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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Eighty-fifth Meeting
Montreal, 25-29 May 2020
Postponed to 19-22 July 2020*

PROJECT PROPOSAL: ECUADOR

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

Phase-out

• HCFC phase-out management plan (stage I, fifth tranche)

UNIDO and UNEP

^{*} Due to coronavirus disease (COVID-19)

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS Ecuador

(I) PROJECT TITLE	AGENCY	MEETING APPROVED	CONTROL MEASURE
HCFC phase out plan (Stage I)	UNEP, UNIDO (lead)	65 th	35% by 2020

(II) LATEST ARTICLE 7 DATA (Annex C Group l)	Year: 2019	14.03 (ODP tonnes)
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(III) LATEST COUNTRY PROGRAMME SECTORAL DATA (ODP tonnes)									Year: 2019
Chemical	Aerosol	Foam	Fire fighting	Refrigeration		Solvent	Process agent	Lab use	Total sector consumption
				Manufacturing	Servicing				
HCFC-22					13.27				13.27
HCFC-123					0.01				0.01
HCFC-124									
HCFC-141b					0.74				0.74
HCFC-141b in imported pre-blended polyols		11.20							11.20
HCFC-142b									

(IV) CONSUMPTION DATA (ODP tonnes)								
2009 - 2010 baseline:	23.49	Starting point for sustained aggregate reductions:	44.16					
	CONSUMPTION ELIGIBLE FOR FUNDING (ODP tonnes)							
Already approved:	28.03	Remaining:	16.13					

(V) BUSINESS PLA	N	2020	Total
UNIDO	ODS phase-out (ODP tonnes)	0.65	0.65
	Funding (US \$)	59,125	59,125
UNEP	ODS phase-out (ODP tonnes)	0.12	0.12
	Funding (US \$)	11,300	11,300

(VI) PRO	JECT DA	TA	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
Montreal Protocol consumption limits		n/a	n/a	23.49	23.49	21.14	21.14	21.14	21.14	21.14	15.27	n/a	
Maximum allowable consumption (ODP tonnes)		n/a	n/a	23.49	23.49	21.14	21.14	21.14	21.14	21.14	15.27	n/a	
Agreed	UNIDO	Project costs	1,531,940	0	86,500	0	0	86,500	0	518,219	0	55,000	2,278,159
funding (US\$)		Support costs	114,896	0	6,488	0	0	6,487	0	36,707	0	4,125	168,703
	UNEP	Project costs	30,000	0	20,000	0	0	30,000	0	25,000	0	10,000	115,000
		Support costs	3,900	0	2,600	0	0	3,900	0	3,250	0	1,300	14,950
Funds app	•	Project costs	1,561,940	0	106,500			116,500		*543,219			2,328,159
ExCom (U	J 3 \$)	Support costs	118,796	0	9,088			10,387		39,957			178,228
Total fund requested	for	Project costs										65,000	65,000
approval a meeting (Support costs										5,425	5,425

^{*}Including the polyurethane (PU) foam sector plan approved at the 81st meeting and subsumed under the Agreement.

Secretariat's recommendation:	Blanket approval
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PROJECT DESCRIPTION

1. On behalf of the Government of Ecuador, UNIDO as the lead implementing agency has submitted a request for funding for the fifth and final tranche of stage I of the HCFC phase-out management plan (HPMP), at a total cost of US \$70,425, consisting of US \$55,000, plus agency support costs of US \$4,125 for UNIDO, and US \$10,000, plus agency support costs of US \$1,300 for UNEP.¹ The submission includes a progress report on the implementation of the fourth tranche and the tranche implementation plan for 2020 to 2021.

Report on HCFC consumption

2. The Government of Ecuador reported a consumption of 14.03 ODP tonnes of HCFC in 2019, which is 40.3 per cent below the HCFC baseline for compliance. The 2015-2019 HCFC consumption is shown in Table 1.

