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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Eighty-eighth Meeting
Montreal, 15-19 November 2021¹

PROJECT PROPOSALS: SUDAN (THE)

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

Phase-out

- HCFC phase-out management plan (stage III, first tranche) UNIDO

Air-conditioning

- Conversion of domestic air-conditioning manufacturing facility from HFC-410a-based units to R-290-based units at J.M. Group/Mina Factory UNIDO

¹ Online meetings and an intersessional approval process will be held in November and December 2021 due to coronavirus disease (COVID-19)

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS

SUDAN (THE)

(I) PROJECT TITLE	AGENCY
HCFC phase-out plan (stage III)	UNIDO (lead)

(II) LATEST ARTICLE 7 DATA (Annex C Group I)	Year: 2020	10.59 (ODP tonnes)
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(III) LATEST COUNTRY PROGRAMME SECTORAL DATA (ODP tonnes)								Year: 2020	
Chemical	Aerosol	Foam	Fire-fighting	Refrigeration		Solvent	Process agent	Lab use	Total sector consumption
				Manufacturing	Servicing				
HCFC-22				1.99	8.60				10.59

(IV) CONSUMPTION DATA (ODP tonnes)			
2009 - 2010 baseline:		52.7	Starting point for sustained aggregate reductions: 50.6
CONSUMPTION ELIGIBLE FOR FUNDING (ODP tonnes)			
Already approved:		47.49	Remaining: 3.11

(V) BUSINESS PLAN		2021	2022	2023	Total
UNIDO	ODS phase-out (ODP tonnes)	0.00	0.93	0.00	0.93
	Funding (US \$)	0	87,124	0	87,124

(VI) PROJECT DATA			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Montreal Protocol consumption limits			34.24	34.24	34.24	34.24	17.12	17.12	17.12	17.12	17.12	0	n/a
Maximum allowable consumption (ODP tonnes)			13.17	8.54	7.51	6.48	6.48	5.33	4.4	3.39	2.36	0	n/a
Projects costs requested in principle (US \$)	UNIDO	Project costs	129,918	0	0	0	0	112,500	0	0	0	29,000	271,418
		Support costs	9,094	0	0	0	0	7,875	0	0	0	2,030	18,999
Total project costs requested in principle (US \$)			129,918	0	0	0	0	112,500	0	0	0	29,000	271,418
Total support costs requested in principle (US \$)			9,094	0	0	0	0	7,875	0	0	0	2,030	18,999
Total funds requested in principle (US \$)			139,012	0	0	0	0	120,375	0	0	0	31,030	290,417

(VII) Request for approval of funding for the first tranche (2021)		
Agency	Funds requested (US \$)	Support costs (US \$)
UNIDO	129,918	9,094
Total	129,918	9,094

Secretariat's recommendation:	Individual consideration
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PROJECT DESCRIPTION

Background

1. On behalf of the Government of the Sudan, UNIDO as the designated implementing agency has submitted a request for stage III of the HCFC phase-out management plan (HPMP), at the amount of US \$924,720, plus agency support costs of US \$64,730, as originally submitted.² The implementation of stage III of the HPMP will phase out the remaining consumption of HCFCs by 2030.
2. The first tranche of stage III of the HPMP being requested at this meeting amounts to US \$462,360, plus agency support costs of US \$32,365 for UNIDO, as originally submitted.

Status of implementation of stages I and II of the HPMP

3. Stage I of the HPMP for the Sudan was approved at the 66th meeting³ to meet the 10 per cent reduction from the baseline by 2015, at a cost of US \$400,000, plus agency support costs to phase out 4.28 ODP tonnes of HCFC-22 used in the refrigeration and air-conditioning (RAC) servicing sector; it also included an investment project approved at the 62nd meeting,⁴ at a cost of US \$1,056,341, plus agency support costs to phase out 11.87 ODP tonnes of HCFC-141b used in polyurethane (PU) rigid foam production, that was subsumed in stage I of the HPMP. In line with decision 84/16, stage I of the HPMP was completed by December 2019.
4. Stage II of the HPMP for the Sudan was approved at the 75th meeting⁵ to meet the 35 per cent reduction from the baseline by 2020, at a total cost of US \$2,750,729, plus agency support costs to phase out 31.34 ODP tonnes of HCFCs used in the PU foam manufacturing sector and the RAC servicing sector. The third and final tranche was approved at the 86th meeting. Stage II of the HPMP will be completed by December 2021 as stipulated in the Agreement between the Government of the Sudan and the Executive Committee.

HCFC consumption

5. The Government of the Sudan reported under Article 7 of the Montreal Protocol a consumption of 10.59 ODP tonnes of HCFCs in 2020, which is 80 per cent below the HCFC baseline for compliance. The 2016-2020 HCFC consumption is shown in Table 1.

Table 1. HCFC consumption in the Sudan (2016-2020 Article 7 data)

HCFC	2016	2017	2018	2019	2020	Baseline
Metric tonnes (mt)						
HCFC-22	203.58	197.50	197.80	190.00	192.62	218.50
HCFC-141b	280.67	234.10	234.10	180.64	0.00	369.50
Total (mt)	484.25	431.60	431.90	370.64	192.62	588.00
ODP tonnes						
HCFC-22	11.20	10.86	10.88	10.45	10.59	12.02
HCFC-141b	30.87	25.75	25.75	19.87	0.00	40.65
Total (ODP tonnes)	42.07	36.61	36.63	30.32	10.59	52.67

6. HCFC consumption has been declining due to the implementation of activities under stages I and II of the HPMP along with the enforcement of the licensing and quota system. Conversion of the PU foam

² As per the letter of 27 July 2021 from the High Council for Environment and Natural Resources of the Government of Sudan to UNIDO.

³ UNEP/OzL.Pro/ExCom/66/46.

⁴ UNEP/OzL.Pro/ExCom/62/49.

⁵ UNEP/OzL.Pro/ExCom/75/67.

enterprises resulted in the complete phase out HCFC-141b; and training programmes for refrigeration technicians and technical assistance programmes in the RAC servicing sector, have reduced consumption of HCFC-22. An additional reduction in the consumption of HCFC in 2019 and 2020 was due to social unrest and subsequent economic slowdown. The introduction of non-HCFC-based RAC equipment has further contributed to the reduction in consumption. According to the country programme (CP) data reporting and the information collected during the preparation of the HPMP, the refrigerant use in the country is as follows: HFC-134a (66.4 per cent of the total); HCFC-22 (18.4 per cent); ammonia (5.8 per cent); R-410A (6.1 per cent); R-404A (2.8 per cent); R-407A (0.4 per cent); and R-290 and R-600a (0.1 per cent).

CP implementation report

7. The Government of the Sudan reported HCFC sector consumption data under the 2020 CP implementation report consistent with the data reported under Article 7 of the Montreal Protocol.

Status of progress and disbursement

Legal framework

8. The Government of the Sudan has established a licensing and quota system for HCFCs. The national ozone unit (NOU) works closely with the Sudan Customs Administration to enforce the licensing and quota system to control HCFC imports. Currently the ODS regulation is being revised to include control measures for HFCs and the zero quota for imported HCFC-141b pure or contained in pre-blended polyols. To ensure the safety of refrigeration technicians, the Government has stipulated that the introduction of flammable refrigerants must meet the existing occupational health and safety standards.

9. Five customs officers were trained as trainers in the Netherlands who further trained 20 trainers; these trainers in turn provided training to customs officers in routine training during stages I and II of the HPMP; and 14 portable multi-refrigerant identifiers have been distributed (four for training purposes and 10 to the Sudan Customs Administration). The Customs Administration is working on incorporating ODS control into the routine training of customs officers.

10. The Government of the Sudan has initiated the Kigali Amendment ratification process, and the ODS regulation will be amended to include HFCs in the licensing and quota system. Due to the recent social and political unrest in the country, the Government has gone through institutional changes that have delayed the process of ratification. The newly appointed Secretary General has confirmed that the Kigali Amendment will be given priority and that its ratification is expected to be completed no later than December 2021.

