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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Eighty-sixth Meeting
Montreal, 2-6 November 2020
Postponed to 8-12 March 2021¹

PROJECT PROPOSAL: BRAZIL

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

Phase-out

- HCFC phase-out management plan (stage II, fourth tranche)

UNDP/UNIDO/
Germany/Italy

¹ Due to coronavirus disease (COVID-19)

Pre-session documents of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol are without prejudice to any decision that the Executive Committee might take following issuance of the document.

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS

Brazil

(I) PROJECT TITLE	AGENCY	MEETING APPROVED	CONTROL MEASURE
HCFC phase out plan (Stage II)	Germany, Italy, UNDP (lead), UNIDO,	75 th	45% by 2021

(II) LATEST ARTICLE 7 DATA (Annex C Group I)	Year: 2019	838.85 (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				84.79	480.46				565.24
HCFC-123					0.30				0.30
HCFC-124					0.59				0.59
HCFC-141b		259.24				13.64			272.88
HCFC-142b		0.02							0.02

(IV) CONSUMPTION DATA (ODP tonnes)			
2009 - 2010 baseline:	1,327.3	Starting point for sustained aggregate reductions:	1,327.3
CONSUMPTION ELIGIBLE FOR FUNDING (ODP tonnes)			
Already approved:	684.36	Remaining:	642.94

(V) BUSINESS PLAN		2020	2021	2022	After 2022	Total
UNIDO	ODS phase-out (ODP tonnes)	46.70	25.81	12.90	0	85.41
	Funding (US \$)	3,872,721	2,140,000	1,070,000	0	7,082,721
Germany	ODS phase-out (ODP tonnes)	12.96	19.36	0	11.26	43.58
	Funding (US \$)	1,116,345	1,666,941	0	969,856	3,753,142
UNDP	ODS phase-out (ODP tonnes)	50.26	0.0	0	0	50.26
	Funding (US \$)	4,167,650	0	0	0	4,167,650

(VI) PROJECT DATA			2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
Montreal Protocol consumption limits			1,194.60	1,194.60	1,194.60	1,194.60	1,194.60	862.74	862.74	862.74	862.74	n/a
Maximum allowable consumption (ODP tonnes)			1,194.60	1,194.60	1,194.60	1,194.60	1,194.60	862.74	730.02	730.02	730.02	n/a
Agreed* funding (US \$)	UNDP	Project costs	3,078,900	0	2,627,704	7,168,396	0	0	3,895,000	0	0	16,770,000
		Support costs	215,523	0	183,939	501,788	0	0	272,650	0	0	1,173,900
	UNIDO	Project costs	1,950,275	0	0	**1,902,953	0	0	116,000	0	0	**3,969,228
		Support costs	136,519	0	0	**133,507	0	0	8,120	0	0	**277,846
	Germany	Project costs	1,299,386	0	686,978	2,363,637	0	1,004,545	1,500,000	0	872,727	7,727,273
		Support costs	144,614	0	76,457	263,059	0	111,800	166,941	0	97,129	860,000
	Italy	Project costs	250,000	0	0	0	0	0	0	0	0	250,000
		Support costs	32,500	0	0	0	0	0	0	0	0	32,500
Funds approved by ExCom (US\$)		Project costs	6,578,561	0	3,314,682	**11,434,986	0	0	0	0	0	**21,328,229
		Support costs	529,156	0	260,396	**898,053	0	0	0	0	0	**1,687,606
Total funds requested for approval at this meeting (US\$)		Project costs						1,004,545				1,004,545
		Support costs						111,800				111,800

* Reflects the figures in the revised Agreement (Annex II).

** US \$744,104, plus agency support cost of US \$52,087 to be returned by UNIDO at the 86th meeting have been deducted from the original figure.

Secretariat's recommendation:	Individual consideration
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PROJECT DESCRIPTION

1. On behalf of the Government of Brazil, UNDP as the lead implementing agency has submitted a request for funding for the fourth tranche of stage II of the HCFC phase-out management plan (HPMP), at a total cost of US \$3,386,025, consisting of US \$2,121,197, plus agency support costs of US \$148,484 for UNIDO, and US \$1,004,545, plus agency support costs of US \$111,800 for the Government of Germany.² The submission includes a progress report on the implementation of the third tranche, the verification report on HCFC consumption for 2018 and 2019 and the tranche implementation plan for 2020 to 2022.

2. The level of funds requested by UNIDO is lower than the programmed tranche of US \$3,619,365, plus agency support cost of US \$253,356. In addition, the programmed tranche of US \$3,895,000, plus agency support cost of US\$272,650 for UNDP is not being requested at the present meeting.

Report on HCFC consumption

3. The Government of Brazil reported a consumption of 838.85 ODP tonnes of HCFC in 2019, which is 37 per cent below the HCFC baseline for compliance. The 2015-2019 HCFC consumption is shown in Table 1.

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

HCFC	2015	2016	2017	2018	2019	Baseline
Metric tonnes (mt)						
HCFC-22	12,757.62	11,101.86	10,050.47	8,830.72	10,277.15	14,401.0
HCFC-123	0.00	-2.87	14.89	8.99	14.77	14.9
HCFC-124	238.12	69.22	42.98	26.20	26.69	351.3
HCFC-141b	2,863.05	2,371.80	2,586.90	3,076.16	2,479.10	4,741.3
HCFC-142b	60.96	35.74	(20.50)	2.02	0.35	86.3
Total (mt)	15,919.75	11,575.75	12,674.74	11,943.94	12,798.06	19,594.8
ODP tonnes						
HCFC-22	701.67	610.60	552.78	485.69	565.24	792.0
HCFC-123	0.00	-0.06	0.30	0.18	0.30	0.30
HCFC-124	5.24	1.52	0.95	0.58	0.59	7.7
HCFC-141b	314.94	260.9	284.56	338.38	272.70	521.7
HCFC-142b	3.96	2.32	(1.33)	0.13	0.02	5.6
Total (ODP tonnes)	1,025.81	875.29	837.26	824.96	838.85	1,327.3

4. The declining HCFC consumption trend is due to legislative measures including the operation of the licensing and quota system, implementation of phase-out activities in the polyurethane (PU) foam and refrigeration manufacturing sectors approved under stages I and II of the HPMP, conversion of insulation foam used in domestic refrigeration equipment manufactured by multinational enterprises without assistance from the Multilateral Fund, public awareness of the need to keep reaching the compliance targets up to 2020, the economic slowdown over the last few years, and the introduction of non-HCFC-based refrigeration and air-conditioning equipment.