Table 1. HCFC consumption in Ecuador (2015-2019 Article 7 data)

HCFC	2015	2016	2017	2018	2019	Baseline
Metric tonnes (mt)						
HCFC-22	347.10	310.21	288.95	243.00	241.21	382.27
HCFC-123	1.27	4.43	1.74	0.00	0.47	9.18
HCFC-124	0.44	0.30	0.54	0.26	0.00	9.99
HCFC-141b	8.70	9.91	19.73	19.06	6.70	7.84
HCFC-142b	0.27	0.18	0.33	0.15	0.00	18.45
Sub-total (mt)	357.78	325.03	311.29	262.47	248.38	427.73
HCFC-141b in imported pre-blended	142.56	181.07	118.09	131.29	101.79	187.91**
polyols*						
Total (mt)	500.34	506.10	429.38	393.76	350.17	615.64
ODP tonnes						
HCFC-22	19.09	17.06	15.89	13.37	13.27	21.02
HCFC-123	0.03	0.09	0.03	0.00	0.01	0.18
HCFC-124	0.01	0.01	0.01	0.01	0.00	0.22
HCFC-141b	0.96	1.09	2.17	2.10	0.74	0.86
HCFC-142b	0.02	0.01	0.02	0.01	0.00	1.20
Sub-total (ODP tonnes)	20.10	18.26	18.13	15.49	14.02	23.49
HCFC-141b in imported pre-blended	15.68	19.92	12.99	14.44	11.20	20.67**
polyols*						
Total (ODP tonnes)	35.78	38.18	31.11	29.93	25.21	44.16

^{*}Country programme data submitted on 17 March 2020

3. Since 2015, HCFC-22 consumption has been gradually decreasing due to activities implemented under the HPMP, including the enforcement of the HCFC import/export licensing and quota system, training of technicians and promotion of alternatives technologies in the refrigeration and air-conditioning (RAC) sector; introduction of non-HCFC based RAC equipment in the market; and an economic slowdown. During 2017 and 2018, HCFC-141b consumption for flushing refrigeration circuits during servicing increased; however, this practice was discontinued as of 1 January 2020, following the ban on imports of pure HCFC-141b, and the use of nitrogen has been promoted as an alternative.

Country programme (CP) implementation report

4. The Government of Ecuador reported HCFC sector consumption data under the 2019 CP

^{**}Starting point established in the Agreement with the Executive Committee.

¹ As per the letter of 13 March 2020 from the Ministry of Production, Foreign Trade, Investment, and Fisheries of Ecuador to UNIDO.

implementation report that is consistent with the data reported under Article 7 of the Montreal Protocol.

Progress report on the implementation of the fourth tranche of the HPMP

Legal framework

- 5. The Government of Ecuador has an operational HCFC import licensing and quota system, which also includes licenses (no quotas) for HFC imports since August 2017. The Ministry of Production, Foreign Trade, Investment, and Fisheries (MPCEIP) and the National Customs Service (SENAE) continue to exchange information on HCFC imports, and importers are obliged to submit quarterly invoices and customs declarations in digital form. Furthermore, the Government participates in the informal prior informed consent (iPIC) electronic portal developed by UNEP. The use of this system helped avoid the import of an unauthorized shipment of 125 mt of HCFC-22.
- 6. Through mutual agreement, MPCEIP provides regular training to SENAE officers on ODS regulations, Montreal Protocol regulations, and the prevention of illegal trade in ODS. To ensure the sustainability of the ODS phase-out, the Government has enforced the bans on substances already phased out (e.g., CFC) through the regulations developed with the Foreign Trade Committee and SENAE, and has issued instructions at the ministerial level to improve control procedures and standardize the documents to approve import licenses. In order to control the import of counterfeit refrigerant, the Ecuadorian Standardization Service is considering developing a regulatory instrument that would allow market surveillance and seizure of counterfeit refrigerant. The Government is not aware of any use of phased-out controlled substances in the local market.
- 7. A total of 350 customs officers were trained between 2013 and 2019, and additional training for 50 officers is planned for 2020. The sustainability of customs training is ensured through a web page on the MPCEIP platform, which includes interactive tools to deliver training courses (online and in person), as well as discussion forums and consultation sections.
- 8. In addition, the Government of Ecuador established a ban on the manufacturing and import of HCFC-based air-conditioners as of 1 January 2019, a ban on the manufacturing and import of domestic refrigeration equipment using HCFCs in thermal insulation and HCFCs and HFCs as refrigerants as of 1 March 2019, and a ban on the import of HCFC-141b as a pure substance as of 1 January 2020.
- 9. The Government also committed to not issuing any import quotas for HCFC-141b contained in pre-blended polyols as of 1 January 2020, except for a maximum of 0.86 ODP tonnes (7.78 mt) for the spray foam sector for 2020 and 2021. However, postponing the ban on imports of pre-blended polyols with HCFC-141b to 1 January 2021 (except for spray foam, which is set to 1 January 2022), once the PU foam project has been completed, is currently under consideration.

