradual decrease of R-404A, which is the main refrigerant used in cold rooms.

16. The project aims to support the replacement of HCFC-based refrigeration units in three cold rooms with R-290-based units, among CANACODEA members. Energy consumption will be measured and compared with other similar systems using HCFC-22 or HFC refrigerants. The results will be disseminated to members and other end users and training will be provided for 30 service technicians serving this type of system.

17. The National Energy Efficiency Plan of Costa Rica (MINAE, 2019), currently in implementation, has as one of its strategic objectives to increase the energy efficiency of equipment, including domestic refrigeration, commercial refrigeration and air conditioners.

18. The description and proposed cost breakdown of activities to maintain energy efficiency in the sector include:

- (a) *Demonstration project:* Design of three energy-efficient R-290-based cold rooms;

procurement of insulation panels, tools, equipment, materials, and consumables, as well as R-290 leak detectors and sensors, cooling system analyzers; installation, testing, and trials (US \$75,600);

- (b) *Training and dissemination:* One training workshop for 30 technicians and cold room operators; one awareness-raising workshop and production of information materials (US \$24,400); and
- (c) *Project implementation:* National and international consultants to support the implementation of the project, technology selection, monitoring of performance and energy consumption of the installed equipment, and training (US \$20,000).

19. Once the R-290-based cold rooms are operational, a comparative analysis of the performance and energy consumption against cold rooms using R-404A or HCFC-22 of similar capacity and refrigeration conditions provided by the beneficiary company will be carried out. Benchmarking parameters may include energy consumption, ambient temperature, condensing and evaporating temperature and pressure, load volume, door opening numbers, maintenance control and cold room characterization. Information will be collected for the development of MEPS in the cold room subsector.

20. The project will be implemented over 36 months. The demonstrated technologies will provide alternatives for the phase-out of HCFC-22 and HFCs, with the potential of phasing-out HCFC consumption in the entire cold room subsector as well as increasing the replacement of HFC-based installations.

21. The cost of selecting the beneficiary enterprise, comparative analysis and evaluation, and collection of data for developing MEPS in cold rooms will be provided by the Government of Costa Rica as co-funding.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

Progress report on the implementation of the second tranche of stage II of the HCFC phase-out management plan

Legal framework

22. The Government of Costa Rica has established the HCFC import quota for 2024 at 65.32 mt (3.93 ODP tonnes), which is lower than the Montreal Protocol control targets and the maximum allowable consumption under the country's Agreement with the Executive Committee.

Manufacturing sector

23. Noting the concerns in the region about the price and availability of low-GWP alternatives, the Secretariat followed up on whether the enterprise Omega, which completed its conversion to HFO-1233zd(E) in 2023, continues to use this alternative blowing agent on a permanent basis for the manufacturing of foam in commercial refrigeration equipment. UNDP confirmed that this is the case and that the enterprise will continue to do so as part of its agreement with the Government of Costa Rica. The enterprise imports HFOs in pre-blended polyols from a system house located in Panama and has not shortage in supply.

24. The Secretariat inquired about the reasons for not implementing a ban on the import of HCFC-141b contained in pre-blended polyols, as committed by the Government of Costa Rica upon completion of the conversion in foam sector. UNDP explained that Costa Rican legislation establishes that a controlled substance that has not been imported for a year will automatically be prohibited the following year.

HCFC-141b in pre-blended polyols has not been imported since 2021; thus, it is already prohibited according to the legislation. Additionally, in 2025 the national ozone unit (NOU) will request customs to complete the process to prohibit it through a technical note.

Refrigeration servicing sector

25. The Secretariat followed up with UNDP on the slow pace of implementation of the RRR project, noting that the relevant equipment and tools have not yet been provided to the beneficiaries. UNDP explained that two enterprises were identified to provide recovery and recycling services, and a third one was identified for providing reclamation services. During the third tranche, the reclamation centre and the two recovery and recycling centres will be equipped to start operations and a business model for self-sustained operation will be developed taking into account the experiences of other countries in Latin America.

26. Regarding the commercial limitations that prevented the procurement of 20 nitrogen kits for use as an alternative to HCFC-141b in cleaning refrigeration systems, UNDP explained that the nitrogen distribution enterprises require the project to cover the security deposit for the nitrogen cylinder and the payment of a monthly rental fee for the cylinder to be used by the workshops, which is not a viable condition for the project. A potential alternative to resolve the issue is for the project acquire nitrogen cylinders, under the specifications of one of the industrial gas distribution companies in Costa Rica, which could be provided to the 20 workshops included in the project at no cost. Another alternative is to provide a quantity (to be defined) of a biodegradable chemical cleaning agent to each workshop. UNDP informed that country would use one of these options for the phase-out of HCFC-141b, during the third tranche implementation.

Implementation plan for the third tranche of stage II of the HCFC phase-out management plan

27. The Secretariat requested UNDP to provide more details on the demonstration project under the tranche and how it differs from the project proposed under decision 89/6. UNDP explained that the project under the tranche would replace two HCFC-based self-contained commercial refrigeration units used by retailers, while the additional activities under decision 89/6 focus on cold rooms containing equipment with larger cooling capacity. The demonstration project under the tranche will also be implemented with CANACODEA, will measure performance and energy efficiency of the installed equipment against the HCFC-based equipment, and will make the project equipment available to the organization. CANACODEA will design a financing model to encourage the replication of the project by other retailers and will publish and promote the results of the demonstration through webinars, newsletters and other means. In line with decision 92/36(g), the Secretariat requested UNDP, upon completion of both demonstration projects, to submit a final report on their implementation, including the HCFC phase-out and energy-efficiency gains achieved.

Activities to maintain energy efficiency in the refrigeration servicing sector

28. In line with decision 89/6(d), UNDP has included in the tranche implementation plan the specific actions, performance indicators and funding associated with additional activities to maintain energy efficiency.

29. The Secretariat requested UNDP to elaborate on how this project will be implemented in cooperation with the relevant energy efficiency and standards bodies (including those in charge of MEPS) in the country and how this project is linked with the country's energy efficiency plan. UNDP explained that the project will be implemented by the NOU within the Directorate for Environmental Quality Management (DIGECA) and the Planning Secretariat of the Energy Subsector (SEPSE); both are within the Ministry of Environment and Energy (MINAE). This project is part of the national energy efficiency strategy, which will be coordinated between institutional entities and the regulated sector, with the support of UNDP and the project resources.

30. Regarding the demonstration, UNDP explained that the participants in the project will be CANACODEA associates, from small businesses, such as butcher shops, restaurants, ice cream parlors, and small supermarkets, that have a cold room between 12 and 18 m³ in size. So far, no cold rooms with R-290 have been identified in Costa Rica. The equipment to be installed will be R-290-based monobloc units to be funded by the project, while the beneficiary would cover the cost of installation and the adaptations to the structure of the cold room. The improvement in energy efficiency is estimated to be between 25 to 30 per cent from the baseline equipment. The results of the demonstration will be disseminated through the training activity included in the project and through ongoing HPMP training and awareness activities. UNDP estimates that upon completion of the project, this experience could be replicated in approximately 10 to 15 cold rooms at CANACODEA.

31. On inquiring about the linkage to MEPS in the country, UNDP informed that as many cold rooms use tailor-made equipment it may be challenging to standardize. Costa Rica will constitute a working group of manufacturers and assemblers of cold rooms, end users, and delegates from the energy directorate, the NOU, and academia specialized in energy efficiency to analyze experiences in both Article 5 and non-Article 5 countries. It is expected that in the 36 months duration of the project the foundations for the establishment of MEPS could be laid.

Gender policy implementation

32. In line with decisions 84/92(d), 90/48(c) and 92/40(b) the activities developed by the project have encouraged the participation of women, for example, in the training workshops and in the contracting of services, and gender disaggregated data has been collected. The project has promoted greater integration of women in technical education and has highlighted notable women working in the RAC sector. Multiple women are working in the Ozone Office and have collaborated in the implementation and supervision of the projects and activities aimed at phasing-out HCFCs.

Updated Agreement

33. In view of the inclusion of funding for additional activities to maintain energy efficiency in the commercial refrigeration sector, the Agreement between the Government of Costa Rica and the Executive Committee has been updated. Specifically, Appendix 2-A has been revised and paragraph 17 has been added to indicate that the updated Agreement supersedes that reached at the 84th meeting by decision 84/75, as contained in annex I to the present document. The full updated Agreement will be appended to the final report of the 95th meeting.

Sustainability of the HCFC phase-out and assessment of risks

34. Implementation of the licensing and quota system ensures that the import of HCFCs is controlled and monitored. The HCFC quota system is enforced, and a ban on the import of HCFC-based equipment is in place. Furthermore, the ban on imports of HCFC-141b contained in pre-blended polyol will ensure the sustainability of the phase-out of HCFCs in the PU foam sector. The new activities, including the pilot project to demonstrate low-GWP non-HCFC-based technology in the commercial refrigeration sector, in coordination with the relevant association, provide an opportunity to introduce new technologies, improve the capacity of the sector for handling new flammable refrigerants, and develop a system for financing the adoption of the technology by additional end users. The long-term sustainability of the RAC training is assured since good practices are included in the country's regular courses on refrigeration. Further the pilot project under 89/6 for cold rooms will allow the country to improve energy efficiency in the RAC sector while phasing out HCFCs. Together, the enforcement of the HCFC licensing and quota system, the regulations to ban HCFCs in the foam sector, the introduction of alternative technologies in the commercial refrigeration sector, and the continued training of servicing technicians and end users, will support the country in achieving the sustainable phase-out of HCFCs.

Conclusion

35. The Secretariat notes that the Government of Costa Rica is in compliance with the Montreal Protocol and its Agreement with the Executive Committee, that its 2023 HCFC consumption is 73 per cent below the baseline level, and that the country has established a well-designed license and quota system for HCFCs. The overall disbursement rate for the first and second tranche of stage II of the HPMP is 61 per cent, and activities under the second tranche are advancing with the development of legislation, training for trainers, and the procurement of equipment to strengthen the refrigeration training institutes. The activities planned under the third tranche will further strengthen the refrigeration servicing sector including recovery, recycling, and reclamation, and will ensure the long-term sustainability of stage II of the HPMP.

RECOMMENDATION

36. The Fund Secretariat recommends that the Executive Committee note:

- (a) The progress report on the implementation of the second tranche of stage II of the HCFC phase-out management plan (HPMP) for Costa Rica;
- (b) The submission of additional activities to maintain energy efficiency in the commercial refrigeration servicing sector in the amount of US \$120,000, plus agency support costs of US \$8,400, for UNDP;
- (c) That the Fund Secretariat has updated the Agreement between the Government of Costa Rica and the Executive Committee, as contained in annex I to the present document, specifically: Appendix 2-A, based on the inclusion of funding for additional activities to maintain energy efficiency in the commercial refrigeration servicing sector referred to in subparagraph (a)(ii) above; and paragraph 17 has been added to indicate that the updated Agreement supersedes that reached at the 84th meeting by decision 84/75;
- (d) That upon completion of the end-user demonstration projects, included in stage II of the HPMP, UNDP will submit final reports on their implementation in line with decision 92/36(g), including the HCFC phase-out and energy efficiency gains achieved; and

37. The Fund Secretariat further recommends blanket approval of the third tranche of stage II of the HPMP and the corresponding 2024-2027 tranche implementation plan for Costa Rica at the funding level shown in the table 3 below.