5. HCFC-22 consumption increased in 2019 given the need to service installed equipment and its low price compared to alternatives. However, this consumption increase will not represent a risk to achieving the 35 per cent reduction in 2020 since the quota system has established a reduction of 39.3 per cent of the HCFC consumption baseline by 2020, including the total phase-out of HCFC-141b in the PU foam sector.

Country programme (CP) implementation report

6. The Government of Brazil reported HCFC sector consumption data under the 2019 CP implementation report that is consistent with the data reported under Article 7 of the Montreal Protocol.

² As per the letter of 7 August 2020 from the Ministry of the Environment of Brazil to UNDP.

Verification report

7. The verification report confirmed that the Government continues to implement its licensing and quota system for HCFC imports and exports in an effective manner and that the total consumption of HCFCs reported under Article 7 of the Montreal Protocol for 2018 and 2019 is consistent with the import and export data issued by the Brazilian Institute of the Environment and Renewable Natural Resources. The verification concluded that all enterprises have met the requirements of the quota system, that the HCFC consumption levels for 2018 and 2019 meet the requirements of the Agreement between the Government of Brazil and the Executive Committee, and that the Government of Brazil is consistently promoting the reduction of HCFC consumption in the country.

Progress report on the implementation of the third tranche of the HPMP*Legal framework*

8. The Government continued implementing the HCFC import and export licensing and quota system, and supporting the Brazilian Association of Technical Standards (ABNT) in developing specific standards for the handling, installation and maintenance of equipment using flammable refrigerants (e.g., safety of refrigeration systems; based on the last version of standard ISO 5149). A ban on imports of HCFC-141b pure or contained in pre-blended polyols for the foam sector entered into force on 1 January 2020.

*PU foam manufacturing sector*Conversion of 13 stand-alone PU foam enterprises (53.52 ODP tonnes)³

9. Seven enterprises have completed their conversions to water-based technology, methyl formate (MF), methylal and HFO, phasing out 28.42 ODP tonnes of HCFC-141b. Five additional enterprises are in the process of conversion with an associated phase out of 18.16 ODP tonnes, and one enterprise (Ananda Metais, 6.93 ODP tonnes) is considering a change in technology from hydrocarbon (HC) to MF or HFO, but it has not made a final decision. Table 2 summarizes the status of progress of the 13 foam enterprises.

Table 2: Status of progress for individual projects in the PU foam manufacturing sector

Status of implementation	Enterprises	HCFC phase-out (ODP tonnes)	Technology
Project completed	7 (Artico, Cold Air, F. Ibiopora, Gelopar, IBF, Isar, Niju)	28.42	CO ₂ , MF, methylal, HFO
Formulation development completed and industrial conversions ongoing	4 (Bulltrade, Refrimate, Tecpur, Termjet/Thermotelas)	15.67	CO ₂ , HFO, MF
Formulation development and industrial conversion ongoing	1 (Sao Rafael)	2.50	CO ₂ or HFO
Possible change of technology	1 (Ananda Metais)	6.93	From HC to MF or HFO
Total	13	53.52	

Conversion of 14 systems houses with more than 700 downstream users (116.20 ODP tonnes)

10. Seven eligible systems houses have completed their formulations and plant conversions, where needed, and are in the process of assisting their downstream foam users to convert to formulations developed with low-GWP blowing agents; a total of 73 downstream users have already been converted.

³ The project originally included 14 enterprises for 57.14 ODP tonnes. One enterprise (Poliumetka, 3.63 ODP tonnes) was removed and not funded from stage II as this project was completed under stage I.

The remaining systems houses and downstream users are at different stages of implementation, as presented in Table 3.

Table 3. Status of progress for group projects in the PU foam manufacturing sector

Status of implementation	Systems house	Technology	Downstream users (DSU)	HCFC phase-out (ODP tonnes)	Status of implementation of DSU
Completed formulation development and plant conversion	Purcom	MF	90	15.03	Ongoing. 26 converted
	Polyurethane	MF	16	4.06	Ongoing. 24 converted
	Amino	MF	46	12.37	Ongoing. 6 converted
	Ecoblaster	MF	40	8.91	Ongoing. 3 converted
	Ariston	MF, methylal	32	3.27	Eligibility being validated
Completed formulation development, no plant conversion	Flexivel	HFO	260	8.23	Ongoing. 3 converted
	M. Cassab		24	7.1	Ongoing. 2 converted
Ongoing formulation development, completed plant conversion	U-Tech	MF, HFO	22	0.95	Eligibility being validated
Ongoing formulation development, plant conversion not started	Comfibras	HFO	12	0.84	Not started
Non-eligible systems houses developing formulations self-funded	Univar	CO ₂ , HFO, methylal	84	24.63	Ongoing. 9 converted
	Basf	HFO	8	3.02	Not started
	Dow	HFO	11	12.88	
Eligibility confirmed, conversion not started	Polisystem	MF	47	13.09	
	Shimtek	HFO	13	1.83	
Total	14		705	116.2	Not started

11. The constraints imposed by the COVID-19 pandemic has slowed down the ongoing conversion of systems houses and the downstream users and reduced the demand of foam products by users. While the conversion to low-GWP foam blowing agents are completed, the systems houses will continue using existing stocks of HCFC-141b noting that the ban on imports of HCFC-141b has been in effect from 1 January 2020.