Manufacturing sector

- 10. The largest domestic refrigeration enterprise (Induglob) converted from the use of 136 mt (14.96 ODP tonnes) of HCFC-141b contained in imported pre-blended polyols as insulation foam to cyclopentane. It also converted from the use of HFC-134a for the refrigeration system to R-600a with its own funding.
- 11. The PU foam sector plan to phase out 44.10 mt (4.85 ODP tonnes) of HCFC-141b contained in imported pre-blended polyols, approved as part of stage I of the HPMP at the 81st meeting, is currently being implemented. Foam enterprises completed their first stage of testing HFO, CO₂, pre-blended hydrocarbon (HC), and water-based technologies with positive results; the second stage of testing will be completed during 2020. It is expected that by the end of 2020, foam producers of continuous and discontinuous panels and other commercial applications, except spray, will decide on a low-global warming potential (GWP) alternative to HCFC-141b.

- 12. One domestic refrigeration enterprise (Ecasa) completed the conversion of the foam insulation of panels to pre-blended HC. However, due to budget restrictions, it has been unable to convert with its own funding the refrigeration part of the process from HFC-134a and R-404A to isobutane (R-600a) and propane (R-290), respectively. Thus, Ecasa has been importing rather than producing equipment with isobutane and propane at a lower cost, reducing its production until new investments are secured by the enterprise.
- 13. UNIDO has identified seven new foam enterprises that are stakeholders of the PU foam sector plan; these enterprises received information about technical and risk aspects of low-GWP blowing agents, but will convert with their own resources. In order to allow these and other enterprises to complete tests with low-GWP alternative blowing agents and the associated conversion of their manufacturing processes, the Government of Ecuador is considering the possibility of postponing the ban on imports of HCFC-141b contained in imported pre-blended polyols from 1 January 2020 to 1 January 2021, except for spray foam users, who have a later deadline, 1 January 2022.

Refrigeration servicing sector

14. The following activities continue to be implemented:

Technician training and certification

- (a) Eighteen training centres from the Ecuadorian Professional Training Service (SECAP) and one additional technical institute were provided with equipment and tool kits, including refrigerant recovery equipment, recovery cylinders, pressure gauge, vacuum pump, leak detector, clamp meter, and hand tools. SECAP instructors and 957 technicians received training in safe handling of flammable refrigerants and good practices during the installation and maintenance of RAC systems;
- (b) The RAC technician certification scheme was developed and will be operated from the second half of 2020 by SECAP in collaboration with the Technical Secretariat of the National System of Professional Qualifications (SETEC), MPCEIP and UNIDO;

Pilot project to demonstrate the safe use of R-290 in a cold room used for flower storage

- (c) A flower producer (Hilsea) replaced an HCFC-22-based system (25 kg charge) located in a cold room with an R-290-based system, using the safety standard for refrigeration (EN-378) and the standard for explosive atmospheres, explosion prevention and protection (EN-1127-1) for flammability risk assessment. The project demonstrated safe handling and proper risk management for the use of flammable refrigerants in the conservation of perishable products; training was also provided to the beneficiary enterprise and the enterprise responsible for the installation of the HC refrigeration equipment;
- (d) The installation of the R-290 refrigeration system was completed in December 2019 and the results of the project will be disseminated in the second half of 2020. These results include an increase by around 20 per cent of the coefficient of performance and a reduction in energy consumption of 36 per cent for the R-290 system compared to the HCFC-22-based system; estimated operational savings of US \$95,500 during the lifetime of the equipment (i.e., 15 years); and an estimated emission reduction of 1,501 tonnes (41 per cent) of CO₂-equivalent over the same period;