	Project title	Project funding (US \$)	Support costs (US \$)	Implementing agency
(a)	HCFC phase-out management plan (stage II, third tranche)	415,200	29,064	UNDP

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS

Costa Rica

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

LATEST ARTICLE 7 DATA (Annex F)	Year: 2023	830.45 mt	1,803,777 CO ₂ -eq tonnes
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SECTORAL HFC CONSUMPTION DATA (CO ₂ -eq tonnes) AND ACTIVITIES								
	Aerosol	Foam	Fire-fighting	AC and refrigeration		Servicing	Solvent	Other
				Manufacturing				
				Refrigeration	AC			
As submitted (2023)			1,873	40,451		1,540,012	*5,706	284,165
Latest CP report (2023)	290		1,873	40,451		1,472,595		**289,581
KIP stage I activities as agreed (Y/N)	N	N	N	***Y	N	Y	N	***Y

* Including aerosols, solvents and processing agents

** Including 5,416 CO₂-eq tonnes of HFC-152a used in the solvents sector and 284,165 CO₂-eq tonnes of R-404A and R-507A in the local installation and assembly sector.

*** Proposal includes a request for the local installation and assembly sector and a commitment to also eliminate a small amount of residual HFC consumption in the commercial manufacturing sector

AVERAGE 2020-2022 HFC CONSUMPTION IN SERVICING	450.25 mt	959,981 CO ₂ -eq tonnes
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BASELINE CONSUMPTION DATA (CO ₂ -eq tonnes)	2020	2021	2022	Average 2020-2022
HFC annual consumption	1,100,536	953,108	1,578,209	1,210,618
HCFC baseline (65%)				240,181
HFC baseline				1,450,799

HFC CONSUMPTION ELIGIBLE FOR FUNDING	
Starting point for sustained aggregate reductions	TBD
Previously approved HFC phase-down investment projects	No
Aggregate reductions from previously approved projects (CO ₂ -eq tonnes)	n/a

PROJECT DATA AS AGREED		2024*	2025	2026	2027	2028	2029	Total
Consumption (CO ₂ -eq tonnes)	Montreal Protocol limits	1,450,799	1,450,799	1,450,799	1,450,799	1,450,799	1,305,719	n/a
	Maximum allowable	1,450,799	1,450,799	1,450,799	1,450,799	1,450,799	1,305,719	n/a
	Maximum allowable (%)	100	100	100	100	100	90	n/a
Amounts recommended in principle (US \$)	UNDP	Project costs	370,968	0	0	247,312	0	618,280
		Support costs	46,807	0	0	31,204	0	78,011
	Total project costs		370,968	0	0	247,312	0	618,280
	Total support costs		46,807	0	0	31,204	0	78,011
	Total funds		414,775	0	0	278,516	0	696,291

* Recommended for approval at the present meeting

Reduction from remaining consumption eligible for funding stage I in CO ₂ -eq tonnes	211,395
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PROJECT DESCRIPTION

38. The present document contains the following sections:

- I. Summary of the proposal as submitted
- II. Background: Implementation status of the country's HCFC phase-out management
- III. HFC consumption: Overview of the country's HFC consumption levels, trends, and sectoral uses
- IV. Stage I of the Kigali HFC implementation plan, as submitted: Overarching strategy and plan of implementation for the first tranche
- V. Secretariat's comments, including the agreed cost of activities
- VI. Recommendation

I. Summary of the proposal as submitted

39. On behalf of the Government of Costa Rica, 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 \$743,380, plus agency support costs of US \$52,037, as originally submitted.⁷ In addition, UNDP submitted a pilot project to maintain and/or enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down (non-investment activities), which will be considered in paragraphs 116 to 139 below.

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

41. The first tranche of stage I of the KIP being requested at this meeting amounts to US \$446,028, plus agency support costs of US \$31,222 for UNDP, as originally submitted, for the period of December 2024 to December 2027.

II. Background

Status of implementation of the HCFC phase-out management plan

42. Table 3 presents information on the HPMP in Costa Rica as of November 2024.

Table 3. HPMP implementation status for Costa Rica

	Stage I	Stage II*
Meetings when HPMP was approved/updated	64 th /70 th	84 th
Reduction from baseline	35% by 2020	97.5% by -2030
Total project cost (US \$)	1,153,523	1,099,177
Date of completion (actual/planned)	31 December 2021	31 December 2031

* Updated Agreement is being considered at the present meeting to include additional energy efficiency-related activities under decision 89/6.

⁷ As per the letter of 20 August 2024 from the Ministry of Environment and Energy of Costa Rica to UNDP.

Status of implementation of previous HFC-related activities

43. Table 4 presents an overview of activities implemented in Costa Rica in the context of the Kigali Amendment that have been funded by the Multilateral Fund.

Table 4. Previously approved HFC-related activities in Costa Rica

Approval meeting	Project title	Implementing agency	Cost (US \$)	Date of completion
74	Survey of ODS alternatives	UNDP	70,000	February 2017
80	Enabling activities for HFC phase-down	UNDP	150,000	March 2020

III. HFC consumption overviewHFC consumption levels

44. Costa Rica only imports HFCs. The most consumed substances in 2023 were HFC-134a (42.1 per cent of total HFC consumption in metric tonnes (mt), or 27.7 per cent in CO₂-equivalent (CO₂-eq) tonnes), R-410A (22.8 per cent in mt or 21.9 per cent in CO₂-eq tonnes), R-404A (15.3 per cent in mt or 27.6 per cent in CO₂-eq tonnes), and R-507A (10.6 per cent in mt or 19.5 per cent in CO₂-eq tonnes). HFC-152a and other HFCs represent together only 9.2 per cent of the HFC consumption in mt and 3.3 per cent in CO₂-eq tonnes. Table 5 presents the country's HFC consumption as reported to the Ozone Secretariat under Article 7 of the Montreal Protocol.

Table 5. HFC consumption in Costa Rica (2019–2023 Article 7 data)*

HFC	GWP	2019	2020	2021	2022	2023
Metric tonnes (mt)						
HFC-134a	1430	244.82	233.05	201.29	323.41	349.29
HFC-152a	124	32.76	23.34	52.24	52.33	46.02
R-404A	3,922	73.51	87.09	70.13	109.00	126.9
R-410A	2087.5	108.67	70.49	58.66	119.63	189.36
R-507A	3985	47.91	61.75	56.56	101.08	88.17
Others**		19.43	15.53	18.45	14.87	30.63
Total (mt)		527.10	491.25	457.33	720.32	830.45
CO₂-eq tonnes						
HFC-134a	1,430	350,088	333,259	287,845	462,476	499,480
HFC-152a	124	4,063	2,894	6,478	6,489	5,706
R-404A	3,922	288,285	341,548	275,022	427,454	497,988
R-410A	2,088	226,840	147,144	122,453	249,728	395,283
R-507A	3,985	190,929	246,090	225,392	402,804	351,361
Others**		39,667	31,043	36,878	31,145	53,958
Total (CO₂-eq tonnes)		1,099,873	1,101,976	954,066	1,580,096	1,803,777

* Article 7 data was revised by the Ozone Secretariat during the preparation of this document to the following totals 2019: 1,098,992 CO₂-eq tonnes; 2020: 1,100,536 CO₂-eq tonnes; 2021: 953,108 CO₂-eq tonnes; and 2022: 1,578,209 CO₂-eq tonnes. The Secretariat did not have the revised breakdown of the Article 7 data at the time of posting.

** Including HFC-32, HFC-125, HFC-227ea, HFC-236fa, HFC-23, R-407C, R-407F, R-417A, R-422D, R-448A, R-449A, R-452A, R-508B, R-513A

Established HFC baseline

45. The Government of Costa Rica reported the Article 7 data for 2020-2022. The country's HFC consumption baseline was established at 1,450,799 CO₂-eq tonnes by adding 65 per cent of its HCFC baseline (expressed in CO₂-eq tonnes) to its average HFC consumption in 2020-2022, as shown in table 6.

Table 6. HFC baseline calculation for Costa Rica (CO₂-eq tonnes)

Baseline calculation components	2020	2021	2022
HFC annual consumption	1,100,536	953,108	1,578,209
HFC average consumption in 2020-2022	1,210,618		
HCFC baseline (65%)	240,181		
HFC baseline	1,450,799		

Country programme implementation report

46. The sectoral HFC consumption data provided by the Government of Costa Rica in its CP report for 2023 is largely consistent with the data reported under Article 7 of the Montreal Protocol. Small differences are due to exports that need to be deducted from the domestic use in the CP report. The Government of Costa Rica resubmitted the CP report in November 2024 with the corrected data.

HFC consumption trends

47. HFC consumption in Costa Rica decreased in 2020 and 2021 due to the COVID-19 pandemic, which caused a rise in the price of refrigerants and transport and a reduction in the demand for refrigeration servicing. In 2022, HFC consumption grew by 65 per cent, in CO₂-eq tonnes, above the 2021 level, followed by an additional increase of 14 per cent in 2023. While installed HFC-based equipment has been increasing due to the ban on imports of HCFC-22-based equipment in January 2020 and the relatively slow introduction of non-HFC alternatives in the country, HFC consumption growth in the last two years is mostly attributed to swift economic recovery. Specifically, in 2022, the price of refrigerants decreased by 60 per cent causing a steep increase in demand and imports to serve sectors that had been severely impacted by the pandemic, such as tourism.

HFC consumption by sector

48. HFCs are consumed mainly in the RAC servicing sector, based on the revised CP data received in November (84.4 per cent in mt and 82.3 per cent in CO₂-eq tonnes of total consumption), the local assembly and installation sector (8.6 per cent in mt and 15.2 per cent in CO₂-eq tonnes), and some small amounts in manufacturing of glass as a process agent (5.5 per cent in mt and 0.3 per cent in CO₂-eq tonnes), the manufacture of commercial refrigeration equipment (1.4 per cent in mt and 2.2 per cent in CO₂-eq tonnes), and in firefighting equipment (0.1 per cent in mt and in CO₂-eq tonnes).

49. In the service sector, HFCs are mainly consumed for servicing commercial refrigeration equipment, (17.8 per cent in mt and 24.7 per cent in CO₂-eq tonnes), followed by mobile air-conditioning (MAC) (28.3 per cent in mt and 18.1 per cent in CO₂-eq tonnes), transport refrigeration (14.8 per cent in mt and 17.3 per cent in CO₂-eq tonnes), commercial air-conditioning (AC) (18.4 per cent in mt and 17.0 per cent in CO₂-eq tonnes), and other applications, as shown in table 7. A detailed table with HFC consumption by substance and subsector, based on a survey of the RAC servicing subsectors and the revised CP data, is provided in annex II to the present document.

Table 7. Estimated sectoral distribution of HFC consumption in Costa Rica (2023)

Sector	Consumption				Most commonly consumed HFCs
	mt	Share (%)	CO ₂ -eq tonnes	Share (%)	
* Non-servicing (includes manufacturing and other sectors)					
Commercial refrigeration manufacturing	11.50	1.4	40,451	2.2	HFC-134a, R-507A
Local installation and assembly	72.02	8.6	284,165	15.2	R-404A, R-507A
Firefighting	0.49	0.1	1,873	0.1	HFC-125, HFC-227ea, HFC-236fa

Sector	Consumption				Most commonly consumed HFCs
	mt	Share (%)	CO ₂ -eq tonnes	Share (%)	
Process agent/solvent	46.02	5.5	5,706	0.3	HFC-152a
Subtotal non-servicing	130.0262	15.6	332,195	17.7	n/a
** Servicing sector					
Refrigeration servicing	294.98	35.4	844,310	45.1	HFC-134a, R-404A, R-507A, others
AC servicing	172.43	20.7	357,776	19.1	HFC-134a, R-404A, R-407C, R-410A, R-507A, others
MAC	236.32	28.3	337,943	18.1	HFC-134a
Subtotal servicing	703.73	84.4	1,540,029	82.3	n/a
Total for all sectors	833.76	100.0	1,872,224	100.0	n/a

* Amounts from the non-servicing sector are taken from revised CP data submitted in November 2024.