12. UNDP also reported a challenge with part of the foam sector migrating toward high-GWP HFC foam formulations due to their availability in the local market (due to a strong marketing strategies implemented by international systems houses and chemical suppliers), and their competitive prices compared to HFO- or water-based- technologies.

Temporary use of high-GWP technology

13. One systems house (U-Tech), which has completed the conversion of its manufacturing plant from HCFC-141b to MF, is temporarily using HFC-134a to replace the use of HCFC-22 for some of its downstream clients using the froth application, which requires the use of a gaseous blowing agent (i.e., the usual low-GWP technologies alternative to HCFC-141b cannot be used in this application), with the commitment to discontinue its use, with its own resources, as soon as gaseous HFO is available on the market and polyol systems containing it have been developed and optimized. The enterprise is testing gaseous HFO formulations with the supplier's support.

Refrigeration and air-conditioning (AC) manufacturing sector (61.05 ODP tonnes)

14. Activities undertaken within the commercial refrigeration manufacturing sector included individual projects in the supermarket sector, group projects, and a technical assistance project in small and medium-sized enterprises (SMEs). The status of implementation is presented below.

Commercial refrigeration individual projects (8.67 ODP tonnes)

15. This project includes the conversion to R-290 of two enterprises (Eletrofrio and Plotter Rack), consuming more than 35 mt of HCFC-22, and demonstration of the new technology in the supermarket sector.

16. Eletrofrio completed the conversion and certification of its plant to manufacture equipment with R-290 refrigerant, developed a R-290-based modular chiller prototype composed of six modules and with a capacity of 20,000 kcal/h and total refrigerant charge of 11.40 kg (1.90 kg per module), and installed it in a supermarket in Curitiba following the safety standard ABNT ISO 5149 (a translation to Portuguese of ISO 5149). Initial data collected from the operation of the chillers indicate fewer technical problems and an approximately 3 per cent improvement in energy efficiency compared to similar systems using HFC-134a. The project received the international “Lower-GWP Refrigeration and Air-Conditioning Innovation Award” for its contribution to reducing the adverse impacts of refrigeration technologies on the ozone layer.⁴

17. Plotter Racks also completed the conversion of its manufacturing plant to operate with R-290 and developed, assembled and tested a modular chiller prototype with a capacity of 10,800 kcal/h and refrigerant charge of 1.04 kg per module, and installed it in a supermarket in Juiz de Fora in accordance with safety standards ABNT ISO 5149, EC 60355-2-89 and IEC 60079-15. The demonstration stage of the project started in April 2020, but due to the constraints imposed by the COVID-19 pandemic, no further activities have been carried out on-site. The project was disseminated through other means, including news and articles.⁵ A conclusion workshop for both individual conversions will take place in 2021.

Commercial refrigeration group projects (3.22 ODP tonnes)

18. This project includes the conversion of three enterprises with consumption between 10 and 35 mt of HCFC-22. One enterprise (Chopeiras Ribeirão Memo, 1.24 ODP tonnes of HCFC-22) converted its manufacturing line to produce R-290-based refrigeration equipment (beverage coolers) with a capacity of 3,860 BTU/h, refrigerant charge of 150 gr and energy consumption reduction from 1.7 kW/h to 0.72 kW/h. Commercial production is expected to start for the Brazilian, South American and African markets.

19. The second enterprise (Aquagel Refrigeração, 1.05 ODP tonnes of HCFC-22), producing beverage coolers and refrigerated displays, completed the conversion of the first manufacturing line to R-290 technology in May 2020. The enterprise also started the conversion of three lines (beer pre-cooling; refrigerated display; and the juice dispenser). The prototypes with capacities between 3,000 and 5,000 BTU and refrigerant charge from 90 to 130 gr were manufactured and are being tested in the enterprise laboratory.

20. At the 84th meeting, UNIDO reported that the third enterprise, (Freeart Seral, 0.93 ODP tonnes of HCFC-22) withdrew from the HPMP. Accordingly, the Executive Committee noted that the funds associated with the enterprise would be returned to the Fund unless UNIDO identified additional enterprises eligible for funding that had not been assisted under stage I or stage II of the HPMP to which those funds could be reallocated; and that any reallocation of funds would be reported to the 86th meeting (decision 84/33(a)(ii)). In line with decision 84/33(a)(ii), UNIDO reported that it had identified a potential eligible enterprise with characteristics similar to Freeart Seral (medium-sized) that could replace it, but would need more time to verify the eligibility of the enterprise and whether the funds could be reallocated.

⁴ Award was granted by the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), headquartered in Atlanta (USA), and by the United Nations Environment Programme (UNEP). A video of the project is available at: <https://youtu.be/E2TdMRb295c>

⁵ https://www.youtube.com/watch?v=nylRrIysTUE&feature=emb_title

21. UNIDO also reported minor delays that had been caused by the COVID-19 pandemic; however, the conversions of the two enterprises were expected to be fully completed during the first half of 2021.

Commercial refrigeration technical assistance project for SMEs (3.85 ODP tonnes)

22. Three additional workshops on R-290-, CO₂- and HFO-based technologies were held for beneficiary enterprises, representatives of the sector associations, experts, technicians and suppliers of components and refrigerants, and three newsletters (one on each of the three alternatives) were produced. Of the 33 SMEs included in the project, four that were not interested in participating were replaced by four other eligible enterprises.⁶

23. Six enterprises have started their conversions to R-290 and an additional enterprise has started its conversion to HFO, with the following results so far:

- (a) One enterprise (Chopeira Citti) developed in cooperation with the Federal University of Uberlandia a prototype for draft beer cooler equipment adapted to the requirements of the Brazilian market.⁷ The innovative aspects of the developed technology have been used and optimized by other enterprises in the project;
- (b) One enterprise (JJ Instalacoes) completed the conversion of its manufacturing line, developing seven models of commercial refrigeration units with capacities from 447 to 877 kcal/h and R-290 charge from 100 to 125 gr; and
- (c) Two enterprises (Kitfrigor and Refrimate) are starting the conversion, and three more (Mecalor, Refriac and Ingecold) are in the process of finalizing terms of reference for their conversions.