Progress in implementation of stage II

11. Conversion of the foam manufacturing enterprises were planned in stages I and II of the HPMP to phase out a total of 39 ODP tonnes of HCFC-141b. During stage I, four enterprises using 11.87 ODP tonnes of HCFC-141b as a blowing agent for insulation foam for refrigeration equipment and for insulation panels were converted to cyclopentane. Stage II included the conversion of six enterprises, through an umbrella project; so far, four thermoware enterprises and one spraying enterprise have phased out 7.94 ODP tonnes of HCFC-141b and replaced it with CO₂-water technology. Equipment for DAM Construction Chemicals Co. Ltd (a very small spray foam enterprise) has been delivered in July 2021; installation, commissioning and training has been arranged to take place virtually; and the conversion is expected to be completed by the end of 2021.

12. The 2019-2020 social unrest, followed by economic slow-down and constraints imposed by the COVID-19 pandemic, has delayed project implementation at the refrigeration and panel manufacturers.

The conversion at the Target Steel factory, using 7.40 ODP tonnes of HCFC-141b in the manufacturing of insulation panels, is delayed due to the change of ownership coupled with the outbreak of the COVID-19 pandemic; part of the equipment was delivered in August 2021; delivery of the remaining equipment is being discussed with the beneficiary enterprise with the conversion expected to be completed by the second quarter of 2022. The conversion at Mina, using 10.68 ODP tonnes of HCFC-141b in the manufacturing of insulation foam for commercial refrigeration equipment, has been delayed due to the relocation of the plant, preparatory issues and technical requirements; the delivery, installation and commissioning of the equipment are expected to be completed by the end of 2022. The two enterprises are producing using stockpiles of HCFC-141b from previous years. The Government did not issue any import licences and quotas for HCFC-141b in 2020.

13. In the servicing sector, the following activities were conducted:

- (a) A total of 38 trainers and 585 technicians were trained in good servicing practices, including refrigerant recovery and recycling;
- (b) Twenty-one training sets of servicing equipment (e.g., vacuum pumps, recovery machines, drying filters, recovery cylinders, piercing valves, bottles of cooling oil and nitrogen cylinders) were purchased for the Sudan University for Science and Technology (SUST);
- (c) Fifty sets of toolkits, a Lokring tool set and equipment (e.g., vacuum pumps and gauges, refrigerant control valves, electronic charging scales, adjustable manifold sets, pinch-off and piercing tools, leak detectors) were delivered to the NOU and will be distributed to vocational training centres, technical schools and selected servicing shops by the first quarter of 2022; and
- (d) Eighty R-290 air-conditioning (AC) units have been procured to demonstrate the use of R-290 technology; beneficiaries have been selected (e.g., Government institutions, universities, vocational training centres), and information on performance and electricity consumption will be collected to further promote the adoption of hydrocarbon-based equipment.

14. Discussions were held with customs authorities on the adoption of the new harmonized system (HS) codes. Training of seven customs officers has been planned for early 2022. Training of 50 technicians was delayed due to the impact of COVID-19; some training has already taken place in the form of learning-by-doing through the installation of R-290 AC units in the demonstration project. Eighty R-290 split units have been distributed and installed to universities, vocational training centres, hospitals and Government institutions; and information on the technology, including performance and electricity consumption, will regularly be collected to promote the adoption of hydrocarbon-based equipment, in line with decision 84/84(d).

Project implementation and monitoring

15. The project was managed by the project management unit (PMU). During stage II, US \$35,157 was disbursed for the cost of staff and consultants.

Level of fund disbursement

16. As of July 2021, of the US \$2,750,729 approved so far, US \$835,743 had been disbursed to the final beneficiaries and US \$2,692,255 had been committed, as shown in Table 2. The balance of US \$1,914,986 will be disbursed in 2021 and 2022.

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

Tranche	Funds approved	Funds disbursed	Disbursement rate (%)	Funds committed	Rate of commitment (%)
First	2,383,572	573,725	24	2,381,806	100
Second	330,441	260,665	79	281,837	85
Third	36,716	1,353	4	28,612	78
Total	2,750,729	835,743	30	2,692,255	98

*The disbursement data reported at the 82nd and 86th meetings were based on the committed funding; the current disbursement is based on actual payment to the final beneficiaries.

Completion of stage II

17. Due to the impact of the COVID-19 pandemic, completion of stage II of the HPMP has been delayed. Accordingly, the Government has requested an extension to the end of 2022.

Stage III of the HPMP

Remaining consumption eligible for funding

18. After deducting 16.15 ODP tonnes of HCFCs associated with stage I of the HPMP and 31.34 ODP tonnes of HCFCs associated with stage II, the remaining consumption eligible for funding in stage III amounts to 3.11 ODP tonnes.

Sector distribution of HCFCs

19. There are approximately 10,000 technicians and 2,500 workshops in the servicing sector, consuming HCFC-22 to service RAC equipment. A large share of the technicians work part-time and on a seasonal basis. There are approximately 500,000 AC units and 400,000 units of commercial refrigeration equipment consuming 90 per cent of the HCFC-22 in the country; the remaining 10 per cent of HCFC-22 is used in industrial refrigeration facilities, refrigerated transport trucks and central chillers.

Phase-out strategy in stage III of the HPMP

20. The Sudan has completely phased out the consumption in the manufacturing sector in stage I and stage II. Stage III will address the consumption in the servicing sector only; the Government will further strengthen the licensing and quota system to control HCFCs; promote the transition to low-global warming potential (GWP) technologies and not-in-kind technology; further strengthen the capacity of the servicing sector to reduce leakage and to promote refrigerant recovery and recycling; and strengthen the certification scheme for technicians. The lessons learned and infrastructure established during the implementation of stage II of the HPMP will be utilized in stage III.

Proposed activities in stage III of the HPMP

21. Stage III proposes the following activities:

- (a) Strengthening the licensing and quota system to control HCFC imports, and facilitating the introduction of a ban on the import of second-hand HCFC-based equipment and a quota for the import of new HCFC-based equipment (US \$56,000);
- (b) Training 100 customs officers in the enforcement of the licensing and quota system for HCFCs; monitoring and controlling imports of HCFCs and HCFC-based equipment; applying new customs HS codes; and preventing illegal imports of HCFCs (US \$40,000);
- (c) Updating the training curriculum at universities, colleges and other training institutes for

technicians; training 50 trainers and 960 technicians in good servicing practices, refrigerant recovery and recycling, and safety in handling flammable, toxic and pressurized refrigerants; establishing a certification system for technicians with regulatory support; and certifying 640 technicians (US \$498,720);

- (d) Providing equipment and tools (e.g., recovery machines, cylinders, piercing pliers, weighing scales, safety equipment) to servicing workshops (US \$160,000); and
- (e) Awareness-raising activities to promote low-GWP and not in-kind technology (water-evaporation-based cooling or desert coolers): conducting a survey to collect information on ammonia-based refrigeration installations, researching its advantages and identifying opportunities to replace HCFC- and HFC-based equipment with ammonia refrigerant; and promoting the use of desert coolers (US \$80,000).

Project implementation and monitoring

22. The system established under stage II of the HPMP will continue into stage III, in which the national ozone unit (NOU) will monitor activities, report progress, and work with stakeholders. The cost of the PMU is budgeted at US \$90,000 for staff and consultants (US \$63,000), and for travel, meetings and miscellaneous expenses (US \$27,000).

Gender policy implementation⁶

23. In line with decision 84/92(d), preparation of stage III of the HPMP has taken into consideration the Multilateral Fund's gender mainstreaming policy and has incorporated relevant indicators into the activities in stage III. Awareness-raising activities will be conducted on gender equality and opportunities and incentives will be provided to encourage women's participation in all activities in the HPMP including training courses, the technician certification process, consultations and the decision-making process. Disaggregated data on gender will be collected and reported.

Total cost of stage III of the HPMP

24. The total cost of stage III of the HPMP for the Sudan has been estimated at US \$924,720 (plus agency support costs), as originally submitted and will be implemented solely by UNIDO to achieve the 67.5 per cent reduction from its HCFC baseline consumption by 2025 and the 100 per cent reduction by 2030. The proposed activities and cost breakdown are summarized in Table 3.

