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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
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Item 9(c) of the provisional agenda¹

PROJECT PROPOSAL: CUBA

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

Technical assistance

- Additional activities to maintain and/or enhance energy efficiency under decision 89/6(b)

UNDP

¹ UNEP/OzL.Pro/ExCom/94/1

PROJECT DESCRIPTION

1. Stage II of the HCFC phase-out management plan (HPMP) for Cuba was approved at the 86th meeting² to completely phase out HCFC consumption by 2030, at a total cost of US \$1,040,000, plus agency support costs. Stage II of the HPMP will be completed by December 2031, as stipulated in the Agreement between the Government of Cuba and the Executive Committee.

2. On behalf of the Government of Cuba, UNDP as the designated implementing agency has submitted a request for funding additional activities for the introduction of alternatives to HCFCs with low global-warming potential (GWP) and for maintaining energy efficiency in the refrigeration servicing sector in line with decision 89/6 and 92/22³, in the amount of US \$120,000, plus agency support costs of US \$8,400.⁴ The submission includes a description of specific activities, targets, and performance indicators for a 36 month implementation plan from July 2024 to June 2027.

Report on HCFC consumption

3. The Government of Cuba reported under the country programme (CP) implementation report a consumption of 0.55 ODP tonnes of HCFCs in 2023, which is 96.7 per cent below the HCFC baseline for compliance. The Article 7 data for 2023 has not been reported yet. The 2019-2023 HCFC consumption is shown in table 1.

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

HCFC	2019	2020	2021	2022	2023*	Baseline
HCFC-22	113.32	23.46	14.74	25.36	10.06	259.05
HCFC-124	0.22	0.37	0.0	0.0	0.0	0.60
HCFC-141b	0.0	0.0	0.0	0.0	0.0	23.61
HCFC-142b	0.13	0.23	0.0	0.0	0.0	0.36
Total (mt)	113.67	24.06	14.74	25.36	10.06	283.62
HCFC-22	6.23	1.29	0.81	1.39	0.55	14.25
HCFC-124	0.01	0.01	0.0	0.0	0.0	0.01
HCFC-141b	0.0	0.0	0.0	0.0	0.0	2.60
HCFC-142b	0.01	0.01	0.0	0.0	0.0	0.02
Total (ODP tonnes)	6.25	1.31	0.81	1.39	0.55	16.88

* CP data

4. Only HCFC-22 is currently imported into Cuba, used for servicing refrigeration and air-conditioning (RAC) equipment. Bans on imports of HCFC-141b in bulk and contained in pre-blended polyols were established on 1 January 2014 and 1 January 2016, respectively.

5. The HCFC consumption has been decreasing due to the implementation of the HPMP and the gradual introduction of alternative technologies. Consumption of HCFC-22 decreased sharply in the last three years due to financial strain caused by *inter alia* the COVID-19 pandemic, inflation, slowdown in the tourism sector and the increasing freight and insurance costs. It is expected that in the coming years, following worldwide economic recovery, HCFC-22 imports might increase slightly as they already did in 2022, however without returning to pre-pandemic levels.

² Decision 86/66

³ Decision 92/22 allows for the submission of requests for activities referred to in decision 89/6(b) separately from HCFC phase-out management plan tranche requests, including a revised Agreement between the Government of the Article 5 country concerned and the Executive Committee, on the understanding that those activities were integrated into the ongoing tranche implementation plans.

⁴ As per the letter of 18 March 2024 from the Ministry of Science, Technology and the Environment of Cuba to UNDP.

6. Based on the survey conducted during the preparation of the Kigali HFC implementation plan (KIP), the consumption in the commercial refrigeration subsector (including cold rooms) accounts for 41.5 per cent of the total consumption in the country. In the cold storage subsector, 33 per cent of equipment using HCFC-22 and 66 per cent using HFCs (mainly R-404A and HFC-134a) with less than 1 per cent using R-290. As part of the refrigeration equipment, cold rooms are frequently used in the health, commerce, and tourism sectors for the preservation of pharmaceutical products and foods.

Project description

7. The project aims to promote the market acceptance of low-GWP technologies (R-290 and CO₂) in commercial refrigeration (cold room) subsector through technology demonstrations and to collect information related to energy efficiency for further development of minimum energy efficiency standard (MEPS) in the cold room subsector.

8. Cuba is implementing stage II of the HPMP and stage I of the KIP. The Government established a ban on the import of HCFC-based equipment on 1 January 2015 and considers it important to introduce low-GWP technologies when phasing out the remaining HCFC consumptions to avoid the introduction of HFCs. The demand for commercial refrigeration equipment is expected to increase due to the projected expansion in health, commerce and tourism subsectors, especially through micro, small, and medium-sized enterprises. It is imperative for investors in the new cold storage subsector to consider environmental sustainability through selection of low-GWP refrigerants and the improvement of energy efficiency of equipment to reduce climate impact.