24. The conversion of the remaining 26 enterprises are being prioritized based on their capacity to handle flammable refrigerants and to co-finance the conversion. However, the constraints imposed by the COVID-19 pandemic are having an impact on these activities, as many of the SMEs have slowed down or interrupted their activities, and as the SMEs' conversion depends on field visits to validate information and provide technical assistance, which have been limited. The strategy to reconnect with the SMEs will be maintained and improved in the coming years to allow them to manufacture RAC equipment using low-GWP alternatives, fully phasing out the use of HCFC-22. This project is strongly supported by the training activities on handling flammable refrigerants that are being provided as part of the refrigeration servicing component, which is helping enterprises and technicians to familiarize themselves with and learn to handle low-GWP technologies.

Room AC manufacturing sector (45.31 ODP tonnes)

25. The project includes the conversion of three room AC manufacturers (Climazon, Elgin and Gree) to R-290, at a total funding of US \$7,353,365, approved in principle. Activities planned to start in 2018 were delayed due to the enterprises' concerns regarding uncertainty about the regulations on the use of flammable refrigerants and their acceptance in the market; concern of higher prices of the converted AC units than units that were imported or locally manufactured by multinational enterprises based on non-flammable refrigerants; and scarcity or unavailability of R-290 components on the local market.

26. Consequently, at the 82nd meeting, UNIDO only requested US \$950,000 (of the US \$1,722,982 approved in principle for the third tranche) to provide technical assistance to ensure the participation of the three enterprises in the project. On this basis, the Executive Committee requested UNIDO to report at the

⁶ The Executive Committee approved these changes at the 82nd and 84th meetings (decisions 82/62 and 84/33).

⁷ High flow rate, low temperature (below zero degrees Celsius) and quick delivery of beer at the desired temperature.

84th meeting on the status of implementation of this project (decision 82/62(c)).

27. In response to decision 82/62(c), UNIDO reported at the 84th meeting and 85th meeting (through the intersessional approval process) that two workshops were conducted for representatives of the AC sector on the use of alternative refrigerants in room AC equipment in 2019, and that a market study was initiated in 2020 addressing *inter alia* market acceptability, consumer perception assessment, evaluation of existing safety standards, cost and availability of components, and possible obstacles. During this process, one enterprise (Elgin) confirmed its interest in adopting HFC-32 rather than R-290, and a second enterprise (Climazon) expressed initial interest in adopting HFC-32 but further discussions are needed. In order to initiate the conversion of the enterprise that confirmed its interest in introducing the HFC-32 technology, UNIDO submitted to the 86th meeting a request for the change of technology and a revised project proposal at a reduced cost (US \$2,121,197 instead of US \$3,619,365) as changes to the heat exchangers and other components in the baseline would not be required. However, during the project review process, UNIDO reported that the three room AC manufacturing enterprises converted their HCFC-22 capacity to R-410A technology with their own resources.

Refrigeration servicing sector

28. The following activities were completed during the reporting period:

- (a) *Training and capacity building on HCFC-22 containment:* an additional 28 (for a total of 93) trainers and 2,656 (for a total of 3,894) technicians were trained in best service practices for split and window-type air conditioners; an additional 120 (for a total of 857) technicians were trained in best service practices for commercial refrigeration; and 14 (for a total of 17) monitoring visits to regional partner training institutions were carried out;
- (b) *Training and capacity-building on low-GWP alternatives:* two technical training institutions were selected to provide training to technicians on the safe design, installation, operation and maintenance of commercial refrigeration systems operating with CO₂ and R-290; market research on technology, potential suppliers and potential implementation partners was performed; and technical specifications for the acquisition of two demonstration mini- cascade systems⁸ for use in mini-supermarkets to be installed in the two selected training institutions were prepared;
- (c) *Outreach and awareness campaign:* the preparation of best-practices handbooks on low-GWP alternatives was initiated and several dissemination and awareness activities were completed (i.e., updating and operation of the project website,⁹ production of educational videos,¹⁰ participation in workshops, seminars and meetings with stakeholders in the servicing sector, posters, stickers, stamps, rulers, and cards promoting awareness of best practices in refrigeration); and
- (d) *Management, monitoring and evaluation:* support for the translation of the International Standard ISO 5149 on safety and environmental requirements for refrigeration systems and heat pumps, and for the review of standards on safety in refrigeration systems, pressure vessels for refrigeration systems, and reverse manufacturing of refrigeration equipment, all concluded in 2018.

⁸ Unit designed as a CO₂ dry expansion refrigerant circuit for product freezing (lower stage) and conventional indirect system for product cooling (upper stage) and with an integrated dry cooler.

⁹ www.boaspraticasrefrigeracao.com.br

¹⁰ Dissemination of best practices and new technologies in the AC and commercial refrigeration sectors.

Project implementation and monitoring unit (PMU)

29. The PMU for stage II of the HPMP is managed by UNDP and by UNIDO with a separate budget. The PMU provides international and national technical assistance to the Government and the eligible enterprises; manages the implementation of investment projects; organizes missions, meetings and technical visits to enterprises; prepares reports and technical documentation; organizes meetings with the Ministry of the Environment (MAA) and the Brazilian Cooperation Agency; provides technical analyses of products; and monitors the schedules agreed upon in contracts. The PMU managed by UNDP was engaged in drafting, executing and monitoring service contracts; preparing annual budget reviews conforming to the agency rules and regulations; ensuring financial control of the funds approved; and organizing awareness-raising activities. The PMU costs incurred under the first three tranches are presented in Table 4.

Table 4. PMU costs under the first three tranches of stage I of the HPMP as of August 2020 (US \$)

Activity	Approved	Disbursed
UNDP		
Personnel (staff and international/national consultants)	604,500	442,591
Travel (including monitoring costs)	185,250	133,412
Awareness (workshops/meetings/communication)	39,000	24,818
Operational costs	146,250	108,093
Total UNDP	975,000	708,914
UNIDO		
Personnel (staff and international/national consultants)	552,000	135,706
Total UNIDO	552,000	135,706

Level of fund disbursement

30. As of July 2020, of the US \$22,072,333 approved so far, US \$12,222,281 had been disbursed (US \$7,326,742 for UNDP, US \$1,942,727 for UNIDO, US \$2,702,812 for the Government of Germany, and US \$250,000 for the Government of Italy) as shown in Table 5. The balance of US \$9,850,053 will be disbursed in 2020-2022.