** Distribution of servicing consumption among subsectors is based on the HFC survey data.

Commercial refrigeration manufacturing

50. In Costa Rica, there is one enterprise, Omega, which manufactures commercial refrigeration units in moderate quantities. The enterprise has partially converted, with its own funds, from the use of HFC-134a to R-290 in the manufacture of self-contained units with a refrigerant charge below 150g. However, there is still some consumption of HFCs in refrigeration manufacturing in Omega. In 2023 it consumed 2.10 mt of HFC-134a and 9.40 mt of R-507A in the manufacturing of refrigeration units.

Local installation and assembly subsector

51. Costa Rica has a local assembly and installation subsector where RAC equipment is charged onsite (consisting of cold rooms, large commercial refrigeration). The local installation and assembly of new systems uses R-404A and R-507A and amounts to roughly 15.2 per cent of the country's HFC consumption in CO₂-eq tonnes. It is anticipated that without intervention, consumption would grow in this sector particularly for R-507A. One enterprise, Omega, carries out assembly, installation and charge onsite of commercial refrigeration systems. A project to reduce consumption in this sector has been included along with the KIP.

Process agent/solvent/aerosol applications

52. HFC-152a is used as a process agent in glass manufacturing, as a cleaning solvent for gum removal, and as aerosol control sprays for pet training. While the sectoral consumption of HFC-152a ranks fifth relative to other sectors in terms of mt, given its low-GWP (of 124), its total in CO₂-eq tonnes is less than 1 per cent of HFCs consumed in the country, and thus it is not prioritized in stage I of the KIP.

Firefighting applications

53. Less than 1 per cent of the total HFC consumption, in both mt and CO₂-eq tonnes, is consumed in the firefighting subsector. HFC-125 is the main substance consumed to serve firefighting applications, although some small quantities of HFC-227ea, or HFC-236fa are occasionally brought in for use in portable fire extinguishers.

Refrigeration and air-conditioning servicing sector

54. There are approximately 3,430 technicians (including 223 women) who have received formal training from educational institutes and work in the design, construction, installation and maintenance of RAC systems. Of these, 2,000 technicians have received a good servicing practices certificate. In Costa Rica, RAC technicians' education is mainly provided by three regional schools, eight schools under the

direction of the Ministry of Public Education and several private education institutions. Under the HPMP, several centres received training equipment and tools, including R-290-based air conditioners and R-600a-based refrigerators, but none of the institutions has training equipment for servicing industrial or commercial refrigeration, refrigerated transport, or MAC equipment operating with alternatives to HCFCs and HFCs.

55. Costa Rica developed a waste refrigerant collection system in cooperation with technical associations, training institutes, and three specialized waste management enterprises. Identified needs to ensure an efficient and safe network for the collection, recovery, recycling, and destruction of refrigerants include further strengthening of the refrigerant recovery and storage capacity, identification of additional waste management enterprises, procedures to implement extended responsibility of importers and distributors, and awareness activities.

Domestic, commercial, industrial and transport refrigeration servicing

56. Domestic refrigerators account for 1.3 per cent in mt and 1 per cent in CO₂-eq tonnes of the total HFC consumption. The subsector predominantly uses HFC-134a, but R-600a-based units have shown steady growth over the last decade, accounting for about 35 per cent of the inventory of equipment in 2023. Inadequate servicing practices have been observed in the service sector for domestic refrigerators with R-600a, as some technicians conduct substitutions of R-600a with HFC-134a, which can cause technological and environmental damage and reduce energy efficiency. Training in good practices for servicing R-600a-based equipment has been prioritized in the proposed activities.

57. The commercial refrigeration subsector has the highest consumption of HFCs among the subsectors in terms of CO₂-eq tonnes and the third largest in mt (primary HFCs consumed in this subsector include HFC-134a, R-404A, R-410A, and R-507A). The subsector comprises more than 57,900 enterprises in tourism, construction, health, services, finance, communications, and consists of 351,816 units of standalone equipment and 846 centralized systems units. Standalone equipment in the commercial subsector accounts for 8 per cent of the HFC consumption in the commercial refrigeration subsector both in mt and in CO₂-eq tonnes and uses mainly HFC-134a, and some smaller quantities of R-404A and R-507A. For centralized systems the servicing demand amounts to 92 per cent of the HFC consumption in the commercial refrigeration subsector in mt and is CO₂-eq tonnes and uses primarily R-404A and R-507A, and to a lesser extent HFC-134a and R-448A.

58. The industrial refrigeration subsector also relies on standalone refrigeration units and centralized systems and is made up of more than 10,188 enterprises in export-agriculture, food processing and storage, and manufacturing of electronic components, medical devices, and textiles. The consumption in this subsector amounted to 1.5 per cent in mt and 2.3 per cent in CO₂-eq tonnes of the total HFC consumption in 2023 primarily from centralized systems.

59. The refrigerated transport subsector consists of refrigerated containers (HFC-134a, R-404A and R-507A) used for import and export needs, and refrigerated trucks (HFC-134a, R-404A, R-507C, and R-452A) used domestically. The transport refrigeration subsector amounted to 14.8 per cent in mt and 17.3 per cent in CO₂-eq tonnes of the HFCs in the country in 2023.

Residential, commercial and industrial air-conditioning servicing

60. The consumption HFC in the air-conditioning servicing sector is 19.1 per cent which includes residential, commercial and industrial AC servicing. Under residential servicing, less than 4 per cent of households in Costa Rica have AC units, and HFC consumption in this sector amounts to roughly 1 per cent of total HFC consumption in mt and CO₂-eq tonnes. Existing residential AC equipment still relies

predominantly on HCFC-22 but there is increasing consumption of R-410A, and to a much lesser extent HFC-32.

61. The commercial AC subsector has the fourth highest consumption of HFCs in 2023 in CO₂-eq tonnes and third highest in mt (17 per cent of the HFC consumption in CO₂-eq tonnes). Commercial AC includes the tourism, construction, health, services, finance, communications, supermarket and public sectors. In the industrial subsector, the main users of AC consist of enterprises manufacturing electronics and in biotechnology; the industrial subsector accounted for roughly 1 per cent of HFC consumption in 2023, in both mt and CO₂-eq tonnes. Equipment in both subsectors consists of AC equipment and chillers. Refrigerants used in these subsectors are predominantly R-410A followed by HCFC-22, HFC-134a and R-407C, and small quantities of R-507A, R-404A, R-422D, and R-513A are consumed in chillers.

Mobile air-conditioning servicing

62. This subsector has the highest consumption of HFCs in mt and the second highest in CO₂-eq tonnes and was not assisted during the HPMP. It only uses HFC-134a and accounts for roughly 28.3 per cent of HFCs in mt and 18.1 per cent in CO₂-eq tonnes of the 2023 consumption. All vehicles in Costa Rica are imported, and there is no restriction on use based on longevity for private vehicles, only for public transport. There is an estimate of 150 MAC servicing workshops in the country and a portion of technicians can also provide home service. The dependence of the automotive sector on HFC-134a is expected to continue for some time, as only a negligible quantity of vehicles with HFO-1234yf are currently being imported; it is therefore necessary to ensure good servicing practices and recovery, recycling, and reuse of HFC-134a.

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

Institutional, policy and regulatory framework

63. Since 2010, Costa Rica has implemented a licensing system for the import of both HCFCs and HFCs. Under this system, the import of HFCs has been monitored since 2012 albeit without a limit on the annual amounts imported. Costa Rica ratified the Kigali Amendment of the Montreal Protocol on 23 May 2018.

64. A new regulation to strengthen the control of HFC imports by establishing annual quotas came into force on 1 January 2024, with the total annual HFC import quota based on the country's baseline. The quota system will include a procedure to reserve 12 per cent of the country's HFC baseline consumption to be administered by DIGECA, which could be used to grant quotas to new importers or to existing importers for emergency and critical uses of HFCs in addition to those already allocated. This regulation also provides for a mechanism to carry over remaining quotas in cases where an existing or new importer does not import the full amount of the allocated quota and defines the procedure for their distribution. These remaining quotas may also be used to replenish the reserve, when required, to guarantee the availability of HFCs in the market consistent with the compliance targets of the Montreal Protocol.

65. From January 2024, quotas are issued in aggregate in CO₂-eq tonnes and individual importers have the flexibility to import the substances as required, as long as they do not exceed their assigned quotas. An online system (TICA)⁸ was established to facilitate monitoring of ODS imports and other refrigerants (including HFCs) and cross-checking with quotas issued.

66. During the implementation of the HPMP, 18 national standards for refrigeration systems and heat pumps were revised or adopted to regulate the RAC service sector. The set of standards establishes requirements for the safety of persons and property; provides guidance for the protection of the environment; defines procedures for the operation, maintenance, and repair of refrigerating systems and the

⁸ Information Technology for Custom Control

recovery of refrigerants; adopts requirements for container cooling systems using flammable refrigerants regarding design, performance and servicing; and sets conditions for the design, installation and dismantling of closed circuit ammonia refrigeration systems, and commercial refrigeration appliances and ice-makers.

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

Overarching strategy

67. Stage I of the KIP in Costa Rica aims to meet the freeze in 2024 and the 10 per cent reduction from its HFC baseline consumption by 2029. Subsequent stages of the KIP will address the phase-down targets in 2035, 2040 and 2045.

Proposed reductions

68. The Government of Costa Rica and UNDP forecasted HFC consumption in an unconstrained scenario, as shown in table 8. The table includes the actual HFC consumption level for 2023, which became available after the forecast was made and is 22 per cent higher than initially anticipated.⁹ Table 8 shows that even without considering the growth in HFCs in 2023, forecasted HFCs consumption levels between 2024 and 2029 exceed the control targets, posing a risk of non-compliance.

Table 8. HFC consumption forecast under unconstrained scenario, Montreal Protocol limits and proposed HFC reductions under stage I (CO₂-eq tonnes)

	2023*	2024	2025	2026	2027	2028	2029
HFC consumption forecast **	1,803,777	1,529,572	1,584,542	1,641,487	1,700,479	1,734,778	1,769,770
Montreal Protocol HFC consumption limits	n/a	1,450,799	1,450,799	1,450,799	1,450,799	1,450,799	1,305,719
Proposed HFC consumption under the KIP	n/a	1,450,799	1,450,799	1,450,799	1,450,799	1,450,799	1,305,719
Proposed reduction in HFC consumption from baseline (%)	n/a	0	0	0	0	0	10

* As per Article 7 data but the initial model projected consumption of only 1,474,075 CO₂-eq tonnes

** Based on the data provided the Secretariat noted that the average growth in HFC consumption from 2024 to 2027 was 3.6 per cent on average and slowing to 2 per cent on average until 2029.

69. Noting that HFC consumption levels in 2022 and 2023 were already 8.8 and 24.3 per cent above the baseline and on a growing trend, an effective application of the HFC import quota from 1 January 2024 onwards is required ensure compliance with the freeze, followed by the activities described below. Stage I of the KIP proposes to reduce HFC consumption in the country to the freeze level in 2024 and to reduce it by 10 per cent of the baseline by 2029.