Development of technical standards for handling refrigerants

(e) Technical Standards and Technical Regulations to include safety matters in the handling, transport, recovery, recycling and storage of flammable refrigerants were developed with

the support of SECAP, SETEC and MPCEIP. A revision of international standards will also be undertaken to enable the safe use of zero-ODP and low-GWP alternatives; and

Other activities

(f) Training of 20 technicians and distribution of 12 tool kits to assist the Government in declaring the Galapagos Islands free of ODS by 2020; and implementation of the "Zero Leaks" pilot project, to provide technical assistance to two large consumers of refrigerants (e.g., supermarket or flower producer) to reduce refrigerant leaks, and monitor system performance and energy consumption associated with leakage control and good maintenance service.

Project implementation and monitoring

15. The implementation of the HPMP continues to be coordinated by the National Ozone Unit (NOU). During the eight years of implementation of stage I a total of US \$140,270 has been spent on personnel training (US \$3,000), travel (US \$37,192), workshops and meetings with stakeholders (US \$52,963), and monitoring activities, which comprise the coordination of all the activities in the plan (including the PU foam sector plan approved at the 81st meeting), contracting for goods and services required during implementation, analysis of the market trends, implementation of corrective measures, and preparation of progress reports for tranche requests (US \$47,115).

Level of fund disbursement

16. As of March 2020, of the US \$1,896,440 approved so far, US \$1,864,591 had been disbursed (US \$1,765,197 for UNIDO and US \$99,394 for UNEP), as shown in Table 2. The balance of US \$31,849 will be disbursed in 2020.

Table 2. Financial report of stage I of the HPMP for Ecuador (US \$)

Tranche	·	UNIDO	UNEP	Total	Disbursement rate (%)
First	Approved	1,531,940	30,000	1,561,940	100.0
FIISt	Disbursed	1,531,940	30,000	1,561,940	100.0
Second	Approved	86,500 20,000 106,500		106,500	100.0
Second	Disbursed	86,500	20,000	106,500	100.0
Third	Approved	86,500	30,000	116,500	96.1
TIIII	Disbursed	86,348	25,629	111,977	90.1
Fourth*	Approved	86,500	25,000	111,500	75.5
roului.	Disbursed	60,409	23,765	84,174	73.3
Total*	Approved	1,791,440	105,000	1,896,440	00.2
	Disbursed	1,765,197	99,394	1,864,591	98.3

^{*}Excluding the funding related to the PU foam sector plan approved at the 81st meeting.

Implementation plan for the fifth and final tranche of the HPMP

- 17. The following activities will be implemented between July 2020 and December 2021:
 - (a) Strengthening of the ODS legal framework (UNEP) (US \$10,000): continued support of institutional coordination; training of 50 customs officers and other enforcement officers on the prevention of illegal trade; and update of standards for the use of flammable refrigerants;
 - (b) Technical assistance for the refrigeration servicing sector (UNIDO) (US \$38,000): training of 300 technicians in good practices and safe handling of low-GWP alternatives; implementation of the certification scheme and certification of 100 technicians;

establishing of one reclaiming operation centre; development of a self-learning manual for technicians; replication of the Hilsea project in at least one enterprise and continued promotion of HC as alternative refrigerant; and the implementation of the Galapagos Islands and the "Zero Leaks" programmes;

- (c) Continued implementation of the PU foam sector plan approved at the 81st meeting (UNIDO); and
- (d) Implementation and monitoring (UNIDO) (US \$17,000): comprising US \$3,000 for staff and consultants, US \$2,000 for workshops and meetings, and US \$12,000 for the implementation and monitoring services for all activities within the HPMP, including completion of the PU foam sector plan, analysis of market trends and developments; technical assistance to beneficiaries; monitoring of energy efficiency of HC-based RAC equipment; monitoring of gender indicators; and preparation of reports.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