Table 5. Financial report of stage II of the HPMP for Brazil (US \$)

Agency	First tranche		Second tranche		Third tranche		Total approved	
	Approved	Disbursed	Approved	Disbursed	Approved	Disbursed	Approved	Disbursed
UNDP	3,078,900	3,038,798	2,627,704	1,950,042	7,168,396	2,337,902	12,875,000	7,326,742
UNIDO	1,950,275	1,152,306	0	0	2,647,057	790,420	4,597,332	1,942,727
Germany	1,299,386	1,299,386	686,978	686,978	2,363,637	716,448	4,350,001	2,702,812
Italy	250,000	250,000	0	0	0	0	250,000	250,000
Total	6,578,561	5,740,490	3,314,682	2,637,020	12,179,090	3,844,770	22,072,333	12,222,280
Disbursement rate (%)	87		80		32		55	

Implementation plan for the fourth tranche of the HPMP

PU foam manufacturing (UNDP) (funds from previous tranches)

31. With the entry into force of the ban on imports of HCFC-141b for the foam sector on 1 January 2020, it was expected that the full conversion of the foam sector before the depletion of stocks of HCFC-141b. However, the drastic reduction in commercial activities due to the COVID-19 pandemic, compound by a new financial crisis, resulted in a strong deceleration in the conversion process of end-users since March 2020. Under these circumstances, UNDP will continue the conversion of individual PU foam enterprises, systems houses and PU foam downstream users, and project implementation and monitoring through the PMU with the balances from the first three tranches (i.e., US \$5,124,302). UNDP and the MAA

are in contact with these enterprises to determine an emergency strategy which will enable the safe continuation of activities.

32. Based on the above facts, UNDP is requesting to reschedule the fourth tranche (US \$3,895,000, plus agency support costs of US \$272,650), to 2021, when the fifth tranche of stage II would be submitted. Accordingly, the Government of Brazil is requesting a modification in the annual tranche distribution in its Agreement with the Executive Committee.

Commercial refrigeration (UNIDO) (funds from previous tranches)

33. UNIDO will hold the conclusion workshop on the demonstration component of the individual projects, will finalize the conversion of the enterprises in the group project, and will continue implementing the product modification and line conversions in the remaining SMEs included in the project.

Room AC (UNIDO) (funds from previous tranches)

34. UNIDO will complete the market study on the room AC sector and continue raising awareness and providing information on the use of low-GWP alternative refrigerants for the room AC sector.

Refrigeration servicing sector (Germany) (US \$1,004,545)

35. The Government of Germany will implement the following activities:

- (a) *Training and capacity-building on HCFC-22 containment:* continue training additional 381 technicians in best practices for commercial refrigeration and 2,000 technicians in best practices for split and window-type AC systems, and conduct monitoring visits to training institutions involved in the training programme (funds from previous tranches);
- (b) *Training and capacity-building on low-GWP alternatives:* continue developing training material on the safe use of CO₂ and flammable refrigerants in commercial refrigeration systems (e.g., best practices handbooks, course agenda, evaluations, presentations); procure demonstration units and tool kits (commercial refrigeration); conduct two train-the-trainer workshops and train 300 refrigeration technicians on the safe use of CO₂ and flammable refrigerants in commercial refrigeration systems; and hold follow-up and monitoring visits (US \$700,000);
- (c) *Outreach and awareness campaign:* continue developing informative materials, technical publications and videos on best practices and low-GWP alternatives; operate and maintain the website; regionally broadcast the activities and results of stage II of the HPMP, including through the publication of articles in regional sector magazines, on the website and on the project fan page; participate in trade shows and sector events; hold meetings and networking activities with stakeholders in the servicing sector at the regional and national levels (US \$112,475); and
- (d) *Management, monitoring and evaluation:* continue data processing and quality control; support experts at the ABNT in the review, discussion and development of technical standards for the servicing sector; and produce periodic reports as required (US \$192,070).

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

Legal framework

36. The Government of Brazil has allocated total HCFC import quotas of 806.10 ODP tonnes for 2020, which is 39.3 per cent below the HCFC consumption baseline, and 642.92 ODP tonnes for 2021, which is 51.6 per cent below the baseline.

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

No submission of funding for the PU foam sector and the PMU

37. The Secretariat noted the challenges described by UNDP regarding the implementation of the conversion of the foam sector in particular the downstream users due to the COVID-19 pandemic and the current economic crisis. Given the level of balances still to be disbursed (US \$5,124,302) the Secretariat considers prudent UNDP's request to reschedule the fourth funding tranche (US \$3,895,000) to 2021, when the fifth tranche of the HPMP will be submitted. As indicated by UNDP, it is expected that by mid-2021 the situation in the country will have improved and the outstanding activities in the PU foam sector will be able to be completed.

38. Regarding the assessment being made by the MAA on the impact in the foam sector due to the pandemic and the economic crisis experienced in the country, UNDP explained that it is too early to provide any conclusion; UNDP continues to hold periodic virtual meetings with systems houses to establish a strategy to respond to the current scenario. More information will be provided by the time of requesting the fifth tranche at the 88th meeting.

Sustainability of the conversions to low-GWP technologies in the PU foam sector

39. Regarding the potential risk of some foam enterprises to use polyols systems based on HFC blowing agents which are available in the local market, the Secretariat enquired whether the Government of Brazil had considered any measures to discourage their use and to ensure that the conversions of the foam enterprises to low-GWP alternatives are sustained. UNDP reported that, as the Government had not yet ratified the Kigali Amendment, it could not implement any restrictions on the use of HFCs at present. However, to ensure the sustainability of conversions to low-GWP alternatives, all enterprises that have received assistance from the Multilateral Fund had signed an agreement where they commit to phasing out the use of HCFC-141b and to avoid phasing in high-GWP alternatives. The systems houses are also playing a critical role to provide the required assistance to SMEs to use formulations based on low-GWP alternatives selected in stage II of the HPMP.