Table 3. Total cost of stage III of the HPMP for the Sudan as submitted

Activity	Cost (US \$)
Strengthening the regulatory framework	56,000
Training 100 customs officers	40,000
Training 50 trainers and 960 technicians in good practices, certification of technicians	498,720
Providing equipment and tools to facilitate good servicing practices	160,000
Providing technical assistance to promote climate-friendly technologies	80,000
Project implementation, monitoring and reporting	90,000
Total	924,720

Activities planned for the first tranche of stage III

25. The first funding tranche of stage III, at the total amount of US \$462,360, will be implemented

⁶ Decision 84/92(d) requested bilateral and implementing agencies to apply the operational policy on gender mainstreaming throughout the project cycle.

between November 2021 and November 2025 and will include the following activities:

- (a) Strengthening the licensing and quota system to control HCFC imports, and facilitating the introduction of a ban on imports of second-hand HCFC-based equipment and a quota for the import of new HCFC-based equipment (US \$24,000);
- (b) Training 40 customs officers in the enforcement of the licensing and quota system for HCFCs; monitoring and controlling imports of HCFCs and HCFC-based equipment; adopting new customs HS codes; and preventing illegal imports of HCFCs (US \$16,000);
- (c) Training 20 trainers and 560 technicians in good servicing practices, refrigerant recovery and recycling, and safety in handling flammable, toxic and pressurized refrigerants; establishing a certification system for technicians with regulatory support; and certifying 400 technicians (US \$302,360);
- (d) Providing equipment and tools (e.g., recovery machines, cylinders, piercing pliers, weighing scales, safety equipment) to servicing workshops (US \$90,000); and
- (e) Project implementation, monitoring and reporting at a total amount of US \$30,000, for staff and consultants (US \$21,000), and for travel, meetings and miscellaneous expenses (US \$9,000).

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

26. The Secretariat reviewed stage III of the HPMP in light of stage II, the policies and guidelines of the Multilateral Fund, including the criteria for funding HCFC phase-out in the consumption sector for stage III of HPMPs (decision 74/50), and the 2021-2023 business plan of the Multilateral Fund.

Overarching strategy

27. The Government of the Sudan proposes to meet the 100 per cent reduction of its HCFC baseline consumption by 2030, and to maintain a maximum annual consumption of HCFC in the period of 2030 to 2040 consistent with Article 5, paragraph 8 ter(e)(i) of the Montreal Protocol.⁷ The Government commits to continuing to enforce the established licensing and quota system for HCFCs and to monitor the level of import and the uses of HCFCs during the period from 2030 to 2040 to ensure that they are limited to the conditions established by the Montreal Protocol.

28. In line with decision 86/51, the Government of the Sudan agreed to submit a detailed description of the regulatory and policy framework in place to implement measures to ensure that HCFC consumption was in compliance with paragraph 8 ter(e)(i) of Article 5 of the Montreal Protocol for the 2030-2040 period, and the expected annual HCFC consumption in the Sudan for the 2030-2040 period.

29. With regard to whether the complete phase-out of HCFC could be achieved earlier given the current low level of consumption, UNIDO explained that the overarching strategy had been developed based on negotiations, consultations and information dissemination between the authorities and main stakeholders, avoiding bans and strict regulations as they could lead to irregularities in the market. This strategy has resulted in a smooth transition to ODS-free, and recently to low-GWP alternative technologies, and will continue to be applied in stage III. Since the proposed activities, including training of technicians, provision

⁷ HCFC consumption may exceed zero in any year so long as the sum of its calculated levels of consumption over the ten-year period from 1 January 2030 to 1 January 2040 divided by 10, does not exceed 2.5 per cent of the HCFC baseline.

of tools and promotion of low-GWP technologies, will take time to have an impact, the duration of the implementation up to 2030 is needed.

30. The Government of the Sudan has issued HCFC import quotas for 2021 at 10.56 ODP tonnes, and proposes a gradual phase-out as follows: by 84 per cent of the HCFC baseline by 2022, 86 per cent by 2023, 88 per cent by 2024, 90 per cent by 2026, 92 per cent by 2027, 94 per cent by 2028, 96 per cent by 2029, and to the total phase-out of HCFCs by 1 January 2030.

Regulations to support HCFC phase-out

31. When stage II of the HPMP was approved, the Government of the Sudan committed to ban imports of HCFC-141b in bulk by 1 January 2020 once conversion projects in the foam sector had been completed (decision 75/48(a)(ii)). Due to the delay in the full conversion of the foam enterprises, the Government is controlling the imports of HCFC-141b through a zero-quota policy that it began on 1 January 2020. The ban will be consolidated after completion of the foam projects by the end of 2022. The stockpiled HCFC-141b will be used until the end of 2022.

Technical issues

32. Noting that the Government of the Sudan will control HCFC-based equipment through a licensing and quota system rather than a ban on their import, and that HCFC-based equipment will continue to be imported, the Secretariat enquired about how the servicing tail will be managed under such scenario. UNIDO explained that the Government will monitor the situation in addition of annual quotas for imports of HCFC-based equipment and will reduce it as needed, including applying a zero import quota. It is expected that the stock of HCFC-based RAC equipment will gradually decrease with the implementation of stage III.

33. The Secretariat further enquired about the management of the servicing tail allowance given that the Government had not committed to banning the import of HCFCs by 2030. UNIDO explained that the servicing tail after 2030 would be managed through the licensing and quota system.

34. Noting that the demonstration of R-290 domestic AC units approved at the 75th meeting is progressing, that 80 R-290 AC units have been installed, and that information on the demonstration would be collected for training and for the promotion of this technology, the Secretariat requested UNIDO to submit the relevant data once the project is completed in accordance with decision 84/84(d).

35. With regard to the low disbursement of the first tranche, UNIDO explained that this relates to the conversion of the two foam enterprises; as part of the equipment for Target Steel and all the equipment for Mina still remains to be delivered, funding associated with this equipment has not yet been disbursed. Full conversion of all the enterprises is expected in 2022 with all associated funding disbursed.

Total project cost

36. The Secretariat noted that the funding of US \$924,720 requested in stage III was not in line with decision 74/50. Based on the remaining eligible consumption of 3.11 ODP tonnes (56.55 mt), the total eligible funding amounts to US \$271,418. On this basis, UNIDO adjusted stage III as shown in Table 4.

Table 4. Revised cost of stage III of the HPMP for the Sudan

Activity	Cost (US \$)
Strengthening regulatory framework	30,000
Training of 20 customs officers in HCFC import control	8,000
Updating training curriculum; training of 20 trainers and 320 technicians in good servicing practices, certification of 320 technicians	167,000
Provision of tools and refrigerant recovery equipment to facilitate good servicing practices	40,000

Project implementation, monitoring and reporting	26,418
Total	271,418

37. The first funding tranche of stage III of the HPMP was adjusted to the total amount of US \$129,918 and will include the following activities:

- (a) Strengthening the licensing and quota system to control HCFC imports, and facilitating the introduction of a ban on the import of second-hand HCFC-based equipment and a quota for the import of new HCFC-based equipment (US \$12,500);
- (b) Training 20 customs officers in enforcement of the licensing and quota system for HCFCs; monitoring and controlling imports of HCFCs and HCFC-based equipment; applying new customs HS codes; and prevention of illegal imports of HCFCs (US \$4,000);
- (c) Updating training curriculum to introduce long-term alternatives and related safety aspects; training 10 trainers and 160 technicians in good servicing practices, refrigerant recovery and recycling, and safety in handling flammable, toxic and pressurized refrigerants; establishing a certification system for technicians with regulatory support; and certifying 160 technicians (US \$84,000);
- (d) Providing equipment and tools (recovery machines, cylinders, piercing pliers, weighing scales, safety equipment) to servicing workshops (US \$20,000); and
- (e) Project implementation, monitoring and reporting at a total amount of US \$9,418, with the following breakdown: staff and consultants (US \$6,000); travel (US \$1,500); meetings and workshops (US \$1,500); and other miscellaneous costs (US \$418).

38. Due to the limited funding available and noting that stage III will be implemented until 2030, the Government of the Sudan is proposing only three funding tranches, the first up to 2026, to initiate the implementation of several of the activities proposed so that their impact can take effect, including establishment of the required regulatory framework, technician certifications, support to training institutions and addressing large installations. The second tranche is planned in 2026, after knowing that Sudan has achieved compliance with a major reduction step (over 90 per cent of the consumption). The Government expects that the regulations and the momentum created during the first funding tranche will support the continuous phase-out of the remaining HCFCs after 2026. The Secretariat support this tranche distribution.