9. The project submitted in line with decision 89/6 has been designed to promote the adoption of refrigeration systems with transcritical CO₂ and R-290 as alternatives to HFCs and HCFCs. This project aims to support the final elimination of HCFC-22 and the gradual decrease of R-404A and HFC-134a, which are the main refrigerants used in cold rooms.

10. The demonstration aims to design, install and put in operation of two cold rooms using R-290 and CO₂ as refrigerant respectively with a design temperature of minus 15 to 20 and capacity of 2.50 to 3.52 kW for food preservation. The design feature for enhancing energy efficiency will include air-cooled condensing units with inverter compressor, electrical board and control systems. The description of activities and the proposed cost breakdown are presented in table 2.

Table 2. Activities and funding for maintaining and enhancing energy efficiency for Cuba

Description of activities	Cost (US \$)		Total
	CO ₂	R-290	
Design of two cold rooms based on transcritical CO ₂ and R-290 technology	5,000	3,000	8,000
Procurement of refrigeration equipment, insulation panels, system devices, materials and consumables for installation of two cold rooms	40,000	27,000	67,000
Leak detectors, sensors and safety systems	1,600	2,600	4,200
Cooling system analyzers	400	400	800
Installation, test, trial and commissioning	5,000	5,000	10,000
<i>Sub-total for equipment, installations, and commissioning</i>	52,000	38,000	90,000
Training of 30 technicians and operators (15 for each technology) by an international consultant on energy efficiency design, selection of equipment, installation and operation of equipment to achieve maximum energy efficiency, safety use of refrigerant, repair and maintenance and technical exchange with equipment suppliers			20,000
One workshop for 30 participants to disseminate the results and to raise awareness			5,000
National consultant supporting implementation of the project			5,000
Total			120,000

11. Once the cold rooms are installed and operational, a comparative analysis of the performance and energy consumption of both cold rooms will be carried out with a third cold chamber using R-404A with similar capacity and cooling conditions provided by the beneficiary enterprise. Parameters for comparative analysis may include energy consumption, ambient temperature, condensing and evaporating temperature and pressure, load volume, door opening numbers, maintenance control and the chamber characterisation. Information will be collected for developing MEPS in the cold room subsector.

12. The project will be implemented in 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 whole cold room subsector as well as increased replacement of HFC-based installations.

13. 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 Cuba as co-funding.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

14. The Secretariat has reviewed the project proposal in light of decision 89/6 and sought additional information from UNDP on different activities.

15. The Government of Cuba is implementing a mandatory MEPS and labelling system and is supported by regulations and enforcement by the Ministry of Energy and Mines. The MEPS is reassessed every 2 years and enforced through resolutions that oblige any importer and manufacturer to certify and assess the technologies in the centres set up by the country, including the mandatory requirement to incorporate an energy efficiency label for electrical end-use equipment in order to be marketed in the country. The current MEPS covers domestic refrigeration and air-conditioners only and there is an interest in establishing MEPS for different RAC systems. The basic information collected through the demonstration project will be used for the development of MEPS for cold rooms. The national ozone unit (NOU) will collaborate with the Ministry of Energy and Mines to this effect.

16. The Secretariat discussed inclusion of HCFC-22 technology into the comparison study and the HCFC-22 phase-out associated with the demonstration project in line with decision 89/6. UNDP explained that the project proposal will target the most commonly used HCFC-22 cold rooms with a volume of up to 40 m³. Based on the estimated HCFC-22 charge of 8 kg per chamber, the phase-out directly associated with the project would be 16 kg of HCFC-22. It was agreed that the comparative analysis of the performance and energy consumption of cold rooms as mentioned in paragraph 11 will include the HCFC-22 technology as well.

17. The Secretariat noted that there is already some use (62 units) of R-290 in the cold room subsector. UNDP explained that for many years Cuba has been converting facilities operating with HCFCs and HFCs to hydrocarbons. The cold rooms using R-290 or R-600a are from retrofitting existing installations, not newly established facilities. The energy efficiency of the retrofitted cold rooms may not be representative for study. The intention of the proposal is to install a cold room designed from the start to work with R-290 technology. The results will also be disseminated to encourage other users to invest in these technologies rather than replacing their end-of-life equipment with HFC-based technology available on the market. UNDP will monitor the energy performance and safety aspects (operation, repair and maintenance) of the technologies and ensure service is provided in a safe manner. The information collected will be disseminated through the activities planned under the HPMP to ensure sustainable adoption of these technologies.