Temporary use of high-GWP technology by U-Tech

40. The temporary use of HFC-134a to replace the use of HCFC-22 for the froth application by U-Tech has been reported since the 80th meeting. At that meeting, the Executive Committee requested UNDP to continue assisting U-Tech in securing the supply of the alternative technologies selected, on the understanding that incremental operational costs (IOCs) would not be paid until the alternative technology selected or another low-GWP-based technology had been fully introduced. UNDP was also requested to report on the status of use of the interim technology until the technology originally selected or another low-GWP-based technology had been fully introduced (decision 80/12(e)), along with an update from the suppliers on progress made toward ensuring that the selected technologies, including associated components, were available on a commercial basis in the country (decision 81/9).

41. In line with these decisions, UNDP has reported on the status of the use of interim technology at each meeting. At the present meeting, UNDP reported that U-Tech has continuously follow up with the supplier's representative in Brazil on an economical viable and technical feasible low-GWP formulation for froth application; however, such formulations are not yet available. On this basis, the Secretariat recommends, in line with previous decisions, that UNDP continue to report on the matter until the enterprise is able to introduce a low-GWP technology.

Reporting of incurred IOCs in line with decision 75/43

42. Decision 75/43(b)(iii) states that UNDP would report to the Executive Committee the IOCs incurred during the conversion to reduced HFO formulations in the foam sector when requesting the second tranche of stage II of the HPMP, on the understanding that if the IOCs were below US \$5.00/kg, the Government of Brazil would return the associated funds to the Multilateral Fund. At the time of submission of the second and third tranches all conversions to HFO were still ongoing. The Secretariat will request this information and address this issue by the time the request of funds for the PU foam sector is submitted with the next tranche.

Introduction of R-290 commercial refrigeration units in the market

43. Regarding the completed conversions of commercial refrigeration equipment to R-290-based technology, UNIDO reported that prospective clients have welcomed the new equipment developed and no regulatory obstacles have been encountered to selling them. Due to the COVID-19 pandemic, some components (i.e., micro channel condenser and ATEX electronic expansion valve) are not available in sufficient quantities, as a result Chopeiras Ribeirão Memo is manufacturing a limited number of beer coolers, but expects to increase production once the availability of the components is restored. The equipment developed by another enterprise (Aqualgel Refrigeração) are already available, with targeted sales; however, sales were affected as restaurants and bars have been closed for several months. It is expected that in 2021 the situation will improve.

44. Regarding the conversion of SMEs, the Secretariat notes that implementation of this project requires extensive visits and interaction with the enterprises. In addressing the constraints imposed by the pandemic, UNIDO is using digital tools for meetings and technical assistance, with positive response from the enterprises. Recently, UNIDO completed the commissioning of a project (JJ Instalacoes) through an online visit, which included simulation of a leak, system filling, safety measures testing and interaction with the operators. In October 2020, UNIDO held a webinar jointly with one enterprise that have been converted (Plotter Racks) to demonstrate to other enterprises the technology applied in a supermarket and the results achieved. UNIDO and the Government of Brazil consider that the commercial refrigeration sector project implementation can continue without major impediment using remote communication.

Identification of eligible enterprises (reallocation of Freeart Seral funds) (decision 84/33(a)(ii))

45. With regard to the potential reallocation of funds approved for Freeart Seral to another eligible enterprise not previously identified, the Secretariat notes the progress in identifying a potential eligible enterprise by UNIDO and the additional time required to assess the eligibility of the identified enterprise. The Secretariat recommends that UNIDO reports as soon as this assessment is completed and presents it for consideration by the Executive Committee.

Delay in the room AC sector and cancellation of the project

46. The Secretariat noted the continuous technical assistance and support provided by UNIDO since the project design phase, to assist the three enterprises included in stage II of the HPMP to select a low-GWP-based technology avoiding the introduction of R-410A technology in their lines to be converted. Considering the continuous efforts by the Government of Brazil and UNIDO, the Secretariat's

recommendations allowing additional time to continue these efforts were adopted by the Executive Committee during the last four meetings. Notwithstanding the technical assistance provided to the enterprises to demonstrate the feasibility of a low-GWP technology, and the interest that one enterprise (Elgin) expressed during this process to convert to a low-GWP technology (i.e., HFC-32 although R-290 was originally proposed), the three enterprises converted their HCFC-22 production lines to manufacture R-410A-based room AC equipment, resulting in the complete phase-out of 823.80 mt (45.31 ODP tonnes) of HCFC-22.

47. As the enterprises converted to R-410A with their own resources, the balance of the funding that was approved in principle for the room AC manufacturing sector (US \$7,353,365), will be returned to the Multilateral Fund. In addition, US \$100,000 associated with the PMU managed by UNIDO, and responsible for monitoring the conversion of the room AC conditioning, will also be returned to Fund.

48. UNIDO reported that of the US \$950,000 that was approved for the room AC manufacturing sector at the 82nd meeting, US \$205,896 had already been used on the technical assistance activities that have been implemented or are planned for 2021 (i.e., technical visits, market study, workshops and publication and dissemination of the market study results in 2021). Therefore, US \$744,104, plus agency support costs of US \$52,087 for UNIDO will be returned to the 86th meeting. In addition, the 2020, 2021 and 2022 funding tranches associated with the conversion of room AC, will not be requested. The funding adjustments to stage II of the HPMP for Brazil associated with the room AC manufacturing sector are summarized in Table 6.