39. The Secretariat also noted the recent political situation in the Sudan and discussed with UNIDO implementation of projects in the country. It was agreed that UNIDO would not disburse any funding approved for the first tranche until UNIDO has submitted a letter to the Secretariat indicating the possibility that the planned activities could be implemented in the country.

Impact on the climate

40. The proposed activities in the servicing sector, which include better containment of refrigerants through training and the provision of equipment, will reduce the amount of HCFC-22 used for RAC servicing. Each kilogramme of HCFC-22 not emitted due to better refrigeration practices results in savings of approximately 1.8 CO₂-equivalent tonnes. A calculation of the impact on the climate was provided in the HPMP. The activities planned by the Sudan, including its efforts to promote low-GWP alternatives, as well as refrigerant recovery and reuse, indicate that the implementation of the HPMP will reduce the emission of refrigerants into the atmosphere, resulting in climate benefits.

Co-financing

41. Co-financing by the Government will be in the form of in-kind contributions during implementation by providing meeting venues for coordinating stakeholders and training activities, and through policy development to support the implementation of the HPMP.

2021-2023 draft business plan of the Multilateral Fund

42. UNIDO is requesting US \$271,418, plus agency support costs, for the implementation of stage III of the HPMP for the Sudan. The total requested value of US \$139,012, including agency support costs for the period of 2021-2023, is US \$51,888 above the amount in the business plan.

Draft Agreement

43. A draft Agreement between the Government of the Sudan and the Executive Committee for the phase-out of HCFCs in stage III of the HPMP is contained in Annex I to the present document.

RECOMMENDATION

44. The Executive Committee may wish to consider:

- (a) Approving the extension of the implementation period for stage II of the HCFC phase-out management plan (HPMP) for the Sudan to 31 December 2022, given the delay in implementing phase-out activities owing to the COVID-19 pandemic, on the understanding that no further extension would be requested;
- (b) Requesting UNIDO to submit a final progress report on the implementation of the third tranche of stage II of the HPMP and a final report on the end-user demonstration of R-290 air-conditioning units, in accordance with decision 84/84(d), to the first meeting of 2023;
- (c) Approving, in principle, stage III of the HPMP for the Sudan for the period from 2021 to 2030 for the complete phase-out of HCFC consumption, in the amount of US \$271,418, plus agency support costs of US \$18,999 for UNIDO, on the understanding that no more funding would be provided from the Multilateral Fund for the phase-out of HCFCs;
- (d) Noting the commitment of the Government of the Sudan to reduce HCFC consumption by 84 per cent of the country's baseline by 2022, 86 per cent by 2023, 88 per cent by 2024, 90 per cent by 2026, 92 per cent by 2027, 94 per cent by 2028, 96 per cent by 2029, and to phase out HCFCs completely by 1 January 2030, and that HCFC would not be imported after that date, except for those allowed for a servicing tail between 2030 and 2040 where required, consistent with the provisions of the Montreal Protocol;
- (e) Deducting 3.11 ODP tonnes of HCFCs from the remaining HCFC consumption eligible for funding;
- (f) Approving the draft Agreement between the Government of the Sudan and the Executive Committee for the reduction in consumption of HCFCs, in accordance with stage III of the HPMP, contained in Annex I to the present document;
- (g) That, to allow for consideration of the final tranche of its HPMP, the Government of the Sudan should submit:
 - (i) A detailed description of the regulatory and policy framework in place to implement measures to ensure that HCFC consumption was in compliance with

paragraph 8 ter(e)(i) of Article 5 of the Montreal Protocol for the period 2030-2040; and

- (ii) If the Sudan intends to have consumption in the period 2030-2040, in line with paragraph 8 ter(e)(i) of Article 5 of the Montreal Protocol, proposed modifications to its Agreement referred to in sub-paragraph (f) above covering the period beyond 2030; and
- (h) Approving the first tranche of stage III of the HPMP for the Sudan, and the corresponding tranche implementation plan, in the amount of US \$129,918, plus agency support costs of US \$9,094 for UNIDO, on the understanding that UNIDO would not disburse any funding approved to the Sudan until UNIDO has submitted a letter to the Secretariat indicating the possibility that the planned activities could be implemented in the country.

PROJECT EVALUATION SHEET – NON-MULTI-YEAR PROJECT

SUDAN (THE)

PROJECT TITLE

BILATERAL / IMPLEMENTING AGENCY

Demonstration project on incremental costs for conversion from HFC-410A to R-290 in domestic air-conditioning at the J.M. Group/Mina Factory	UNIDO
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NATIONAL CO-ORDINATING AGENCY

The High Council for Environment and Natural Resources, National Ozone Unit (NOU)

LATEST REPORTED CONSUMPTION DATA FOR HFC ADDRESSED IN PROJECT

A: ARTICLE-7 DATA (METRIC TONNES (MT))

HFCs	mt	788.76
	mt CO ₂ -eq	1,244,369

B: COUNTRY PROGRAMME SECTORAL DATA (MT), AS OF 2020

HFCs	mt	788.76
	mt CO ₂ -eq	1,244,369

HFC consumption remaining eligible for funding	mt	n/a
	mt CO ₂ -eq	n/a

CURRENT YEAR BUSINESS PLAN ALLOCATIONS	Funding US \$	Phase-out	
	856,000	mt	9.00
		mt CO ₂ -eq	18,788

PROJECT TITLE: Demonstration project on incremental costs for conversion from HFC-410A to R-290 in domestic air-conditioning at the J.M. Group/Mina Factory		
HFC-410A used at enterprise (average 2018-2020):	mt	30.80
	mt CO ₂ -eq	64,295
HFC-410A to be phased out through this project:	mt	30.80
	mt CO ₂ -eq	64,295
R-290 to be phased in:	mt	15.40
	mt CO ₂ -eq	46
Climate benefit:	mt CO ₂ -eq	64,249
Project duration (months):		24
Initial amount requested (US \$):		955,250
Final project costs (US \$):		
Incremental capital cost:		270,950
Incremental operating cost:		194,936
Technical Assistance:		30,000
PMU:		0
Total project cost:		495,886
Local ownership (%):		100
Export component (%):		0
Requested grant (US \$):		0
Cost-effectiveness:	US \$/kg	16.10
	US \$/mt CO ₂ -eq	7.72
Implementing agency support costs (US \$):		34,712
Total cost of project to Multilateral Fund (US \$):		530,598
Status of counterpart funding (Y/N):		Y
Project monitoring milestones included (Y/N):		Y

SECRETARIAT'S RECOMMENDATION	Individual consideration
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PROJECT DESCRIPTION

45. On behalf of the Government of the Sudan, UNIDO has submitted a project proposal to convert the manufacturing of domestic air-conditioning (AC) equipment at J.M. Group/Mina Factory from HFC-410A to R-290, at a total cost of US \$955,250, plus agency support costs of US \$66,867. The project preparation funding of US \$30,000 was approved at the 86th meeting (decision 86/58).

Project objective

46. The objective of the project is to convert one line manufacturing domestic AC units to R-290 in order to gain experience in manufacturing domestic AC with R-290 technology and to obtain information on incremental costs.

Sector background

47. The Sudan has one enterprise, Mina Factory, manufacturing R-410A-based domestic AC units, and supplying 36 per cent of the R-410A-based AC units to the domestic market; the remaining 64 per cent are imported from abroad, mainly from China, India and South Korea. There is another enterprise, Coldair, which has manufactured HCFC-22-based AC equipment; but it stopped production with HCFC-22; the enterprise could modify its manufacturing line (annual capacity 15,000 units) to R-410A through technical modifications. The annual market demand for domestic AC equipment in the Sudan is approximately 120,000 units, out of which approximately 65 per cent (78,000 units) are based on R-410A and 35 per cent (42,000 units) on HCFC-22.

Enterprise background

48. Mina Factory is a subsidiary enterprise of J.M. Group, which was established in 1990. The enterprise is 100 per cent nationally owned and all products are sold to the local market. Mina Factory began its production of split AC equipment in 2011 based on HCFC-22 refrigerant. Due to the HCFC phase-out policies, the lower price of R-410A as compared to HCFC-22, as well as the growing demand for AC in the Sudan, the enterprise decided to convert its line to R-410A, starting manufacturing with R-410A in 2018. It produces four models of AC ranging from 12,000 to 36,000 BTU. The factory's manufacturing amounted to 26,400 units in 2020, as shown in Table 5.