Proposed activities

70. Stage I of the KIP includes the conversion of the remaining manufacturing of HFC-based stand alone commercial refrigeration units to R-290; the promotion of the use of low-GWP alternatives in the local assembly and installation sector; and activities in the refrigeration servicing sector aimed at reducing the demand for high-GWP HFCs, facilitate the use of medium-GWP alternatives as a transition in some applications in the commercial refrigeration sector, and support the safe introduction, installation and maintenance of RAC equipment based on low-GWP technologies with equal or enhanced energy efficiency.

⁹ The original forecasted HFC consumption for 2023 was 1,474,075.

Project to phase-out HFCs in the manufacturing of commercial refrigeration and to provide technical assistance to the local installation and assembly and installation subsector

71. Omega is a 100 per cent Costa Rican-owned enterprise using HFCs since June 2007. It is currently the only commercial refrigeration manufacturer with an average production of 2,000 units per year. Omega manufactures self-contained commercial refrigeration equipment with R-290 that is charged and sealed in the plant. Other commercial refrigeration equipment is charged with high HFCs either in the plant or on site. Omega imports parts and components for the local market and is the distributor for an important number of local installers in the small commercial refrigeration sector. In many cases, Omega also provides the system design for the installers. For larger units (including condensing units and centralized systems) Omega manufactures some of the components such as condensing and evaporator units of different sizes in the plant, to be subsequently assembled and installed on site, where final refrigerant charging takes place. There are fourteen enterprises which are responsible for undertaking this final process.

72. The project aims to eliminate the use of high and medium GWP HFCs in new commercial refrigeration equipment below 5 HP (self-contained, cold rooms etc.) and consists of the following two components:

- (a) *Manufacturing*: Conversion of the remaining consumption of 2.10 mt (3,000 CO₂-eq tonnes) of HFC-134a to R-290-based technology in the manufacturing of commercial refrigeration equipment with refrigerant charge above 150g at the enterprise Omega, which includes the provision of a refrigerant charging station to handle flammable refrigerant;
- (b) *Local installation and assembly*: Phase-out the consumption of 7 mt (27,451 CO₂-eq tonnes) of R-404A and 9 mt (35,865 CO₂-eq tonnes) of R-507A¹⁰ by 14 local assembly and installation enterprises associated with Omega. The project includes:
 - (i) Provision of equipment to the 14 enterprises (mobile loading station with pressure and vacuum measurement system, and recovery or transfer system and vacuum and scale);
 - (ii) Provision of technical assistance to the 14 enterprises on the design and installation of commercial refrigeration equipment based on refrigerants with low-GWP for stand-alone units and R-290-based refrigeration units with capacity of 2 to 5 HP, chillers and cold rooms;
 - (iii) Support for the transition of the assembly and installation subsector to HFC-free low-GWP technologies by the adoption of technical standards required for the safe handling of flammable refrigerants and provision of training; and
 - (iv) Demonstration of the assembly, installation and first charge of the refrigeration systems of a small shop or supermarket (below 450 m² commercial area) with flammable refrigerants and dissemination of the results obtained.

73. The associated costs are shown in table 9 below.

Table 9. Costs for the commercial manufacturing and local installation and assembly project

Project component	Activities	Cost (US \$)
Equipment and safety assessment	Omega: Charging machine including bottle rack and gas sensors and safety assessment	75,000

¹⁰ 16 per cent of the R-404A and 33 per cent of the R-507A consumption reported in this sector in the revised 2023 CP report

Project component	Activities	Cost (US \$)
	Local installation and assembly enterprises (14): - Mobile loading station with pressure and vacuum measurement system, and recovery or transfer system and vacuum and scale - Equipment to measure the performance of the installed system - Portable leak detectors	70,000 14,000 2,800
	Subtotal	161,800
Technical capacity building for assembly and installation of commercial refrigeration systems below 5 HP using low-GWP refrigerants	Technical assistance and training to the beneficiary enterprises on design/thermal load software, compressor and coil selection, for three types of refrigeration systems based on R-290	36,000
	Development of safety evaluation tests for R-290 based refrigeration systems designed with R-290	30,000
	Technical advice to ensure the safe-handling and performance of the refrigeration systems (e.g., remotes and condensing units with R-290 refrigerant) during assembly and installation (ISO5149 -1 and 3)	14,000
	Subtotal	80,000
Support to the transition of the subsector to low-GWP technologies	Support the revision or adoption of international or regional technical standards (i.e., ISO-5149, EN-378, IEC-60035-2-89)	4,000
	Develop and deliver 10 training activities for the safe handling of low-GWP refrigerants in the assembly and installation of commercial refrigeration systems	15,000
	Subtotal	19,000
Demonstration of the technology and dissemination	Assemble and install three refrigeration systems designed with hydrocarbon refrigerant in a small shop or supermarket (max. 450 m ² commercial area)	45,000
	Provision of an energy consumption meter and development of an energy consumption test to compare the environmental impact of the baseline and alternative technologies	6,000
	Two dissemination activities targeting the country's supermarkets on the results achieved in the project	4,000
	Subtotal	55,000
Total for project in the assembly and installation subsector		315,800

Activities in the servicing sector

74. The costs and activities for servicing sector activities are described in table 10 and, as originally submitted:

Table 10. Activities to be implemented in the servicing sector under stage I of the KIP

Project component	Activities	Cost for stage (US \$)
Building national capacity in support of the Kigali Amendment	Strengthening HFC regulatory framework on Kigali Amendment in Costa Rica: - Awareness-raising and at least two training sessions for institutions on legal measures to control and reduce ODS emissions and consumption - Regulatory review, adjustment and impact assessment including adjusting the regulatory measure to control HFCs as of 1 January 2030 - Stakeholder consultations on regulatory updates and preparation of information materials on the regulatory framework	50,000
	Supporting the control of HFCs including: - Three training course for 45 customs officers and stakeholders on relevant topics to control the trade of HFCs - Three courses for 45 brokers and importers - National and international consultants to assist with harmonizing customs codes, and strengthening the legal framework, quota and licensing systems	30,000

Project component	Activities	Cost for stage (US \$)
	Certification of technicians in safe handling of low-GWP refrigerants - Three meetings with RAC sector stakeholders - Development of labour competence standards for evaluation - Development of an implementation plan with certification bodies and promotion of labour competence standards - Three training workshops for the certification bodies and assessors - At least two annual awareness-raising activities including workshops to promote the certification - Certification of at least 100 technicians	50,000
	Dissemination and awareness-raising project	30,000
	Subtotal	160,000
Supporting good refrigerant management practices in critical sectors	Review and update of the RAC curriculum under the Ministry of Public Education based on the needs for the implementation of the Kigali Amendment	20,000
	Training for 14 trainers in the use and management of low-GWP refrigerants in RAC systems and energy-efficient technologies	20,000
	Strengthening good servicing practices in the MAC sector - Identification of 40 high-volume MAC workshops - Development of MAC servicing training materials - Five training courses for a total of 75 MAC technicians	30,000
	Subtotal	70,000
Implementation and expansion of recovery, recycling, and reclaim (RRR) capacities	Supporting the RRR network for HFCs in Costa Rica - Establishing two recovery and reclamation centres and provision of equipment - Equipping and training three groups of RAC technicians in recovery	35,000
	Recovery and recycling network in the MAC sector of Costa Rica - Assessment of equipment needs and acquisition and delivery of good practices tool kits to 25 MAC workshops - Establishing a national network for recovery and reuse of refrigerants in MAC systems	70,000
	Monitoring the operation of the RRR network in the MAC sector and the amount of HFC-134a recovered by each workshops	25,000
	Subtotal	130,000
Total for project in the servicing sector		360,000

Project implementation, coordination and monitoring

75. The monitoring activities will build upon the mechanisms established under the implementation of the HPMP, where the NOU monitors activities, reports progress and collaborates with stakeholders to phase out HFCs with the assistance of UNDP. A budget of US \$67,580 is requested calculated as 10 per cent of the cost of the two projects to cover two verification reports (US \$16,000), five annual meetings (US \$5,000), national consultants (US \$40,000), travel (US \$5,000) and supplies (US \$1,580).

Gender policy implementation

76. The government of Costa Rica wants to promote the inclusion of vulnerable groups in the framework of the Kigali Amendment to the Montreal Protocol through a special programme aimed at the RAC sector. Using the gender mainstreaming checklist, provided as guidance under decision 90/48(b), UNDP and the Government of Costa Rica have taken gender mainstreaming into consideration in the preparation of this project. In line with decision 94/40(b) the mandatory gender indicators will be monitored throughout project implementation.

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

77. The stage II of the HPMP is expected to be completed in 2031. Accordingly, the HPMP and stage I of the KIP will be jointly implemented between 2024 and 2030. Activities for the phase-down of HFCs were designed to be harmonized with the phase-out of HCFC consumption to the extent possible, by identifying opportunities for complementary efforts and avoiding duplication.

78. The proposed schedule of phase-down commitments and funding tranches under stage I of the KIP and the schedule of phase-out commitments and funding tranches under stage II of the HPMP are presented in annex III. Annex IV provides an overview of activities of stage II of the HPMP and stage I of the KIP (2024-2031), showing that activities planned under the KIP either avoid duplication of planned activities under the HPMP or are adding a new element or focus to complement the HPMP activities.

Total cost of stage I of the Kigali HFC implementation plan

79. The budget for stage I has been proposed at US \$743,380. Even though the level of HFC consumption in baseline years is above 360 mt (at 450.25 mt), the country opted to request funds for the refrigeration servicing sector at the funding level determined for low-volume-consuming countries (LVCs) with average HFC consumption in the servicing sector in the baseline years between 300 and 360 mt, in line with decision 92/37(c). In the absence of cost funding guidelines, the funding requested for activities in local installation and assembly sector is the best available estimate provided by UNDP.