Table 6. Funding adjustments to stage II of the HPMP associated with the room AC manufacturing sector

Description		Cost (US \$)		
		Project	Agency support	Total
Total funding approved in principle	(a)	7,353,365	514,736	7,868,101
Funding approved in 2018	(b)	950,000	66,500	1,016,500
Funds disbursed in the first tranche	(c)	205,896	14,413	220,309
Funds returned at the 86 th meeting	(d)=(b)-(c)	744,104	52,087	796,191
Funding not to be requested in 2020	(e)	3,619,365	253,356	3,872,721
Funding not to be requested in 2021	(f)	1,784,000	124,880	1,908,880
Funding not to be requested in 2022	(g)	1,000,000	70,000	1,070,000
Total adjustment of stage II	(h)=(d)+(e)+(f)+(g)	7,147,469	500,323	7,647,792

49. The Secretariat and UNIDO agreed that the US \$100,000 associated with the adjustment of the PMU managed by UNIDO will be deducted from the PMU cost to be requested from the funding tranche to be submitted in 2021, the year when that funding was expected to be requested.

Refrigeration servicing sector

50. The Government of Germany explained that since April 2020, training in person has been suspended due to the restrictions imposed by the COVID-19 pandemic, which has affected the number of technicians expected to be trained in best practices in commercial refrigeration. However, training in person is expected to resume with the remaining funds from the present tranche as restrictions are lifted. Currently, several partner technical institutes were in the process of planning a re-start of activities.

51. The Secretariat enquired how the present situation would affect the additional training activities for the safe operation, installation and maintenance of CO₂/HC-based systems in commercial refrigeration planned in the fourth tranche submitted to the 86th meeting. The Government of Germany explained that this training was only expected to start in June 2021, as time is needed for the delivery and installation of the mini-supermarkets and tool kits and for the completion of training handbooks. The two mini-supermarkets (CO₂ cascade system demonstration units) will be installed in two training institutions for the purpose of training.

52. In explaining the US \$192,070 from the fourth tranche allocated to monitoring, the Government of Germany indicated that in addition to a significant increase in the need for monitoring and quality control of the ongoing activities and reporting, this component included assistance for the review, discussion and development of technical standards for the servicing sector. Particularly, the ongoing process of adaptation of ISO 5149:2014 requires extensive technical input and expert support. The Secretariat acknowledges that this is a substantive technical contribution from the monitoring component, and that only US \$95,930 (of the US \$4.35 million approved for activities in the refrigeration servicing sector) have been committed for monitoring activities.

Revision to the HPMP Agreement

53. In view of the postponement of funding programmed for UNDP in the fourth tranche to the fifth tranche and the reduction of UNIDO's component in stage II of the HPMP due to the removal of the room AC manufacturing sector, Appendix 2-A of the Agreement between the Government of Brazil and the Executive Committee has been updated and paragraph 16 has been modified to indicate that the updated Agreement supersedes that reached at the 82nd meeting, as contained in Annex I to the present document. The full updated Agreement will be appended to the final report of the 86th meeting.

Gender policy implementation¹¹

54. UNDP reported that the development, implementation and supervision of activities included in the HPMP have seen significant participation by women, mainly in the NOU and the PMU, where women make up more than 50 per cent of the team. Furthermore, UNDP has been deploying efforts to develop gender-sensitive indicators for stage II.

Conclusion

55. Brazil continues to be in compliance with the Montreal Protocol and the HCFC consumption targets stated in the Agreement with the Executive Committee. HCFC consumption in 2019 was 36.8 per cent below the HCFC consumption baseline, and 29.7 per cent below the limit established in the Agreement. A ban on imports of HCFC-141b pure or contained in pre-blended polyols entered into force on 1 January 2020, and project conversions to low-GWP alternatives in the PU foam sector continue progressing with the completion of seven individual projects (28.42 ODP tonnes of HCFC-141b phased out), as well as the conversion of seven systems houses and 73 downstream PU foam users. In the commercial refrigeration sector, two individual enterprises developed R-290-based modular chillers for demonstration in supermarkets, an additional enterprise completed its conversion, and technical assistance continues to be provided to SMEs to adopt low-GWP alternatives. Training and capacity-building activities continue to be implemented in the refrigeration servicing sector.

56. In the room AC manufacturing sector, despite the Government of Brazil and UNIDO's efforts to facilitate the conversion of three enterprises to a low-GWP alternative technology, the enterprises converted their HCFC-22 capacity to R-410A, with their own resources. However, the conversion resulted in the permanent phase-out of 823.80 mt (45.31 ODP tonnes). The overall funding of stage II of the HPMP will be adjusted to remove the funding balance associated with the conversion of the room AC manufacturing sector.

57. In view of the postponement of the funding programmed for UNDP at the fourth tranche to the fifth tranche and the reduction of UNIDO's component in stage II of the HPMP due to the removal of the room AC manufacturing sector, the Agreement between the Government of Brazil and the Executive Committee has been updated. Therefore, the only funding being requested under the present tranche is the Government

¹¹ Decision 84/92(d) requested bilateral and implementing agencies to apply the operational policy on gender mainstreaming throughout the project cycle.

of Germany's component for the refrigeration servicing sector.