Table 5: Manufacturing and consumption in Mina Factory

Model	Specification (KWh)	Refrigerant charge	Current refrigerant	Production (unit)			Consumption of R-410A (mt)		
				2018	2019	2020	2018	2019	2020
12,000 BTU	3.52	0.70	R-410A	10,000	10,000	8,000	7,000	7,000	5,600
18,000 BTU	5.27	1.00	R-410A	10,000	10,000	8,000	10,000	10,000	8,000
24,000 BTU	7.03	1.40	R-410A	5,000	5,000	4,000	7,000	7,000	5,600
36,000 BTU	10.55	1.80	R-410A	5,000	5,000	4,000	9,000	9,000	7,200
Total				30,000	30,000	24,000	33,000	33,000	26,400

Technology selection

49. Further to a comprehensive analysis of all available technologies, and through discussions with UNIDO, Mina Factory selected R-290 as the alternative technology for the demonstration project, as it is a mature technology worldwide; the refrigerant supply is already available in the local market; it has zero ODP and very low global warming potential (GWP), better energy performance and a relatively low cost of refrigerant. The conversion of the local manufacturing line is expected to introduce this low-GWP technology to the local market, and establish servicing ability and the refrigerant supply infrastructure.

Project description

50. Mina Factory is designed as an assembly plant; whereby the main components (evaporator, condenser and compressor) are sourced from overseas suppliers and the final assembly is completed at the Mina Factory plant.

51. The process includes an indoor unit (evaporator) assembly line, where purchased parts are assembled, tested for electrical safety and charged with a small amount of refrigerant to allow for leak detection and for easy installation as it is a pre-charged unit. The basic process for the assembly of the indoor units will remain the same, except for the pre-charge and leak test which will be undertaken at the main production line for the outdoor units to avoid handling of the flammable R-290 refrigerant at the indoor-unit assembly line, reduces costs significantly.

52. The process also includes an outdoor unit (condensing unit) assembly line for evacuation, charging of refrigerant, sealing the tube, testing refrigerant leak, performance testing, and sampling of products for testing at a laboratory. The following changes are required:

- (a) A R-290 charging machine for charging both evaporators and condensers;
- (b) Replacement of the open flame brazing with an ultrasonic welding machine to seal the final process tube;
- (c) Replacement of the sniffer probes of leak detectors for leak testing of hydrocarbon refrigerant; and
- (d) Gas monitoring, safety control and enhanced ventilation systems in the following areas: charging of units, leak testing, performance testing, rework, laboratory calorimetric testing chambers, and refrigerant storage area.

Project costs and co-financing

53. The incremental capital costs (ICC) has been estimated at US \$395,250 as shown in Table 6. In addition, the enterprise will provide US \$10,000 to cover civil works and labour costs as co-financing.

Table 6: ICC for the conversion of domestic AC manufacturing at Mina Factory

Description	Cost (US \$)
Technical assistance for product design	10,000
R-290 charging machine and storage structure	75,000
Safety system and ventilation fan for charge and performance test areas	46,000
Recovery machine for rework	6,000
Ultrasonic welding machine and parts for one year use	38,000
Two Inficon sniffer probes for leak testing	7,500
Safety system and ventilation fan for laboratory testing of a sample of AC products	32,000
Gas sensor calibration adaptor, test leaks and general spare parts	8,000
Ventilation ducts, infrastructure and grounding	15,000
Contingency for equipment supplies (10 per cent)	22,750
Equipment transportation and delivery	5,000
Installation, test and trial	10,000
Safety certification	20,000
Training of servicing team and provision of servicing tools	20,000
Project management unit (PMU)	80,000
Total	395,250

54. The incremental operating costs (IOC) include the cost increase in compressors (US \$30/unit) and incremental savings in other components (US \$10/unit), with a net cost of US \$20/unit. Cost change related to the refrigerant was not included. Average annual production of 20,800 units from 2018 to 2020 was used for calculating the IOC, which amounts to US \$560,000.

55. The total costs amount to US \$955,250, to phase out 30.80 mt of R-410A with an annual emission reduction of 64,295 tonne CO₂-eq, with a cost-effectiveness of US \$31.01/kg or US \$14.86/ tonne CO₂-eq.

56. The project will be implemented over a period of 24 months.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

Eligibility for HFC investment projects

57. The Secretariat reviewed the project proposal on the basis of the current policies of the Multilateral Fund, decisions of the Executive Committee relating to HFC investment projects (decisions 78/3(g), 79/45, 81/53, 84/53 and 86/58) and similar approved conversion projects for HCFC and HFC phase-out.

58. In line with decision 78/3(g), the Government has implemented enabling activities for the phase-down of HFCs and is working towards ratifying the Kigali Amendment, expected to be completed by the end of 2021. The Government is aware that, if the project is approved:

- (a) No further funding will be available until the instrument of ratification of the Kigali Amendment has been received by the depositary at the United Nations Headquarters in New York; and
- (b) Any reduction in HFC consumption will be deducted from any starting point for aggregate reductions on HFC consumption that may be agreed in the future.

Technical issues

59. The selection of R-290 technology and the issue of sustainability of the conversion were discussed in view of the particular challenges situation in adopting this technology in many countries due to the concerns with flammability of R-290, safety standards, higher costs, slow market penetration and end-user acceptance. UNIDO explained that, in addition of being a mature and low-GWP technology, it is also accessible, has improved energy efficiency performance and has low refrigerant cost. R-290 components are readily available in the international market, and will be supplied by the parent companies of Samsung and Midea. Mina is the agent for importation of products of both brands and already has agreements with these two companies for supplying components for R-410A-based units. The agreement will be amended to import components for R-290 instead of R-410A. R-290 units are expected to be competitive due to the improved energy efficiency of 30 to 40 per cent according to UNIDO's experience, and lower refrigerant cost for servicing (only 50 per cent of refrigerant charge compared to R-410A). Stage III of the HPMP will conduct awareness-raising activities on R-290 AC's energy-efficiency value and environmental benefits to promote the market adoption of the R-290 technology; and conduct training for technicians on the safe handling and servicing of R-290 AC units, certification of technicians to improve safety in servicing equipment, and provision of tools to support the introduction of R-290. It is expected that the price of R-290 will be reduced as the use of this refrigerant increases to bring in an additional competitive edge. With regard to the policy measures to support the market adoption of R-290 technology, UNIDO explained that the Government is not planning to ban the import of R-410A-based AC units as Mina's production volume cannot cover all the demand in the Sudan.

60. Notwithstanding the factors identified by UNIDO that could contribute to the sustainability of the conversion, the Secretariat recalled that the proposed conversion to low-GWP alternatives of domestic AC manufacturing in other countries that were withdrawn for various reasons; and other manufacturing lines converted to R-290 under the Multilateral Fund that have been experiencing challenges in selling the product. While the Government is unable to ban the import of R-410A product, other regulatory measures to support the sales and market penetration could minimize the risk to a successful conversion.

61. With regard to the safety standards/procedures for the introduction of R-290 as refrigerant, UNIDO explained that there are already regulations regarding the storage and transportation of flammable substances, which will be adopted to the use of R-290 under stage III of the HPMP. The training component under stage III will also include training on handling flammable refrigerants as one training objective in combination with the certification of technicians.

62. The Secretariat noted the recent political situation in the Sudan and discussed with UNIDO implementation of the project in the country. It was agreed that UNIDO would not disburse any funding approved for the project until the planned activities could be implemented in the country. The Secretariat also noted that the demonstration project is expected to be implemented in 24 months after approval, to provide information on incremental costs; the current situation in Sudan may challenge the timely completion of the project.

Energy efficiency of R-290-based AC units

63. The Secretariat enquired about enhancement of the energy efficiency of the new R-290 AC unit through redesign, and UNIDO explained that the energy efficiency of R-290 units depends mainly on the thermodynamic properties of the condensing and evaporating temperature as well as the latent heat of vaporization. The energy efficiency of R-290-based units will depend on the design optimization at the parent company as Mina is an assembly plant; it is worth noting that the energy efficiency improvement can also be realized by thermostat setting, the best selection of installation location, control of operational duration time, and the capacity selection according to best estimation of cooling load. UNIDO indicated that a 30 to 40 per cent reduction in energy consumption is expected based on general industrial experience in conversion from R-410A to R-290. The Secretariat considers the energy efficiency improvement, to a large extent, depends on the product design which can be achieved by the component supplier.