80. The proposed activities and costs of stage I of the KIP are summarized in table 11.

Table 11. Proposed cost of activities to be implemented in stage I of the KIP for Costa Rica (US \$)

Project	Cost \$USD
RAC servicing sector	360,000
Manufacturing and assembly sector	315,800
Project monitoring cost	67,580
Total for stage I of the KIP	743,380

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

81. The first funding tranche of stage I of the KIP, in the total amount of US \$446,028, will be implemented between December 2024 and December 2027 and will include the following activities, as submitted, outlined in table 12 below:

Table 12. Activities to be implemented in the first tranche of stage I of the KIP

Project component	Activities	Cost in first tranche (US \$)
Project in the commercial manufacturing and assembly and installation subsector	-Procure equipment for the manufacturing component for Omega; -Procure equipment for eight local installation and assembly enterprises; - Support the revision or adoption of international or regional standards - Develop and deliver 10 training activities for the safe handling of low-GWP refrigerants in the assembly and installation of commercial refrigeration systems -Assemble and install one hydrocarbon-based refrigeration technology and provide energy consumption meter to assess energy consumption - One awareness-raising activity to disseminate results	189,480
Total in first tranche for project in assembly and installation subsector		189,480

Project component	Activities	Cost in first tranche (US \$)
Building national capacity in support of the Kigali Amendment	-One awareness-raising sessions for institutions on legal measures to control and reduce ODS emissions and consumption -Two training course for 15 customs officers each and stakeholders each on relevant topics to the control of HFC trade - Strengthen control through improvements to the licensing and quota system, customs registry system and updated harmonized customs code - Develop labour competence standards for evaluation - Development of an implementation plan with certification bodies and promotion of labour competence standard - Certify 60 technicians in safe handling of low GWP refrigerants - Two annual awareness-raising activities and workshops to promote the certification	96,000
<i>Subtotal</i>		<i>96,000</i>
Supporting good refrigerant management practices in critical sectors	Evaluate current RAC curriculum under the MEP; revise curriculum and define requirements for including low-GWP alternatives in revised curriculum	12,000
	One training for trainers for 14 trainers in the use and management of low-GWP refrigerants in RAC systems and energy-efficient technologies	12,000
	- Identification of 40 MAC workshops - Development of MAC servicing training materials - Three training courses for a total of 45 MAC technicians	18,000
	<i>Subtotal</i>	<i>42,000</i>
Implementation and expansion of RRR capacities for Kigali compliance	- Assessment of equipment needs and acquisition and delivery of good practices tool kits to 25 MAC workshops - Establishing a national network for recovery and reuse of refrigerants in MAC systems	70,000
	Follow up and monitoring activities on the operation of the RR network in the MAC sector and amount of HFC-134a recovered by workshops	8,000
	<i>Subtotal</i>	<i>78,000</i>
Total in first tranche for project in the servicing sector		216,000
Project monitoring	Activities to include one verification report, three annual meetings, national consultants, and travel	40,548
Total in first tranche for project monitoring		40,548
Total for first tranche of stage I of the KIP		446,028

SECRETARIAT'S COMMENTS AND RECOMMENDATION

V. Comments

HFC consumption

82. The Secretariat noted a significant rise in HFC consumption in 2022, which was 57 per cent in mt higher than the HFC consumption in 2021. Further the consumption of 2023 was 15 per cent in mt higher than HFC consumption of 2022. UNDP explained that HFC consumption had decreased in 2020 and 2021 due to the COVID-19 pandemic, which caused a reduction in the demand of refrigerant for servicing of equipment and new installations. This was exacerbated by an increase in prices of refrigerants and transport costs during these years which also discouraged importers from bringing in these substances. The fall in economic growth due to COVID-19 in 2020 was amply offset by growth in 2022, which has remained higher than in most Latin American countries, reaching 5.1 per cent in 2023. In 2022, prices of HFCs also dropped by 60 per cent from those during the pandemic years, which combined with economic recovery, especially in the tourism sector, stimulated the demand and consequently boosted imports of equipment and refrigerants, mostly HFCs.

83. The Secretariat notes that the continuous growth of HFC consumption in 2022 and 2023 is likely to be related with increasing local demand due to economic growth in sectors such as tourism and construction, as explained by UNDP. While it is possible that imports may have partially increased in 2023 due to a market reaction to the upcoming HFC control measures in 2024, consumption in 2022 was already 8.8 per cent above the HFC consumption baseline. Therefore, an effective application of the HFC import quota from 1 January 2024 onwards is required to ensure compliance with the freeze, and immediate action under stage I of the KIP is needed to maintain consumption below the freeze level in subsequent years.

Overarching strategy

HFC phase-down and reductions from the starting point for sustained reductions in HFC consumption

84. The Government of Costa Rica proposed to reduce 10 per cent (145,080 CO₂-eq tonnes) of the HFC baseline. The activities included in stage I of the KIP include the conversion of Omega in the commercial refrigeration manufacturing sector (3,000 CO₂-eq tonnes), technical assistance to the local installation and assembly subsector (63,316 CO₂-eq tonnes) and the activities for the refrigeration servicing sector. As Costa Rica opted to be funded for the refrigeration servicing sector as an low volume consuming (LVC) country, in line with decision 92/37(c) the funding for the servicing sector is to achieve at least a 10 per cent reduction from the HFC baseline, namely (145,080 CO₂-eq tonnes). The proposed amount of tonnage reductions, including the reductions from the activities in commercial refrigeration and local installation and assembly and in the servicing sector amount to 211,395 CO₂-eq tonnes and represent 14.5 per cent of the HFC baseline, which is higher than the proposed reduction commitment.

85. Noting the growing consumption trend in Costa Rica and that for two consecutive years HFC consumption has been above the HFC baseline (24.3 per cent above in 2023), the Secretariat considered in this case that a commitment to reduce HFC consumption by 10 per cent of the baseline can be considered, even though the activities funded represent 14.5 per cent of the baseline. The funded activities will assist the country to achieve and sustain immediate reductions to reach the freeze level, and subsequently to achieve the 10 per cent reduction target in 2029. This was agreed on the understanding that the 211,395 CO₂-eq tonnes funded under stage I would be deducted from the starting point once it is determined by the Executive Committee.

86. The methodology to calculate the starting point is still under discussion. The way to deduct HFC reductions from the starting point will depend on that methodology. Regarding the KIP for Costa Rica, because the country opted to be funded as an LVC country for servicing (rather than funding of US dollars per kg, a pre-determined level of funds is approved to reach a target) and considering that it also has manufacturing (funded in US dollars per kg), it was unclear how to calculate the reductions from the starting point. However, UNDP confirmed that the proposed reductions of 211,395 CO₂-eq tonnes funded under stage I of the KIP will be deducted from the starting point once this is agreed, on the understanding that the amount to be deducted at the time the starting point is determined by the Executive Committee may be adjusted based on the decided methodology to calculate the starting point.

Institutional, policy and regulatory framework

HFC licensing and quota system

87. In line with decision 87/50(g), UNDP has confirmed that Costa Rica has an established and enforceable system of licensing and quotas for monitoring HFC imports/exports in place. UNDP informed that the quota assigned in 2024 corresponds to the value of the baseline established for the country of 1,450,799 CO₂-eq tonnes, and for 2025 the quota will be the same as for 2024.

88. The Secretariat noted that the Government of Costa Rica committed, during stage I of the KIP, to look at public policies with the intention to introduce early bans on equipment where technologies are

already mature and available at a commercial scale at competitive prices (i.e., domestic refrigerators). The Government of Costa Rica also committed to ban the import and manufacturing of HFC-based self-contained commercial refrigerators with a refrigerant charge below 150g upon completion of the project to convert the manufacturing of commercial refrigerators at Omega.

89. The Secretariat inquired if there are any plans or actions by the Government of Costa Rica to prevent the import of very high-GWP refrigerants such as HFC-23 or R-508B (though small in quantity). UNDP informed that the country is considering a control measure that would discourage the import of substances with high-GWP. However, a final decision will depend on the study of needs and availability of alternatives.

Technical and cost-related issues

90. The Secretariat noted that in addition to the activities in the refrigeration servicing sector, Costa Rica included a project to phase-out the use of HFC-134a in the manufacturing of self-contained commercial refrigeration units at Omega and phase-down the use of HFCs in the assembly and installation of commercial refrigeration equipment charged on the end-user premises by 14 enterprises in the subsector associated with Omega. The Secretariat's review is presented below.

Project to phase out HFC-134a in the manufacturing of commercial refrigeration at Omega and to support local installation and assembly enterprises transition to low-GWP technologies

91. In relation to the commercial manufacturing portion of the project, Omega has partially converted from HFC-134a to R-290 and still has a consumption of 2.10 mt of HFC-134a. The proposed costs included a budget for a refrigerant charging unit. Noting that the baseline equipment did not include a refrigerant charging unit, and the level of production was only 2,000 units per year, it was noted that the existing process did not require an automatic refrigerant charging unit, and therefore the unit requested was not an incremental cost in this case. Accordingly, the charging unit was removed from the proposal and instead, upon further discussion on the incremental costs for items still required in the plant to ensure proper manufacturing of equipment with R-290 in a safe manner, the Secretariat and UNDP agreed on the inclusion of few safety elements (fan, leak detector, sensors), in addition to safety assessment originally requested. The budget for equipment for Omega was accordingly adjusted from US \$75,000 to US \$14,000.

92. In relation to the project for the local installation and assembly subsector, in line with decision 92/39(d), the Secretariat reviewed it on a case-by-case basis, taking into consideration its contribution to stage I of the KIP, experience gained from a limited number of projects for this sector previously submitted, and the information contained in documents UNEP/OzL.Pro/ExCom/92/49 and UNEP/OzL.Pro/ExCom/93/99 related to the subsector.

93. Costa Rica identified HFC consumption in the local installation and assembly sector and revised its CP reports to separate this consumption from the servicing sector, where it was originally contained.¹¹ As a result, the average HFC consumption in the servicing sector during baseline years became 450.25 mt (959,981 CO₂-eq tonnes) and the percentage of consumption identified in the local installation and assembly subsector is equal to 33 per cent of the total consumption of R-404A and R-507A in 2023. The present

¹¹ UNDP clarified that the current CP format does not provide a column for consumption in the local assembly and installation subsector and; therefore, the country had reported such consumption under servicing. Subsequently, the country resubmitted revised CP data reports (2020 to 2023) that included the estimated consumption in the local assembly and installation subsector as part of "other", with a note in the remarks column specifying the estimated quantity of HFCs used in the subsector and removing that consumption from the servicing sector. Also, consumption of HCFC in RAC manufacturing sector was added in the RAC manufacturing as it was only identified in the late stages of preparation of the KIP.

project intends to phase out 7 mt (27,451 CO₂-eq tonnes) of R-404A and 9 mt (35,865 CO₂-eq tonnes) of R-507A.

94. The proposal includes a set of activities to support the transition of local installation and assembly subsector to R-290-based technology in commercial refrigeration equipment with cooling capacity around 5 HP. These activities include:

- (a) *At the enterprise level:* Provision of equipment and tools, training and technical assistance for the design, engineering, assembly and installation of three types of equipment¹² following relevant international and regional standards;
- (b) *At the end-user level:* Demonstration at a small shop or supermarket of the assembly, installation and operation of the three prototype R-290-based refrigeration equipment designed; and measurement of performance, and energy consumption; and
- (c) *At sectoral level:* Support for the revision of relevant standards for the installation and operation of the equipment designed, and provision of training to the subsector on handling the technology.

95. The Secretariat notes that project design has taken into account the suggestions and activities proposed in document UNEP/OzL.Pro/ExCom/93/99 and includes assistance at different levels in the sector to facilitate HFC phase-down in the targeted applications. Regarding the sustainability of the HFC phase-down to be achieved, the Secretariat enquired whether the 14 enterprises included are the only ones assembling this type of equipment in the country and whether the installation of HFC-based equipment of these characteristics could be restricted upon completion of the project. UNDP explained that there are more enterprises and individuals in this subsector who will face challenges associated with the adoption of flammable refrigerants over the course of the implementation of stage I of the KIP; particularly at a time when the demand for cold rooms and energy-efficient equipment is growing. The country still needs time to progress on building the local capacity of installers and technicians to handle flammable technologies before banning or controlling the manufacture of cold rooms with HFCs. Stage I of the KIP is expected to help identify key aspects of this transition and then establish policies to restrict and prohibit the use of HFCs in this activity. The project proposal indicates that as part of this process a ban on equipment up to 5 HP may be considered.

96. The Secretariat considers that some measures that could contribute to the sustainability of the project include the adoption of relevant standards for the use of R-290 in commercial refrigeration, as well as some of the activities included in the KIP, such as policy and regulatory measures to facilitate the adoption of low-GWP technologies and disincentivize the use of high-GWP technologies; and training technicians, importers, and distributors to increase the availability of alternative technologies and components. Given the limited experience in this subsector, the Secretariat also considers it meaningful to follow up during the implementation of stage I on progress made and to ensure the sustainability of this project. This could be done as part of the review of the progress report to be submitted with the request of the second tranche in 2027.