RECOMMENDATION

58. The Executive Committee may wish to consider:

- (a) Noting:
 - (i) The progress report on the implementation of the third tranche of stage II of the HCFC phase-out management plan (HPMP) for Brazil;
 - (ii) That US \$3,895,000, plus agency support costs of US \$272,650 for UNDP, associated with the funding tranche for 2020 would be requested in 2021;
 - (iii) That the three enterprises Climazon, Elgin and Gree that were included in the room air-conditioning (AC) manufacturing sector, had converted with their own resources to R-410A technology, resulting in the phase-out of 823.80 mt (45.31 ODP tonnes) of HCFC-22;
 - (iv) That the funding balance of US \$7,147,469, plus agency support costs of US \$500,323 for UNIDO, associated with the conversion of the enterprises referred to in sub-paragraph (a)(iii) above, would be deducted from stage II of the HPMP as follows:
 - a. US \$744,104, plus agency support cost of US \$52,087 for UNIDO, had been returned to the 86th meeting;
 - b. US \$3,619,365, plus agency support cost of US \$253,356 for UNIDO would be deducted from the funding tranche for 2020;
 - c. US \$1,784,000, plus agency support cost of US \$124,880 for UNIDO would be deducted from the funding tranche for 2021;
 - d. US \$1,000,000, plus agency support cost of US \$70,000 for UNIDO would be deducted from the funding tranche for 2022;
 - (v) That US \$100,000, plus agency support cost of US \$7,000 for UNIDO, associated with the adjustment to the project management unit due to the adjustment in the room AC manufacturing sector referred to in sub-paragraph (a)(iii) above, would be deducted from the funding tranche for 2021;
 - (vi) That the Fund Secretariat has updated the Agreement between the Government of Brazil and the Executive Committee, as contained in Annex I to the present document, specifically: Appendix 2-A, based on the postponement of the funding tranche for 2020 to 2021 referred to in sub-paragraph (a)(ii) above, and the reduction of UNIDO's component due to the removal of the three room AC enterprises referred in subparagraphs (a)(iii), (iv) and (v) above, and paragraph 16, modified to indicate that the updated Agreement supersedes that reached at the 82nd meeting;
- (b) Requesting UNDP to continue assisting the Government of Brazil in securing the supply of alternative technologies with low global-warming potential (GWP) to the systems house U-Tech, on the understanding that any incremental operating costs related to the conversion of froth system applications would not be paid under stage II until the technology originally

selected or another technology with low GWP had been fully introduced, and to provide, at each meeting until the technology originally selected or another technology with low GWP had been fully introduced, a report on the status of the conversion, along with an update from the suppliers on the progress made towards ensuring that the selected technologies, including associated components, were available on a commercial basis in the country; and

- (c) Approving the fourth tranche of stage II of the HPMP for Brazil, and the corresponding 2021-2022 tranche implementation plan, at the amount of US \$1,004,545, plus agency support costs of US \$111,800 for the Government of Germany.

Annex I

TEXT TO BE INCLUDED IN THE REVISED UPDATED AGREEMENT BETWEEN THE GOVERNMENT OF THE FEDERATIVE REPUBLIC OF BRAZIL 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

16. This updated Agreement supersedes the Agreement reached between the Government of Brazil and the Executive Committee at the 82nd meeting of the Executive Committee.

APPENDIX 2-A: THE TARGETS, AND FUNDING

Row	Particulars	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
1.1	Montreal Protocol reduction schedule of Annex C, Group I substances (ODP tonnes)	1,194.60	1,194.60	1,194.60	1,194.60	1,194.60	862.74	862.74	862.74	862.74	n/a
1.2	Maximum allowable total consumption of Annex C, Group I substances (ODP tonnes)	1,194.60	1,194.60	1,194.60	1,194.60	1,194.60	862.74	730.02	730.02	730.02	n/a
2.1	Lead IA (UNDP) agreed funding (US \$)	3,078,900	0	2,627,704	7,168,396	0	0	3,895,000	0	0	16,770,000
2.2	Support costs for Lead IA (US \$)	215,523	0	183,939	501,788	0	0	272,650	0	0	1,173,900
2.3	Cooperating IA (UNIDO) agreed funding (US \$)	1,950,275	0	0	1,902,953	0	0	116,000	0	0	3,969,228
2.4	Support costs for Cooperating IA (US \$)	136,519	0	0	133,207	0	0	8,120	0	0	277,846
2.5	Cooperating IA (Germany) agreed funding (US \$)	1,299,386	0	686,978	2,363,637	0	1,004,545	1,500,000	0	872,727	7,727,273
2.6	Support costs for Cooperating IA (US \$)	144,614	0	76,457	263,059	0	111,800	166,941	0	97,129	860,000
2.7	Cooperating IA (Italy) agreed funding (US \$)	250,000	0	0	0	0	0	0	0	0	250,000
2.8	Support costs for Cooperating IA (US \$)	32,500	0	0	0	0	0	0	0	0	32,500
3.1	Total agreed funding (US \$)	6,578,561	0	3,314,682	11,434,986		1,004,545	5,511,000	0	872,727	28,716,501
3.2	Total support costs (US \$)	529,156	0	260,396	898,053		111,800	447,711	0	97,129	2,344,246
3.3	Total agreed costs (US \$)	7,107,717	0	3,575,078	12,333,039		1,116,345	5,958,711	0	969,856	31,060,747
4.1.1	Total phase-out of HCFC-22 agreed to be achieved under this Agreement (ODP tonnes)										163.16
4.1.2	Phase-out of HCFC-22 to be achieved in previously approved projects (ODP tonnes)										51.50
4.1.3	Remaining eligible consumption for HCFC-22 (ODP tonnes)										577.34
4.2.1	Total phase-out of HCFC-141b agreed to be achieved under this Agreement (ODP tonnes)										300.90
4.2.2	Phase-out of HCFC-141b to be achieved in previously approved projects (ODP tonnes)										168.80
4.2.3	Remaining eligible consumption for HCFC-141b (ODP tonnes)										52.00
4.3.1	Total phase-out of HCFC-142b agreed to be achieved under this Agreement (ODP tonnes)										0.00
4.3.2	Phase-out of HCFC-142b to be achieved in previously approved projects (ODP tonnes)										0.00
4.3.3	Remaining eligible consumption for HCFC-142b (ODP tonnes)										5.60
4.4.1	Total phase-out of HCFC-123 agreed to be achieved under this Agreement (ODP tonnes)										0.00
4.4.2	Phase-out of HCFC-123 to be achieved in previously approved projects (ODP tonnes)										0.00
4.4.3	Remaining eligible consumption for HCFC-123 (ODP tonnes)										0.30
4.5.1	Total phase-out of HCFC-124 agreed to be achieved under this Agreement (ODP tonnes)										0.00
4.5.2	Phase-out of HCFC-124 to be achieved in previously approved projects (ODP tonnes)										0.00
4.5.3	Remaining eligible consumption for HCFC-124 (ODP tonnes)										7.70