Agreed level of funding

64. As a result of the discussions during project review, the costs of the project were adjusted as follows:

- (a) The cost of US \$20,000 for training of the servicing team and provision of servicing tools was removed, as this was addressed in the servicing sector activities under stage III of the HPMP;
- (b) The cost of US \$80,000 for the PMU was removed, as minimal monitoring and coordination is needed in the conversion of one manufacturing line;
- (c) The cost of US \$8,000 for a gas sensor calibration adaptor, test leaks and general spare parts was removed as these should be included in the individual equipment;
- (d) The cost of a blow unit was reduced from US \$6,000 to US \$5,000 to be consistent with approved projects;
- (e) The cost of the ultrasound welding machine was reduced from US \$38,000 to US \$34,000 taking into consideration approved projects; and

- (f) The IOCs were reduced from US \$560,000 to US \$194,936, based on the following: compressor cots at US \$21.12/unit, cost saving from refrigerant change at US \$4.158/unit (price of R-290 at US \$8.00/kg and R-410A at US \$7.78/kg, and a 50 per cent of the R-290 refrigerant charge as compared to R-410A), and cost saving from condenser at US \$10/unit, resulting in a net increase of US \$6.962/unit.

65. The costs of conversion of the manufacturing line in Mina were agreed at US \$495,886, to phase out 30.80 mt of R-410A, with a cost-effectiveness of US \$16.10/kg or US \$7.72/tonne CO₂-eq, as shown in Table 7.

Table 7. Agreed incremental costs for the conversion of an AC manufacturing line at Mina (US \$)

Item	Description	As submitted	As agreed
Storage area	Refrigerant storage, safety ventilation for storage	7,500	7,500
Outdoor unit charging area	Charging machine for R-290	67,500	67,500
Leak test area	Two Inficon sniffer probes	7,500	7,500
Rework area	Blow unit	6,000	5,000
Outdoor unit charging area	Ultrasonic welding machine and parts for one year	38,000	34,000
Spares and accessories	Gas sensor calibration adaptor, test leaks, spare parts	8,000	0
Charge and performance test area	Safety system and ventilation fan	46,000	46,000
	Ventilation ducts, infrastructure and grounding	15,000	15,000
Lab test chambers	Safety system and ventilation fan	32,000	32,000
<i>Total equipment</i>		<i>227,500</i>	<i>214,500</i>
Contingency		22,750	21,450
Freight		5,000	5,000
Installation		10,000	10,000
Product design		10,000	10,000
Safety certification		20,000	20,000
Technical assistance/training		20,000	20,000
ICC		315,250	300,950
IOC		560,000	194,936
PMU		80,000	0
Assistance to servicing		20,000	0
Grand total		975,250	495,886
C/E (US \$/kg)		31.66	16.10
Emission reduction from the conversion (tonnes CO ₂ -eq)		64,249	
C/E (US \$/kg CO ₂ -eq)		15.18	7.72

2019–2021 business plan

66. This project is included in the 2021–2023 business plan of the Multilateral Fund at a value of US \$856,000, to phase out 9.00 mt of HFC-410A. The Secretariat notes that the R-410A consumption to be phased out through the demonstration project has been adjusted to 30.8 mt based on the actual production data from Mina. After the adjustments to the cost, the funding requested, including agency support costs, is US \$530,598 below the value included in the business plan.

Impact on the climate

67. The demonstration project will phase out annual consumption of 30.8 mt of R-410A and reduce emission of greenhouse gas (GHG) by 64,249 CO₂-eq tonnes, as shown in Table 8. The replication of the demonstrated conversion, if successful, by other enterprises will result in further climate benefit.

Table 8. Climate impact for the conversion of four foam enterprises

Description	Substance	Consumption (mt)	GWP	Emission (CO ₂ -eq tonnes)
Before conversion	HCFC-410A (mt)	30.80	2,087.5	64,295

Description	Substance	Consumption (mt)	GWP	Emission (CO ₂ -eq tonnes)
After conversion	R-290	15.4	3	46.2
Net climate impact				64,249

Conclusion

68. The demonstration project was presented in line with decisions 78/3(g), 79/45, 81/53 and 84/53, and is in the priority domestic AC manufacturing sector in the Africa region. The Secretariat considers that the demonstration project has its value in providing information on incremental costs of conversion of domestic AC manufacturing from R-410A to R-290. Noting the challenges faced by other countries in adopting R-290 technology in domestic AC in their markets, the Secretariat was concerned about the ability of the enterprise to sell R-290-based domestic AC equipment absent the implementation of regulatory measures supporting the sales of R-290-based products or measures to gradually limit the sale of R-410A-based domestic AC equipment. The implementation of such measures could mitigate the risk to the successful implementation of the project.

RECOMMENDATION

69. The Executive Committee may wish to consider:

- (a) Noting the project proposal for the conversion of a domestic air-conditioning (AC) facility from HFC-410A-based units to R-290-based units at J.M. Group/Mina Factory in the Sudan, contained in document UNEP/OzL.Pro/ExCom/88/64;
- (b) Whether to approve the project proposal referred to in sub-paragraph (a) above in the amount of US \$495,886, plus agency support costs of US \$34,712 for UNIDO, on the understanding:
 - (i) That no further funding for HFC phase-down projects would be available until the instrument of ratification by the Government of the Sudan had been received by the depositary at the Headquarters of the United Nations in New York;
 - (ii) That 30.80 metric tonnes (mt) (64,295 mt CO₂-eq) of R-410A (15.40 mt of HFC-32 and 15.40 mt of HFC-125) would be deducted from the starting point for sustained aggregate reduction of HFCs once the starting point had been established;
 - (iii) That the project would be completed within 24 months of the transfer of funds to UNIDO, and a comprehensive completion report would be submitted within six months of the project completion with detailed information on:
 - a. The eligible incremental capital costs for all equipment and other components including those not funded under the project;
 - b. Incremental operating costs;
 - c. Any possible savings incurred during the conversion and relevant factors that facilitated implementation (e.g., whether any purchased and/or installed equipment or supplies had gone through a competitive quote/bidding process and the details thereof); and
 - d. Changes in the energy efficiency of the products being manufactured and any related policies undertaken by the Government of the Sudan;

- (iv) That the enterprise committed to stop the manufacturing and sale of R-410A-based AC units and to render unusable the capacity to manufacture R-410A-based AC units in the converted line no later than 1 January 2024;
- (v) That any remaining funds would be returned to the Multilateral Fund no later than one year after the date of project completion; and
- (vi) That UNIDO would not disburse any funding approved to the Sudan until UNIDO has submitted a letter to the Secretariat indicating the possibility that the planned activities could be implemented in the country.

Annex I

DRAFT AGREEMENT BETWEEN THE GOVERNMENT OF THE SUDAN AND THE EXECUTIVE COMMITTEE OF THE MULTILATERAL FUND FOR THE REDUCTION IN CONSUMPTION OF HYDROCHLOROFLUOROCARBONS IN ACCORDANCE WITH STAGE III OF THE HCFC PHASE-OUT MANAGEMENT PLAN

Purpose

1. This Agreement represents the understanding of the Government of the Sudan (the “Country”) and the Executive Committee with respect to the reduction of controlled use of the ozone-depleting substances (ODS) set out in Appendix 1-A (“The Substances”) to a sustained level of zero ODP tonnes by 1 January 2030 in compliance with Montreal Protocol schedule.
2. The Country agrees to meet the annual consumption limits of the Substances as set out in row 1.2 of Appendix 2-A (“The Targets, and Funding”) in this Agreement as well as in the Montreal Protocol reduction schedule for all Substances mentioned in Appendix 1-A. The Country accepts that, by its acceptance of this Agreement and performance by the Executive Committee of its funding obligations described in paragraph 3, it is precluded from applying for or receiving further funding from the Multilateral Fund in respect to any consumption of the Substances that exceeds the level defined in row 1.2 of Appendix 2-A as the final reduction step under this Agreement for all of the Substances specified in Appendix 1-A, and in respect to any consumption of each of the Substances that exceeds the level defined in rows 4.1.3 and 4.2.3 (remaining consumption eligible for funding).
3. Subject to compliance by the Country with its obligations set out in this Agreement, the Executive Committee agrees, in principle, to provide the funding set out in row 3.1 of Appendix 2-A to the Country. The Executive Committee will, in principle, provide this funding at the Executive Committee meetings specified in Appendix 3-A (“Funding Approval Schedule”).
4. The Country agrees to implement this Agreement in accordance with the stage III of the HCFC phase-out management plan (HPMP) approved (“the Plan”). In accordance with sub-paragraph 5(b) of this Agreement, the Country will accept independent verification of the achievement of the annual consumption limits of the Substances as set out in row 1.2 of Appendix 2-A of this Agreement. The aforementioned verification will be commissioned by the relevant bilateral or implementing agency.