97. Regarding the tools and equipment proposed for the 14 enterprises (US \$6,200 per enterprise), the Secretariat noted that these enterprises already have some elements, such as the scale, which do not need to be changed due to flammability. Upon discussion on the matter, it was agreed that the tools to be provided should be those additional ones that are required by the assemblers to operate with flammable refrigerants,

¹² R-290-based stand-alone units of dimensions 2.50 or 3.75 meters long and refrigeration capacity between 2 and 5 HP; one remote unit (R-290-based chiller); and R-290-based refrigeration system for cold rooms with capacity below 5 HP.

including A3 recovery unit, cylinders, manifolds, portable leak detectors, lockring, and equipment to measure performance of the installed system.

98. On the testing of the prototype equipment to be installed in a small shop or supermarket; UNDP explained that Omega and the assembly and installation enterprises will design, manufacture and install the equipment (two stands-alone units, one remote unit and a cold room, it depends on the refrigeration capacity of the store). The beneficiary will cover civil infrastructure, electrical installations, transport, and other costs.

99. The costs of technical assistance and training for the 14 enterprises in the design of the systems, development of the evaluation tests and advice on safe handling of the systems during assembly was adjusted from US \$80,000 to US \$60,000. The final agreed cost for the project was US \$234,800, including both, the commercial manufacturing component and the local installation and assembly component.

Refrigeration servicing sector

100. Noting that the ongoing stage II of the HPMP and stage I of the KIP will be implemented simultaneously between 2024 and 2030, and both included activities related to training, certification and RRR, the Secretariat sought to better understand how activities across the two projects would complement and not duplicate each other.

101. Regarding technicians training, UNDP explained that the HPMP provides instructors training on topics such as recovery, recycling, removal of HCFC-141b as a cleaning agent, and good servicing practices, while KIP proposes specific training for the Ministry of Public Education (MEP) instructors on low-GWP refrigerant technologies, regulation related to high-GWP refrigerants, handling of equipment with high-GWP refrigerant at end-of-life, refrigerant disposal, energy efficiency, technical details of commercial low-GWP alternatives, safety considerations, good servicing practices focused on hydrocarbon, ammonia, CO₂, and related topics.

102. In relation to the technicians' certification, UNDP explained that the activity under the HPMP is focused on the process of design and establishment of the certification programme with the relevant national institutions and the dissemination of this program among RAC technicians, while the certification activity under the KIP will focus on starting the actual certification of technicians and expanding the scope of the certification to safe handling of low-GWP refrigerants.

103. About the RRR activities included in both the HPMP and the KIP, UNDP explained that the proposal in the HPMP is in the process of development, it is not yet operational, but it was originally designed with an emphasis on the recovery and recycling of HCFC refrigerants used during servicing of AC equipment service. The KIP's proposal is intended to expand the operation of the RRR network and complement the centers' capabilities to recover and recycle HFC-134a, R-410A, R-404A, R-507 and HFC-32 expanding its technical and storage capacity.

Project coordination and monitoring

104. UNDP originally proposed a cost of US \$67,580 considering 10 per cent of the project for manufacturing and the servicing sector. The Secretariat informed that if the level of funds requested under the servicing sector was in line with decision 92/37(c) (as an LVC country), this level of funding already included the project coordination and monitoring for servicing. Accordingly, the project coordination and monitoring budget was adjusted to US \$23,480, calculated as 10 per cent of the manufacturing/local installation and assembly cost.

Total project cost

105. Costa Rica's average HFC consumption in the servicing sector during the baseline years (450.25 mt) is above 360 mt. However, Costa Rica has opted to request US \$360,000 to reach the 10 per cent reduction target in HFC consumption in line with the compliance schedule of the Montreal Protocol, in line with decision 92/37(c). In addition, stage I of the KIP includes the commercial refrigeration manufacturing/local installation and assembly subsector project with an agreed cost of US \$234,800. Table 13 summarizes the agreed costs and associated reductions from the country's HFC consumption eligible for funding for stage I of KIP for Costa Rica.

Table 13. Agreed cost of activities to be implemented during stage I of the KIP in Costa Rica

Sector	Phase-out (mt)	Phase-out (CO ₂ -eq tonnes)	Cost (US \$)	CE (US \$/kg)	CE (US \$/CO ₂ -eq tonne)
Commercial refrigeration manufacturing and local installation and assembly project	18.10	66,319	234,800	12.97	3.54
Refrigeration servicing sector	(Funded as an LVC country)	145,080	360,000	n/a	n/a
PMU	n/a	n/a	23,480	n/a	n/a
Total		211,395	618,280		

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

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

107. As per revised agreed cost, the activities in the first tranche were reduced for local installation and assembly and project coordination as shown in table 14. There were no modifications to the action plan for the first tranche for the servicing sector. Reductions in the first tranche are associated to the commercial manufacturing (removal of the charging unit in Omega) and the technical assistance component of the local installation and assembly activity, and associated project monitoring cost.

Table 14. Revised first tranche of stage I of the KIP

Project component	Cost (US \$)
Commercial refrigeration/local installation and assembly -Procure safety items for the manufacturing component for Omega; -Procure tools for eight local installation and assembly enterprises; -Technical assistance and training on design to assemblers and development of safety evaluation tests for R-290	140,880
Refrigeration servicing sector No changes to the submitted proposal	216,000
Project monitoring Coordination, one verification report, three annual meetings, national consultants, and travel	14,088
Total for first tranche of stage I of the KIP	370,968

Co-financing

108. The Government of Costa Rica would provide in-kind co-financing through the provision of personnel, office and storage space, communications and administration, and legal support from the Ministry of Environment and Energy and Customs on matters related to the legislative and regulatory framework to control HFC consumption.

2024--2026 business plan of the Multilateral Fund

109. UNDP is requesting US \$618,280 plus agency support costs, for the implementation of stage I of the KIP for Costa Rica. The total value of US \$417,774, including agency support costs, requested for the period of 2024–2026, is US \$328,008 above below the amount in the business plan.

Sustainability of the HFC phase-down and assessment of risks

110. The Government of Costa Rica is committed to ensuring that the activities under stage I of the KIP will be sustained over time with the control measures (quota system) already in place, continuous market monitoring including surveys and close monitoring of all the activities being implemented under the KIP.

111. UNDP highlighted that there is a high risk of non-compliance for Costa Rica because of the current high growth in HFC consumption, as reported in 2022 and 2023, thus signalling the urgency and importance in the implementation of the activities under stage I. UNDP also reported that consultations with stakeholders and industry demonstrated that they fully support the activities designed in the KIP as those would support a quick transition and promote the use of low-GWP alternative, as the way to reduce consumption.

Impact on the climate

112. The activities proposed, including efforts to phase down of HFCs in manufacturing and local installation and assembly subsector, promote low-GWP alternatives, as well as refrigerant recovery and reuse, 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 by 2029, Costa Rica will have reduced its emissions by approximately 211,395 CO₂-eq tonnes of HFCs, based on the reductions associated to the activities funded under stage I of the KIP, assuming that all consumed HFCs would eventually have been emitted.

Draft Agreement

113. A draft Agreement between the Government of Costa Rica 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.

114. If the Executive Committee so wishes, the funds for stage I of the KIP for Costa Rica could be approved in principle, and funds for the first tranche could be approved on the understanding that the Agreement would be prepared and presented at a future meeting, before the submission of the second tranche, and once the Agreement template has been approved.

VI. Recommendation

115. The Executive Committee may wish to consider:

- (a) Approving, in principle, stage I of the Kigali HFC implementation plan (KIP) for Costa Rica for the period 2024–2029 to reduce HFC consumption by 10 per cent of the country's baseline by 2029, in the amount of US \$618,280, plus agency support costs of US \$78,011, for UNDP, as reflected in the schedule contained in annex III to the present document;

- (b) Noting:
 - (i) That the Government of Costa Rica 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 eligibility 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 subparagraphs (b)(ii) above, will be deducted from the starting point referred to in subparagraph (b)(i);
 - (iv) That the Government of Costa Rica commits to ban the manufacturing of HFC-based self-contained commercial refrigerator with refrigerant charge below 150 grams upon completion of the project to convert the manufacturing of commercial refrigerators in Omega;
- (c) Approving the first tranche of stage I of the KIP for Costa Rica and the corresponding tranche implementation plan, in the amount of US \$370,968, plus agency support costs of US \$46,807, for UNDP; and
- (d) Requesting the Government of Costa Rica, UNDP and the Secretariat to finalize the draft Agreement between the Government of Costa Rica 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.

**PILOT PROJECT TO MAINTAIN AND/OR ENHANCE THE ENERGY EFFICIENCY OF
REPLACEMENT TECHNOLOGIES AND EQUIPMENT IN THE CONTEXT OF HFC
PHASE-DOWN (NON-INVESTMENT ACTIVITIES)**

PROJECT DESCRIPTION

Background

116. On behalf of the Government of Costa Rica, UNDP has submitted, in line with decision 91/65, a request for a pilot project to demonstrate a transcritical CO₂ refrigeration system in a supermarket as a low-GWP high-energy efficient technology in the context of HFC phase-down, in the amount of US \$270,000, plus agency support costs of US \$18,900, as originally submitted.¹³

Status of implementation of energy efficiency-related activities funded by the Multilateral Fund

117. Stage I of the HPMP included a component to develop a system of eco-labelling for energy-efficient RAC equipment by having at least four types of systems certified and getting the commitment of four enterprises to import eco-efficient equipment. A request for funding of additional activities to maintain energy efficiency in the refrigeration servicing sector was submitted with the request for the third tranche of stage II of the HPMP to the present meeting and is described in paragraphs 13 to 21 of the present document.

118. Information on the country's status of ratification to the Kigali Amendment, the policy, regulatory and institutional frameworks for the implementation of the Montreal Protocol, HFC consumption and its distribution by sector, the established HFC baseline, and relevant activities from the request for stage I of the KIP and the first tranche submitted to the current meeting, is available in paragraphs 39 to 115 of the present document.

Energy efficiency pilot project

119. The main barriers for introducing low-GWP alternatives, especially transcritical CO₂ in the supermarket sector in Article 5 countries is the lack of knowledge about the technology, the limited availability of equipment components, and the high initial cost of conversion. The technical viability cost of conversions, environmental benefits, and energy efficiency of the use of transcritical CO₂ in centralized supermarket refrigeration systems need to be demonstrated to encourage the use of this alternative and reduce dependence on HFCs.

120. This project will demonstrate the installation of a transcritical CO₂ centralized refrigeration system in a supermarket as a non-ODS, low-GWP, highly energy-efficient technology. Specifically, the project is intended to demonstrate the energy efficiency gains and support the phase-out of HFCs used in centralized systems in the supermarket sector in Costa Rica. The implementation of this system will facilitate assessing technical, logistical, financial and safety requirements for its wider adoption.

Policy, regulatory and institutional framework

121. The Ministry of Environment and Energy, through the Directorate of Energy and the Directorate of Environmental Quality Management, is responsible for promoting initiatives to improve energy use and energy efficiency in the adoption of new technologies for high energy consumers such as RAC.

122. The Government of Costa Rica participated in the development of a mandatory technical regulation by Central American countries (RTCA 23.01.80.21) to establish the minimum energy performance standards (MEPS) for air conditioners and heat pump (mini-split and multi-split) for manufacturing, import,

¹³ As per the letter of 20 August 2024 from the Ministry of Environment and Energy of Costa Rica to UNDP.

or sale in the region. That regulation is in the process of being approved and will be incorporated into the sustainable public procurement requirements of the country.