Progress report on the implementation of the fourth tranche of the HPMP

Legal framework

- 18. The Government of Ecuador has already issued HCFC import quotas for 2020 and 2021 at 15.27 ODP tonnes, in accordance with the Montreal Protocol control targets.
- 19. Based on an observation from the verification submitted at the 82nd meeting (one enterprise that imported a slightly higher amount than the allocated quota), in approving the fourth tranche the Executive Committee requested the Government, UNIDO and UNEP to include in the fifth tranche an update on the measures taken by the country to ensure that HCFC imports by individual importers do not exceed the issued quotas. Accordingly, UNIDO reported that the customs authority (SENAE) is carrying out a more effective control on imports and applying the sanction measures in the Organic Code of Production, Commerce and Investments; also, the NOU has signed an agreement with SENAE to ensure better control of illicit traffic of controlled substances and provided additional training and refrigerant identifiers to customs officers. Risk profiles for tariffs of controlled substances and physical inspections for all related goods and, in some cases, laboratory tests are also being implemented.
- 20. A resolution of the Foreign Trade Committee dated 20 December 2019, as well as the development of instructions, agreements and other secondary instruments, have allowed Ecuador to reinforce the control of substances subject to the licensing system, and comply with national commitments to ban substances, as in the case of HCFC-141b pure.

Postponement of the ban on imports of HCFC-141b contained in pre-blended polyols

- 21. On 22 November 2019, the Government of Ecuador informed the Secretariat of the need to postpone the ban on imports of HCFC-141b contained in pre-blended polyols from 1 January 2020 to 1 January 2021 (except for spray foam users, with a deadline of 1 January 2022). This extension would allow PU foam enterprises to complete tests with low-GWP alternative blowing agents and undertake the associated conversion of their manufacturing processes.
- 22. In further justifying the need to postpone the ban for a year, UNIDO explained that the tests with low-GWP blowing agents started late as additional enterprises were identified and invited to participate (although any conversion by these enterprises will be self-funded). A systems house from Colombia tested water-based options for spray applications in 2019, but tests with pre-blended HC by a provider from

Mexico could only take place in January 2020. Also in 2019, two international systems houses tested HFCs, but UNIDO did not support those tests as they used high-GWP technology. Therefore, the providers developed other formulations with low-GWP alternatives. While new tests were scheduled for the first half of 2020, due to the COVID-19 emergency they have been postponed.

23. The Secretariat considers that this extension will allow for the conversion of all foam enterprises using HCFC-141b as a blowing agent and for the introduction of low-GWP alternatives in the local market; accordingly, it is informing the Executive Committee along with the submission of the present tranche.

Availability of technology in the PU foam sector

24. The distribution of HFO and water-based alternatives met neither market challenges nor introduction issues, but cost considerations will be decisive. Pre-blended HC polyols, if imported directly by end-users, will also be available without limitations and at a competitive cost. Activities with small and medium-sized enterprises (SMEs) that cannot import directly are crucial and are expected to need more assessment and advisory work from the project. In view of these challenges, the date of completion of the foam sector plan was revised to the end of 2020; however, the international COVID-19 emergency may further delay its completion by a number of months. Whereas UNIDO has supported the development of tests with water, HC and HFO, international suppliers have also independently carried out tests with high-GWP HFCs with good results. UNIDO and the NOU will maintain efforts to ensure that producers select environmentally-friendly alternatives.

Refrigeration servicing sector

- 25. In line with decision 84/84 related to demonstration and pilot projects directed to end-users, UNIDO provided the following additional information on the replacement of an HCFC-22 refrigeration system by an R-290 system:
 - (a) Fifty-seven per cent of the total budget (US \$21,856) was used for the purchase of two new R-290 compressors, 33 per cent was invested in accessories for the refrigeration system, transportation, workmanship and safety (sensors, visual and audible alarm, control); and the remaining 10 per cent, co-financed by the beneficiary, was invested in electrical items designed for flammable atmospheres and the elimination of ignition sources;
 - (b) The pilot is fully integrated with the other activities in the HPMP. The training programme implemented and the certification scheme developed contain aspects of refrigerant security classification, and safe handling in the installation and maintenance of RAC systems, which are part of this demonstration. The HPMP also includes the formulation of a standard for handling flammable refrigerants. The HCFC-22 from decommissioned equipment can be recovered, reclaimed and reused in the recovery, recycling and reclamation network being developed under the HPMP. Workshops will also be held with RAC technicians and end-users to demonstrate the experience, to promote flammability risk assessment with the identification of possible ignition sources and activities to be implemented to eliminate them, and to demonstrate good installation practices and determination of the maximum allowable charge of flammable refrigerant according to the application and occupation; and
 - (c) On the potential for replicability, it is expected that some enterprises dedicated to the floriculture, dairy and meat products sector that require similar cooling conditions in their cold chain would be interested in adopting R-290 systems based on the positive environmental and economic results of the project. In 2020 the Government of Ecuador will undertake dissemination workshops addressed to decision-makers, managers, supervisors and technical staff from enterprises with similar cooling needs. It is expected that compressor suppliers will start offering components kits that will make the option more attractive. Whereas the NOU will provide technical assistance, the entire investment will