Conditions for funding release

5. The Executive Committee will only provide the Funding in accordance with the Funding Approval Schedule when the Country satisfies the following conditions at least eight weeks in advance of the applicable Executive Committee meeting set out in the Funding Approval Schedule:
 - (a) That the Country has met the Targets set out in row 1.2 of Appendix 2-A for all relevant years. Relevant years are all years since the year in which this Agreement was approved. Years for which there are no due country programme implementation reports at the date of the Executive Committee meeting at which the funding request is being presented are exempted;
 - (b) That the meeting of these Targets has been independently verified for all relevant years, unless the Executive Committee decided that such verification would not be required;
 - (c) That the Country had submitted a Tranche Implementation Report in the form of Appendix 4-A (“Format of Tranche Implementation Reports and Plans”) covering each previous calendar year; that it had achieved a significant level of implementation of

activities initiated with previously approved tranches; and that the rate of disbursement of funding available from the previously approved tranche was more than 20 per cent; and

- (d) That the Country has submitted a Tranche Implementation Plan in the form of Appendix 4-A covering each calendar year until and including the year for which the funding schedule foresees the submission of the next tranche or, in case of the final tranche, until completion of all activities foreseen.

Monitoring

6. The Country will ensure that it conducts accurate monitoring of its activities under this Agreement. The institutions set out in Appendix 5-A (“Monitoring Institutions and Roles”) will monitor and report on implementation of the activities in the previous Tranche Implementation Plans in accordance with their roles and responsibilities set out in the same appendix.

Flexibility in the reallocation of funds

7. The Executive Committee agrees that the Country may have the flexibility to reallocate part or all of the approved funds, according to the evolving circumstances to achieve the smoothest reduction of consumption and phase-out of the Substances specified in Appendix 1-A:

- (a) Reallocations categorized as major changes must be documented in advance either in a Tranche Implementation Plan as foreseen in sub-paragraph 5(d) above, or as a revision to an existing Tranche Implementation Plan to be submitted eight weeks prior to any meeting of the Executive Committee, for its approval. Major changes would relate to:
 - (i) Issues potentially concerning the rules and policies of the Multilateral Fund;
 - (ii) Changes which would modify any clause of this Agreement;
 - (iii) Changes in the annual levels of funding allocated to individual bilateral or implementing agencies for the different tranches;
 - (iv) Provision of funding for activities not included in the current endorsed Tranche Implementation Plan, or removal of an activity in the Tranche Implementation Plan, with a cost greater than 30 per cent of the total cost of the last approved tranche; and
 - (v) Changes in alternative technologies, on the understanding that any submission for such a request would identify the associated incremental costs, the potential impact to the climate, and any differences in ODP tonnes to be phased out if applicable, as well as confirm that the Country agrees that potential savings related to the change of technology would decrease the overall funding level under this Agreement accordingly;
- (b) Reallocations not categorized as major changes may be incorporated in the approved Tranche Implementation Plan, under implementation at the time, and reported to the Executive Committee in the subsequent Tranche Implementation Report;
- (c) Any enterprise to be converted to non-HCFC technology included in the Plan and that would be found to be ineligible under the policies of the Multilateral Fund (i.e., due to foreign ownership or establishment post the 21 September 2007 cut-off date), would not receive financial assistance. This information would be reported as part of the Tranche

Implementation Plan;

- (d) The Country commits to examining the possibility of using pre-blended systems with low-global warming potential blowing agents instead of blending them in-house, for those foam enterprises covered under the Plan, should this be technically viable, economically feasible and acceptable to the enterprises; and
- (e) Any remaining funds held by the bilateral or implementing agencies or the Country under the Plan will be returned to the Multilateral Fund upon completion of the last tranche foreseen under this Agreement.

Considerations for the refrigeration servicing sector

8. Specific attention will be paid to the execution of the activities in the refrigeration servicing sector included in the Plan, in particular:

- (a) The Country would use the flexibility available under this Agreement to address specific needs that might arise during project implementation; and
- (b) The Country and relevant bilateral and/or implementing agencies would take into consideration relevant decisions on the refrigeration servicing sector during the implementation of the Plan.

Bilateral and implementing agencies

9. The Country agrees to assume overall responsibility for the management and implementation of this Agreement and of all activities undertaken by it or on its behalf to fulfil the obligations under this Agreement. UNIDO has agreed to be the lead implementing agency (the “Lead IA”) in respect of the Country’s activities under this Agreement. The Country agrees to evaluations, which might be carried out under the monitoring and evaluation work programmes of the Multilateral Fund or under the evaluation programme of the Lead IA taking part in this Agreement.

10. The Lead IA will be responsible for ensuring co-ordinated planning, implementation and reporting of all activities under this Agreement, including but not limited to independent verification as per subparagraph 5(b). The roles of the Lead IA are contained in Appendix 6-A. The Executive Committee agrees, in principle, to provide the Lead IA with the fees set out in row 2.2 of Appendix 2-A.

Non-compliance with the Agreement

11. Should the Country, for any reason, not meet the Targets for the elimination of the Substances set out in row 1.2 of Appendix 2-A or otherwise does not comply with this Agreement, then the Country agrees that it will not be entitled to the Funding in accordance with the Funding Approval Schedule. At the discretion of the Executive Committee, funding will be reinstated according to a revised Funding Approval Schedule determined by the Executive Committee after the Country has demonstrated that it has satisfied all of its obligations that were due to be met prior to receipt of the next tranche of funding under the Funding Approval Schedule. The Country acknowledges that the Executive Committee may reduce the amount of the Funding by the amount set out in Appendix 7-A (“Reductions in Funding for Failure to Comply”) in respect of each ODP kg of reductions in consumption not achieved in any one year. The Executive Committee will discuss each specific case in which the Country did not comply with this Agreement, and take related decisions. Once decisions are taken, the specific case of non-compliance with this Agreement will not be an impediment for the provision of funding for future tranches as per paragraph 5 above.

12. The Funding of this Agreement will not be modified on the basis of any future Executive Committee decisions that may affect the funding of any other consumption sector projects or any other related activities in the Country.

13. The Country will comply with any reasonable request of the Executive Committee, the Lead IA to facilitate implementation of this Agreement. In particular, it will provide the Lead IA with access to the information necessary to verify compliance with this Agreement.

Date of completion

14. The completion of the Plan and the associated Agreement will take place at the end of the year following the last year for which a maximum allowable total consumption level has been specified in Appendix 2-A. Should at that time there still be activities that are outstanding, and which were foreseen in the last Tranche Implementation Plan and its subsequent revisions as per sub-paragraph 5(d) and paragraph 7, the completion of the Plan will be delayed until the end of the year following the implementation of the remaining activities. The reporting requirements as per sub-paragraphs 1(a), 1(b), 1(d), and 1(e) of Appendix 4-A will continue until the time of the completion of the Plan unless otherwise specified by the Executive Committee.

Validity

15. All of the conditions set out in this Agreement are undertaken solely within the context of the Montreal Protocol and as specified in this Agreement. All terms used in this Agreement have the meaning ascribed to them in the Montreal Protocol unless otherwise defined herein.

16. This Agreement may be modified or terminated only by mutual written agreement of the Country and the Executive Committee of the Multilateral Fund.