123. Costa Rica has implemented a group of energy efficiency standards of voluntary compliance for domestic and commercial refrigeration units and air conditioners. Costa Rica does not produce centralized RAC equipment, so the labelling standards for RAC sector equipment only apply to imports of these systems.

Project objective

124. The objective of the project to promote the adoption of transcritical CO₂ refrigeration systems as an energy-efficient alternative to high-GWP HFC-based systems in the supermarket sector in Costa Rica (large centralized systems) and to raise awareness with relevant end users and other stakeholders.

Project implementation

125. The supermarket sector in Costa Rica mainly uses refrigeration systems operating with R-404A and R-507A as main refrigerants. The use of R-404A and R-507A represents 50 per cent of the HFC consumption in Costa Rica in CO₂-eq tonnes. This sector comprises of around 482 medium to large stores. A store with a centralized refrigeration system with capacity between 22 and 46 tonne of refrigeration (TR) currently in operation will be selected for the demonstration. The project will include the selection of a store, design and installation of the system, monitoring results and dissemination of knowledge gathered and results achieved.

126. The proposed activities for this project are presented below along with the associated costs:

- (a) Technical assistance for designing construction and commissioning of a transcritical CO₂ system (US \$30,000);
- (b) Adopting transcritical CO₂ technology in the centralized refrigeration system of one supermarket (US \$750,000 consisting of equipment, installation and commissioning and adaptations to the premises, including co-finance from the beneficiary (US \$550,000) and funds requested from the Multilateral Fund (US \$200,000);
- (c) Comparative assessment of the transcritical CO₂ technology against baseline technology and energy savings evaluation (US \$10,000);
- (d) Strengthening of national capacity to adopt transcritical CO₂ technology (US \$20,000); and
- (e) Dissemination of results of the demonstration through a workshop and production of relevant materials directed at other supermarket owners, refrigeration system suppliers, refrigeration system installers, technicians and other stakeholders (US \$10,000).

Project cost

127. The total cost of the pilot project to demonstrate a transcritical CO₂ refrigeration system in a supermarket as a low-GWP high-energy efficient technology in the context of HFC phase-down is estimated to be US \$820,000 of which US \$550,000 would be co-finance by the enterprise. A total of US \$270,000 is being requested from the Multilateral Fund. The project will be implemented between January 2025 and December 2027.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

128. The Secretariat has reviewed the project proposal in light of the activities described under decision 91/65.

Eligibility under decision 91/65

129. UNDP explained that the implementation of this project is based on decision 91/65(c) in which priority consideration would be given to projects involving technical assistance for the assembly and installation of equipment, which would lead to the adoption of technologies to improve energy efficiency while phasing down HFCs. The project would demonstrate and encourage national supermarket chains to take the initiative to replicate the use of energy-efficient technologies, displacing energy-inefficient equipment and eliminating the use of high-GWP refrigerants for servicing.

130. The Secretariat noted that a specific beneficiary has not been identified, which in the case of a large investment with a significant cofinancing such as the one proposed for this project, could take some time. UNDP explained that the selection of beneficiaries needs to follow a bidding process but provided reassurance that the duration of the project will not exceed the 36 months after the date of approval by the Executive Committee.

131. In line with decision 91/65, confirmation from the Government of Costa Rica has been received: that, if Costa Rica has mobilized or is to mobilize funding from sources other than the Multilateral Fund for energy efficiency components when phasing down HFCs, the project will not result in the duplication of activities among those funded by the Multilateral Fund and those funded from other sources; that the information on project progress, results and key learning will be made available, as appropriate; and a detailed project report will be submitted to the Executive Committee within six months of the date of completion of the project.

Technical and cost-related issues

132. Considering the few examples of other countries in the past (Argentina and Tunisia), the Secretariat enquired whether there were any supermarket using transcritical CO₂ in Costa Rica and about the likelihood of success of this demonstration project. UNDP responded that although the technology is not used in the supermarket sector in Costa Rica, it was successfully demonstrated in supermarkets in Chile through a pilot project with support from the Climate and Clean Air Coalition. The final report assessment of that project concluded upon monitoring of the transcritical CO₂ system, that it was 44 per cent more efficient than the equivalent system based on R-507A.

133. On inquiring about the incremental capital cost, UNDP mentioned that the amount is based on the costs incurred in previous experience. However, the exact amount would depend on the selection of supermarket and its size and design. The budget of US \$750,000 for capital cost is estimated based on UNDP's best judgement and funding from the beneficiary enterprise may vary depending on final supermarket size and design.

134. The Secretariat, based on a review of other similar projects, considered that the capital cost of such a pilot project could be lower. The Secretariat discussed with UNDP and indicated that the best-case cost could be around US \$550,000, though the actual cost will depend on size and design of the supermarket. Considering US \$550,000 as the total incremental capital cost and that US \$200,000 are being requested from the Multilateral Fund, the beneficiary contribution would still be above 50 per cent of the cost.

135. Noting that the proposed awareness activities could be implemented along with the KIP and HPMP, the Secretariat recommended to combine some costs (capacity building, workshops for dissemination) resulting in a reduction of US \$10,000 from the funds requested, as shown in table 14 below.

Table 14. Total cost of the energy efficiency pilot project for Costa Rica as agreed

Area of activity	Activity	Requested from MLF (US \$)	Co-finance from beneficiary (US \$)
Technical assistance and implementation	Technical assistance for designing construction and commissioning of transcritical CO ₂ system	30,000	0
	Incremental capital cost for adopting transcritical CO ₂ technology	200,000	*350,000
Monitoring and assessment	Comparative assessment of the transcritical CO ₂ technology and energy savings evaluation	10,000	0
Capacity building and awareness raising	Strengthen of national the capacity to adopt transcritical CO ₂ technology and awareness raising	20,000	0
Total		260,000	350,000

*Any cost above US \$200,000 will be borne by the beneficiary

136. The cost of the project was agreed at US \$260,000, plus agency support costs of US \$18,200 for UNDP.

Sustainability of the pilot project and assessment of risks

137. The Secretariat requested for clarification on the sustainability of this technology, UNDP highlighted that transcritical CO₂ technology is among the most effective options for centralized systems, such as those used in supermarkets, and is gaining traction in Latin America. In Costa Rica, efforts will be made to engage other supermarkets in the full process of design and implementation. The outcomes will be shared across the sector to enhance understanding of the technology, addressing the knowledge gap that has contributed to its limited adoption.

138. Further in the case of Costa Rica, the supermarket sector is dominated by a limited number of players with several premises each, which increases the probability of replication. Also, with various capacity building activities carried out under the HPMP and planned in the KIP, and given the economic growth of the country, the Costa Rica refrigeration sector's key stakeholders have ample experience in the design, construction and maintenance of refrigeration systems. Their lack of knowledge on transcritical CO₂ will be addressed with the implementation of the project.

139. Additionally, as part of the project strategy, the technical assistance will be provided to all major supermarket chains, which will provide an opportunity to discuss and design the preliminary transcritical CO₂ refrigeration system with each of them. Thus, not only the supermarket implementing the pilot project, but also all supermarkets will have a preliminary design and the knowledge to implement it, taking the first step for the replication of the technology with its own funds in further stages.

RECOMMENDATION

140. The Executive Committee may wish to consider approving the pilot project to maintain and/or enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down (non-investment activities) for Costa Rica, in the amount of US \$260,000, plus agency support costs of US \$18,200 for UNDP, noting:

- (a) That the Government of the Costa Rica has committed to the conditions referred to in decision 91/65(b)(iv)b. to (b)(iv)d.; and

- (b) That the project would be operationally completed no later than 31 December 2027, and a detailed project report would be submitted to the Executive Committee within six months of the date of completion of the project.

Annex I

UPDATED REVISED AGREEMENT BETWEEN THE GOVERNMENT OF COSTA RICA AND THE EXECUTIVE COMMITTEE OF THE MULTILATERAL FUND FOR THE REDUCTION IN CONSUMPTION OF HYDROCHLOROFLUOROCARBONS IN ACCORDANCE WITH STAGE II OF THE HCFC PHASE-OUT MANAGEMENT PLAN

(Relevant changes are in bold font for ease of reference)

17. This updated Agreement supersedes the Agreement reached between the Government of Costa Rica and the Executive Committee at the 84th meeting of the Executive Committee.

APPENDIX 2-A: THE TARGETS, AND FUNDING

Row	Particulars	2019	2020	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)	12.69	9.17	9.17	9.17	9.17	9.17	4.58	4.58	4.58	4.58	4.58	0.35	n/a
1.2	Maximum allowable total consumption of Annex C, Group I substances (ODP tonnes)	12.69	9.17	9.17	9.17	9.17	9.17	4.58	4.58	4.58	4.58	4.58	0.35	n/a
2.1	Lead IA (UNDP) agreed funding (US \$)	187,777	0	385,750	0	0	415,200	0	0	126,450	0	0	104,000	1,219,177
2.2	Support costs for Lead IA (US \$)	13,144	0	27,003	0	0	29,064	0	0	8,852	0	0	7,280	85,343
3.1	Total agreed funding (US \$)	187,777	0	385,750	0	0	415,200	0	0	126,450	0	0	104,000	1,219,177
3.2	Total support costs (US \$)	13,144	0	27,003	0	0	29,064	0	0	8,852	0	0	7,280	85,343
3.3	Total agreed costs (US \$)	200,921	0	412,753	0	0	444,264	0	0	135,302	0	0	111,280	1,304,520
4.1.1	Total phase-out of HCFC-22 agreed to be achieved under this Agreement (ODP tonnes)													7.07
4.1.2	Phase-out of HCFC-22 to be achieved in the previous stage (ODP tonnes)													2.59
4.1.3	Remaining eligible consumption for HCFC-22 (ODP tonnes)													0.35
4.2.1	Total phase-out of HCFC-141b agreed to be achieved under this Agreement (ODP tonnes)													1.20
4.2.2	Phase-out of HCFC-141b to be achieved in the previous stage (ODP tonnes)													2.38
4.2.3	Remaining eligible consumption for HCFC-141b (ODP tonnes)													0.00
4.3.1	Total phase-out of HCFC-123 agreed to be achieved under this Agreement (ODP tonnes)													0.01
4.3.2	Phase-out of HCFC-123 to be achieved in the previous stage (ODP tonnes)													0.00
4.3.3	Remaining eligible consumption for HCFC-123 (ODP tonnes)													0.00
4.4.1	Total phase-out of HCFC-124 agreed to be achieved under this Agreement (ODP tonnes)													0.09
4.4.2	Phase-out of HCFC-124 to be achieved in the previous stage (ODP tonnes)													0.00
4.4.3	Remaining eligible consumption for HCFC-124 (ODP tonnes)													0.00
4.5.1	Total phase-out of HCFC-142b agreed to be achieved under this Agreement (ODP tonnes)													0.40
4.5.2	Phase-out of HCFC-142b to be achieved in the previous stage (ODP tonnes)													0.00
4.5.3	Remaining eligible consumption for HCFC-142b4 (ODP tonnes)													0.00
4.6.1	Total phase-out of HCFC-141b contained in imported pre-blended polyols agreed to be achieved under this Agreement (ODP tonnes)													0.69
4.6.2	Phase-out of HCFC-141b contained in imported pre-blended polyols to be achieved in the previous stage (ODP tonnes)													14.00
4.6.3	Remaining eligible consumption for HCFC-141b contained in imported pre-blended polyols (ODP tonnes)													0.00