be covered by interested enterprises.

Gender policy implementation²

- 26. UNIDO reported that one out of every 25 RAC technicians receiving training in Ecuador is a woman. As of 2020, the registration of participants in any training session under the HPMP is disaggregated by gender, and future monitoring and evaluation of the project will specify reporting on gender issues and the progress in addressing them in accordance with a comprehensive set of gender indicators agreed for the project and the gender policy of UNIDO.
- 27. In the past years, the invitation of women to all training events has been applied without restriction, thereby ensuring that both women and men can provide input, have access to and participate in the HPMP activities. So far, there is one female instructor at SECAP.

Sustainability of the HCFC phase-out

28. In order to ensure the sustainability of the training provided through the HPMP, agreements between MPCEIP and the technical training institutions have been established; through these agreements, the training institutes have to incorporate the subject of good service practices in refrigeration into their educational curriculum, have to continue providing training to refrigeration technicians under their regular programmes, and have to report periodically on the number of technicians trained. The training institutions have been strengthened with equipment and tool kits to provide hands-on training to technicians. UNIDO has also focused on building the capacity of local experts to become trainers at a national level, ensuring training for a larger number of technicians. The implementation of the technicians' certification scheme, fully operated by local institutions, will help ensure the sustainability of training activities. MPCEIP has also an agreement with SENAI to ensure the continuous capacity building of customs officers on *inter alia* ODS regulations, illegal trade of ODS and counterfeit refrigerants.

Date of completion of stage I

29. As per the Agreement, the duration of stage I is up to December 2021. UNIDO has confirmed that so far activities are progressing as planned and completion is expected by the scheduled date. However, the present global situation is expected to slow down implementation, which may require a future review of the situation.

Conclusion

30. The Government of Ecuador continues to be in compliance with the Montreal Protocol and its Agreement with the Executive Committee. The HCFC import licensing and quota system has been further improved, the country has established a ban on the import of HCFC-141b pure from 1 January 2020 and will establish the ban on imports of HCFC-141b contained in imported pre-blended polyols as of 1 January 2021. A total of 350 customs officers have been trained, implementation of the PU foam sector plan for the remaining eligible PU foam enterprises has started, a total of 957 technicians have been trained in good service practices, 19 training institutes have been strengthened with equipment and service tools, and one flower producer implemented a demonstration project to replace HCFC-22 equipment located in its cold room with a new R-290-based equipment, thereby obtaining improvements in performance and energy use. Activities planned under the fifth tranche will be completed as planned by December 2021; however, UNIDO indicated that given the current situation related to COVID-19, this may need to be reassessed in the future.

² Decision 84/92(d) requested bilateral and implementing agencies to apply the operational policy on gender mainstreaming throughout the project cycle.

RECOMMENDATION

31. The Fund Secretariat recommends that the Executive Committee takes note of the progress report on the implementation of the fourth tranche of stage I of the HCFC phase-out management plan of (HPMP) for Ecuador; and further recommends blanket approval of the fifth and final tranche of stage I of the HPMP for Ecuador, and the corresponding 2020-2021 tranche implementation plan, at the funding levels shown in the table below:

	Project title	Project funding (US \$)	Support cost (US \$)	Implementing agency
(a)	HCFC phase-out management plan (stage I, fifth tranche)	55,000	4,125	UNIDO
(b)	HCFC phase-out management plan (stage I, fifth tranche)	10,000	1,300	UNEP