APPENDICES

APPENDIX 1-A: THE SUBSTANCES

Substance	Annex	Group	Starting point for aggregate reductions in consumption (ODP tonnes)
HCFC-22	C	I	11.6
HCFC-141b	C	I	39.0
Total			50.6

APPENDIX 2-A: THE TARGETS, AND FUNDING

Row	Particulars	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)	34.24	34.24	34.24	34.24	17.12	17.12	17.12	17.12	17.12	0	n/a
1.2	Maximum allowable total consumption of Annex C Group I substances (ODP tonnes)	13.17	8.54	7.51	6.48	6.48	5.33	4.4	3.39	2.36	0	n/a
2.1	Lead IA (UNIDO) agreed funding (US \$)	129,918	0	0	0	0	112,500	0	0	0	29,000	271,418
2.2	Support costs for Lead IA (US \$)	9,094	0	0	0	0	7,875	0	0	0	2,030	18,999
3.1	Total agreed funding (US \$)	129,918	0	0	0	0	112,500	0	0	0	29,000	271,418

Row	Particulars	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
3.2	Total support costs (US \$)	9,094	0	0	0	0	7,875	0	0	0	2,030	18,999
3.3	Total agreed costs (US \$)	139,012	0	0	0	0	120,375	0	0	0	31,030	290,417
4.1.1	Total phase-out of HCFC-22 agreed to be achieved under this Agreement (ODP tonnes)											3.11
4.1.2	Phase-out of HCFC-22 to be achieved in the previous stages (ODP tonnes)											8.49
4.1.3	Remaining eligible consumption for HCFC-22 (ODP tonnes)											0.00
4.2.1	Total phase-out of HCFC-141b agreed to be achieved under this Agreement (ODP tonnes)											0.00
4.2.2	Phase-out of HCFC-141b to be achieved in the previous stage (ODP tonnes)											39.00
4.2.3	Remaining eligible consumption for HCFC-141b (ODP tonnes)											0.00

*Date of completion of stage II as decided at the 88th meeting: 31 December 2022.

APPENDIX 3-A: FUNDING APPROVAL SCHEDULE

1. Funding for the future tranches will be considered for approval at the first meeting of the year specified in Appendix 2-A.

APPENDIX 4-A: FORMAT OF TRANCHE IMPLEMENTATION REPORTS AND PLANS

1. The submission of the Tranche Implementation Report and Plans for each tranche request will consist of five parts:

- (a) A narrative report, with data provided by tranche, describing the progress achieved since the previous report, reflecting the situation of the Country in regard to phase out of the Substances, how the different activities contribute to it, and how they relate to each other. The report should include the amount of ODS phased out as a direct result from the implementation of activities, by substance, and the alternative technology used and the related phase-in of alternatives, to allow the Secretariat to provide to the Executive Committee information about the resulting change in climate relevant emissions. The report should further highlight successes, experiences, and challenges related to the different activities included in the Plan, reflecting any changes in the circumstances in the Country, and providing other relevant information. The report should also include information on and justification for any changes vis-à-vis the previously submitted Tranche Implementation Plan(s), such as delays, uses of the flexibility for reallocation of funds during implementation of a tranche, as provided for in paragraph 7 of this Agreement, or other changes;
- (b) An independent verification report of the Plan results and the consumption of the Substances, as per sub-paragraph 5(b) of the Agreement. If not decided otherwise by the Executive Committee, such a verification has to be provided together with each tranche request and will have to provide verification of the consumption for all relevant years as specified in sub-paragraph 5(a) of the Agreement for which a verification report has not yet been acknowledged by the Committee;
- (c) A written description of the activities to be undertaken during the period covered by the requested tranche, highlighting implementation milestones, the time of completion and the interdependence of the activities, and taking into account experiences made and progress achieved in the implementation of earlier tranches; the data in the plan will be provided by calendar year. The description should also include a reference to the overall Plan and progress achieved, as well as any possible changes to the overall Plan that are foreseen. The description should also specify and explain in detail such changes to the overall plan. This description of future activities can be submitted as a part of the same document as the narrative report under sub-paragraph (b) above;

- (d) A set of quantitative information for all Tranche Implementation Reports and Plans, submitted through an online database; and
 - (e) An Executive Summary of about five paragraphs, summarizing the information of the above sub-paragraphs 1(a) to 1(d).
2. In the event that in a particular year two stages of the HPMP are being implemented in parallel, the following considerations should be taken in preparing the Tranche Implementation Reports and Plans:
- (a) The Tranche Implementation Reports and Plans referred to as part of this Agreement, will exclusively refer to activities and funds covered by this Agreement; and
 - (b) If the stages under implementation have different HCFC consumption targets under Appendix 2-A of each Agreement in a particular year, the lower HCFC consumption target will be used as reference for compliance with these Agreements and will be the basis for the independent verification.

APPENDIX 5-A: MONITORING INSTITUTIONS AND ROLES

1. The forthcoming monitoring follows the modality applied during stages I and II of the HPMP. The Higher Council for Environment and Natural Resources (HCENR) and the national ozone unit (NOU) will be responsible for overall implementation of the HPMP and reporting progress in accordance with the Agreement.
2. The project management unit (PMU) within the NOU will coordinate daily work of the project implementation and also assist the enterprises, as well as Government and non-Government offices and organizations, to streamline their activities for smooth implementation of the projects. The PMU will support the NOU in monitoring the progress of implementation, and reporting to the Executive Committee, with the support of the Lead IA as needed. The monitoring activities and progress achieved including quantitative results and any deviations will be reported to the stakeholders on an annual basis.
3. An independent and certified auditor will be employed to audit and verify the consumption of ODS reported by the Government through Article 7 data and country programme progress reports.

APPENDIX 6-A: ROLE OF THE LEAD IMPLEMENTING AGENCY

1. The Lead IA will be responsible for a range of activities, including at least the following:
- (a) Ensuring performance and financial verification in accordance with this Agreement and with its specific internal procedures and requirements as set out in the Country's HPMP;
 - (b) Assisting the Country in preparation of the Tranche Implementation Reports and Plans as per Appendix 4-A;
 - (c) Providing independent verification to the Executive Committee that the Targets have been met and associated tranche activities have been completed as indicated in the Tranche Implementation Plan consistent with Appendix 4-A;
 - (d) Ensuring that the experiences and progress is reflected in updates of the overall plan and in future Tranche Implementation Plans consistent with sub-paragraphs 1(c) and 1(d) of Appendix 4-A;

- (e) Fulfilling the reporting requirements for the Tranche Implementation Reports and Plans and the overall plan as specified in Appendix 4-A for submission to the Executive Committee;
- (f) In the event that the last funding tranche is requested one or more years prior to the last year for which a consumption target had been established, annual tranche implementation reports and, where applicable, verification reports on the current stage of the Plan should be submitted until all activities foreseen had been completed and HCFC consumption targets had been met;
- (g) Ensuring that appropriate independent technical experts carry out the technical reviews;
- (h) Carrying out required supervision missions;
- (i) Ensuring the presence of an operating mechanism to allow effective, transparent implementation of the Tranche Implementation Plan and accurate data reporting;
- (j) In case of reductions in funding for failure to comply in accordance with paragraph 11 of the Agreement, to determine, in consultation with the Country, the allocation of the reductions to the different budget items and to the funding of the Lead IA;
- (k) Ensuring that disbursements made to the Country are based on the use of the indicators;
- (l) Providing assistance with policy, management and technical support when required; and
- (m) Timely releasing funds to the Country/participating enterprises for completing the activities related to the project.

2. After consultation with the Country and taking into account any views expressed, the Lead IA will select and mandate an independent entity to carry out the verification of the HPMP results and the consumption of the Substances mentioned in Appendix 1-A, as per sub-paragraph 5(b) of the Agreement and sub-paragraph 1(b) of Appendix 4-A.

APPENDIX 7-A: REDUCTIONS IN FUNDING FOR FAILURE TO COMPLY

1. In accordance with paragraph 11 of the Agreement, the amount of funding provided may be reduced by US \$175 per ODP kg of consumption beyond the level defined in row 1.2 of Appendix 2-A for each year in which the target specified in row 1.2 of Appendix 2-A has not been met, on the understanding that the maximum funding reduction would not exceed the funding level of the tranche being requested. Additional measures might be considered in cases where non-compliance extends for two consecutive years.

2. In the event that the penalty needs to be applied for a year in which there are two Agreements in force (two stages of the HPMP being implemented in parallel) with different penalty levels, the application of the penalty will be determined on a case-by-case basis taking into consideration the specific sectors that lead to the non-compliance. If it is not possible to determine a sector, or both stages are addressing the same sector, the penalty level to be applied would be the largest.