*Date of completion of stage I as per stage I Agreement: 31/12/2021

Annex II

HFC CONSUMPTION BY SECTOR AND SUBSTANCE IN COSTA RICA (2023)
(Based on a survey of the servicing subsectors and revised sectoral data in the country programme implementation report)

In metric tonnes

Sector	HFC-125	HFC-134a	HFC-152a	HFC-236fa	R-404A	R-407C	R-410A	R-448A	R-507A	R-422D	R-513A	R-452A	Total	Share of consumption (%)
Manufacturing sector														
Commercial refrigeration	0.00	2.10	0.00	0.00	0.00	0.00	0.00	0.00	9.40	0.00	0.00	0.00	11.50	1.4
Subtotal manufacturing	0.00	2.10	0.00	0.00	0.00	0.00	0.00	0.00	9.40	0.00	0.00	0.00	11.50	1.4
Refrigeration and AC servicing														
Refrigeration subsectors														
Domestic refrigeration	0.00	11.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.13	1.3
Commercial refrigeration	0.00	37.34	0.00	0.00	51.50	0.00	0.00	11.70	47.82	0.00	0.00	0.00	148.36	17.8
Industrial refrigeration	0.00	2.38	0.00	0.00	5.59	0.00	0.00	0.00	4.39	0.00	0.00	0.00	12.36	1.5
Transport refrigeration	0.00	63.97	0.00	0.00	30.33	0.00	0.00	0.00	27.83	0.00	0.00	1.0	123.13	14.8
Air-conditioning subsectors														
Residential AC	0.00	0.42	0.00	0.00	0.00	0.00	7.89	0.00	0.00	0.00	0.00	0.00	8.31	1.0
Commercial AC	0.00	3.99	0.00	0.00	0.41	2.00	146.88	0.00	0.32	0.031	0.031	0.00	153.65	18.4
Industrial AC	0.00	1.92	0.00	0.00	0.46	0.67	7.00	0.00	0.36	0.0310	0.0310	0.00	10.47	1.3
MAC	0.00	236.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	236.32	28.3
Subtotal RAC	0.00	357.48	0.00	0.00	88.28	2.67	161.77	11.70	80.72	0.06	0.06	0.99	703.73	84.4
Other sectors														
Assembly and installation sector	0.00	0.00	0.00	0.00	44.45	0.00	0.00	0.00	27.57	0.00	0.00	0.00	72.02	0.00
Firefighting	0.47	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.47
Process agent/solvent	0.00	0.00	46.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	46.02	0.00
Subtotal other subsector	0.47	0.00	46.02	0.02	44.45	0.00	0.00	0.00	27.57	0.00	0.00	0.00	118.53	0.47
Total (mt)	0.47	359.58	46.02	0.02	132.73	2.67	161.77	11.70	117.69	0.06	0.06	0.99	833.76	0.47

In CO₂-eq tonnes

Sector	HFC-125	HFC-134a	HFC-152a	HFC-236fa	R-404A	R-407C	R-410A	R-448A	R-507A	R-422D	R-513A	R-452A	Total	Share of consumption (%)
Manufacturing sector														
Commercial refrigeration	0	3,000	0	0	0	0	0	0	37,451	0	0	0	40,451	2.2
Subtotal manufacturing	0	3,000	0	0	0	0	0	0	37,451	0	0	0	40,451	2.2
Refrigeration and AC servicing														
Refrigeration subsectors														
Domestic refrigeration	0	15,916	0	0	0	0	0	0	0	0	0	0	15,916	0.9
Commercial refrigeration	0	53,402	0	0	201,970	0	0	16,214	190,548	0	0	0	462,134	24.7
Industrial refrigeration	0	3,403	0	0	21,906	0	0	0	17,494	0	0	0	42,804	2.3
Transport refrigeration	0	91,481	0	0	118,946	0	0	0	110,907	0	0	2,122	323,456	17.3
Air-conditioning subsectors														
Residential AC	0	605	0	0	0	0	16,466	0	0	0	0	0	17,071	0.9
Commercial AC	0	5,699	0	0	1,600	3,544	306,606	0	1,279	85	20	0	318,832	17.0
Industrial AC	0	2,747	0	0	1,788	1,187	14,617	0	1,431	85	20	0	21,873	1.2
MAC	0	337,943	0	0	0	0	0	0	0	0	0	0	337,943	18.1
Subtotal RAC	0	511,196	0	0	346,210	4,731	337,689	16,214	321,659	169	39	2,122	1,540,029	82.3
Other sectors														
Assembly and installation sector	0	0	0	0	174,296	0	0	0	109,869	0	0	0	284,165	15.2
Firefighting	1,652	0	0	221	0	0	0	0	0	0	0	0	1,873	0.1
Process agent/solvent/aerosol	0	0	5,706	0	0	0	0	0	0	0	0	0	5,706	0.3
Subtotal other subsector	1,652	0	5,706	221	74,296	0	0	0	109,869	0	0	0	291,744	15.6
Total (mt)	1,652	514,197	5,706	221	520,506	4,731	337,689	16,214	468,979	169	39	2,122	1,872,224	100.0

Annex III

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 COSTA RICA

Kigali HFC implementation plan (stage I)

Row	Particulars	2024	2025	2026	2027	2028	2029	Total
1.1	Montreal Protocol reduction schedule of Annex F substances (CO ₂ -eq tonnes)	1,450,799	1,450,799	1,450,799	1,450,799	1,450,799	1,305,719	n/a
1.2	Maximum allowable total consumption of Annex F substances (CO ₂ -eq tonnes)	1,450,799	1,450,799	1,450,799	1,450,799	1,450,799	1,305,719	n/a
2.1	Lead IA (UNDP) agreed funding (US \$)	370,968	0	0	247,312	0	0	618,280
2.2	Support costs for Lead IA (US \$)	46,807	0	0	31,204	0	0	78,011
3.1	Total agreed funding (US \$)	370,968	0	0	247,312	0	0	618,280
3.2	Total support costs (US \$)	46,807	0	0	31,204	0	0	78,011
3.3	Total agreed costs (US \$)	417,775	0	0	278,516	0	0	696,291

HCFC phase-out management plan (stage II)*

Row	Particulars	2019	2020	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)	12.69	9.17	9.17	9.17	9.17	9.17	4.58	4.58	4.58	4.58	4.58	0.35	n/a
1.2	Maximum allowable total consumption of Annex C, Group I substances (ODP tonnes)	12.69	9.17	9.17	9.17	9.17	9.17	4.58	4.58	4.58	4.58	4.58	0.35	n/a
2.1	Lead IA (UNDP) agreed funding (US \$)	187,777	0	385,750	0	0	295,200	0	0	126,450	0	0	104,000	1,099,177
2.2	Support costs for Lead IA (US \$)	13,144	0	27,003	0	0	20,664	0	0	8,852	0	0	7,280	76,942
3.1	Total agreed funding (US \$)	187,777	0	385,750	0	0	295,200	0	0	126,450	0	0	104,000	1,099,177
3.2	Total support costs (US \$)	13,144	0	27,003	0	0	20,664	0	0	8,852	0	0	7,280	76,942
3.3	Total agreed costs (US \$)	200,921	0	412,753	0	0	315,864	0	0	135,302	0	0	111,280	1,176,119

* Excluding the additional energy efficiency related activities under decision 89/6 submitted to the present meeting.

Annex IV

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

Area of work	HPMP		KIP		Combined cost (US\$)
	Activity (Based on document 84/45)	Cost (US\$)	Activity	Cost (US\$)	
Project in the local assembly and manufacturing sector			Project to phase-down HFC consumption in the local assembly and manufacturing sector	220,800	220,800
Investment project in commercial refrigeration sector	Foam: Project to replace 6.24 mt (0.69 ODP tonnes) of HCFC-141b contained in imported pre-blended polyols used in the manufacture of PU foam in Refrigeracion Omega with HFO-1233zd	59,177	Refrigeration: Eliminate residual HFC consumption used in the manufacturing of commercial refrigeration equipment	14,000	73,177
Strengthening of the legal and institutional framework to control HCFCs	Reviewing and updating the legal framework to support compliance; strengthening the licensing and quota system for the control of ODS imports and exports; establishing an electronic connection between the NOU and customs to facilitate instant data sharing; and implementing the uniform Central American customs code for HCFC	65,000	Adopt specific HFC-related measures, adjust resolutions to comply with commitments, hold 2 training sessions for institutions and associations on legal measures to control and reduce HFC emissions and consumption, produce and distribute two dissemination pieces with content on the regulatory framework for the KIP	50,000	115,000
Training of customs officers			Training 45 customs officers on relevant topics of HFC trade and improvements on procedures of the licensing and quota system and on the customs registry system and harmonized customs code	30,000	30,000
Strengthening education institutes	Providing equipment to strengthen the educational technical institutes, and developing subjects, including good servicing practices, energy efficiency, safety, and refrigerant management, to be incorporated in the curriculum of the institutes	100,000	Update of the curriculum of the RAC specialty of the Ministry of Public Education	20,000	120,000
Training of RAC technicians	Promoting good servicing practices, conducting two training workshops for 40 trainers, 15 training workshops for 375 technicians and disseminating awareness-raising materials	100,000	Train 14 trainers in the use and management of low-GWP refrigerants in RAC systems and energy-efficient technologies	20,000	120,000
Training of MAC technicians			Project of good servicing practices in the management of refrigerant gases in the service of MAC equipment. Train 75 technicians from 40 MAC workshops	30,000	30,000
Certification of technicians	Establishing a certification system for servicing technicians by developing a procedure for certification of servicing technicians in consultation with stakeholders; and conducting awareness campaigns to promote certification among technicians and end-users. Certification of technicians	113,000	Expand certification system to safe handling low-GWP refrigerants, provide 3 training workshops to certification bodies and leaders, certification of at least 100 technicians, and awareness-raising activities to promote certification	50,000	163,000

Area of work	HPMP		KIP		Combined cost (US\$)
	Activity (Based on document 84/45)	Cost (US\$)	Activity	Cost (US\$)	
RRR in RAC	Strengthening the refrigerant recovery, recycling and reclamation network, training 320 technicians in refrigerant recovery and recycling, providing tools and equipment to three refrigerant recovery and recycling centres and one reclamation centre	225,000	Establish 2 recovery and recycling centres and support 3 recovery brigades of technicians with training and equipment	35,000	260,000
RR in MAC			Provision of kits to 25 MAC workshops and establishment of a refrigerant recovery and reuse network in Costa Rica and follow up and monitoring of the network	95,000	95,000
Use of HCFC-141b in flushing	Phasing out the use of HCFC-141b in cleaning RAC equipment by conducting one workshop for trainers and five workshops for technicians in the use of alternatives, and providing tool kits	97,000			97,000
End-users	Promoting low-GWP alternatives in supermarkets and hotels by conducting 10 training seminars for end-users, supermarkets and hotels; and developing and disseminating awareness-raising materials to support the transition to low-GWP technologies	82,000			82,000
Awareness raising	Annual awareness campaign on HCFC phase-out, developing and disseminating awareness-raising materials to Government institutions, decision makers, end-users and equipment distributors and retailers	88,000	Hold 5 information workshops on the KIP, awareness raising campaign addressed to main stakeholders and end-users and the public	30,000	118,000
	Coordination and management	170,000	Coordination and management	23,480	193,480
	Total for the HPMP	1,099,177	Total for the KIP	618,280	1,717,457