Updated Agreement

18. In view of funding for additional activities to maintain energy efficiency in the refrigeration servicing sector and the accordingly revised funding level, the Agreement between the Government of Cuba 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 86th meeting, as contained in annex I to the present document. The full updated Agreement will be appended to the final report of the 94th meeting.

Conclusion

19. The project is designed to promote energy efficiency design and operation of cold rooms while introducing low-GWP technologies. The implementation of the activities in the project is anticipated to generate positive impact for environmental sustainability by reducing energy usage and promoting low-GWP technologies. The project will be implemented in an integrated manner with HCFC phase-out and HFC phase-down to optimize benefits and has included a component for monitoring and comparative analysis with different technologies for further updating MEPS. The outcomes of the demonstration will be disseminated to key stakeholders to enable informed decisions when opting for low-GWP technologies. Training of technicians on energy efficient design and operation with R-290 and CO₂ systems are included in the project to ensure sustainability.

RECOMMENDATION

20. The Fund Secretariat recommends blanket approval of the project for 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 in Cuba, and the corresponding 2024 to 2027 implementation plan, at the funding level shown in the table below, on the understanding that:

- (a) The Fund Secretariat has updated the Agreement between the Government of Cuba and the Executive Committee, as contained in annex I to the present document, specifically Appendix 2-A, based on the revised funding level due to the inclusion of funding for additional activities to maintain energy efficiency in the refrigeration servicing sector; and paragraph 17 that has been added to indicate that the updated Agreement supersedes that reached at the 86th meeting; and
- (b) Upon completion of the technology demonstration project included in stage II of the HPMP, UNDP will submit a final report on the implementation of this project, in line with decision 92/36(g).

	Project title	Project funding (US \$)	Support costs (US \$)	Implementing agency
(a)	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	120,000	8,400	UNDP

Annex I

TEXT TO BE INCLUDED IN THE UPDATED AGREEMENT BETWEEN THE GOVERNMENT OF CUBA AND THE EXECUTIVE COMMITTEE OF THE MULTILATERAL FUND FOR THE PHASE-OUT OF HYDROCHLOROFLUOROCARBONS

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

17. This updated Agreement supersedes the Agreement reached between the Government of Cuba and the Executive Committee at the 86th meeting of the Executive Committee.

APPENDIX 2-A: THE TARGETS, AND FUNDING

Row	Particulars	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)	10.97	10.97	10.97	10.97	5.49	5.49	5.49	5.49	0	n/a
1.2	Maximum allowable total consumption of Annex C, Group I substances (ODP tonnes)	10.97	10.97	10.97	10.97	5.49	5.49	5.49	5.49	0	n/a
2.1	Lead IA UNDP agreed funding (US \$)	260,000	0	260,000	120,000	208,000	0	208,000	0	104,000	1,160,000
2.2	Support costs for Lead IA (US \$)	18,200	0	18,200	8,400	14,560	0	14,560	0	7,280	81,200
3.1	Total agreed funding (US \$)	278,200	0	278,200	128,400	222,560	0	222,560	0	111,280	1,241,200
4.1.1	Total phase-out of HCFC-22 agreed to be achieved under this Agreement (ODP tonnes)										10.94
4.1.2	Phase-out of HCFC-22 to be achieved in the previous stage (ODP tonnes)										3.31
4.1.3	Remaining eligible consumption for HCFC-22 (ODP tonnes)										0.00
4.2.1	Total phase-out of HCFC-124 agreed to be achieved under this Agreement (ODP tonnes)										0.01
4.2.2	Phase-out of HCFC-124 to be achieved in the previous stage (ODP tonnes)										0.00
4.2.3	Remaining eligible consumption for HCFC-124 (ODP tonnes)										0.00
4.3.1	Total phase-out of HCFC-141b agreed to be achieved under this Agreement (ODP tonnes)										0.00
4.3.2	Phase-out of HCFC-141b to be achieved in the previous stage (ODP tonnes)										2.60
4.3.3	Remaining eligible consumption for HCFC-141b (ODP tonnes)										0.00
4.4.1	Total phase-out of HCFC-142b agreed to be achieved under this Agreement (ODP tonnes)										0.02
4.4.2	Phase-out of HCFC-142b to be achieved in the previous stage (ODP tonnes)										0.00
4.4.3	Remaining eligible consumption for HCFC-142b (ODP tonnes)										0.00
4.5.1	Total phase-out of HCFC-141b contained in imported pre-blended polyols agreed to be achieved under this Agreement (ODP tonnes)										0.00
4.5.2	Phase-out of HCFC-141b contained in imported pre-blended polyols to be achieved in the previous stage (ODP tonnes)										13.35
4.5.3	Remaining eligible consumption for HCFC-141b contained in imported pre-blended polyols (ODP tonnes)										0.00