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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Ninety-seventh Meeting
Montreal, 1–5 December 2025
Item 9(d) of the provisional agenda¹

PROJECT PROPOSALS: EGYPT

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

Phase-out

- | | | | |
|---|---|-------------------|-----------------------------|
| • | HCFC phase-out management plan (stage III, first tranche) | UNIDO and
UNEP | Individual
consideration |
|---|---|-------------------|-----------------------------|

Energy efficiency

- | | | | |
|---|--|-------|-----------------------------|
| • | Project to convert hermetic compressors at Fresh Compressor Factory to inverter compressor technology | UNIDO | Individual
consideration |
| • | Project to enhance energy efficiency in the manufacturing of domestic refrigerators, chest freezer and residential air conditioners in Egypt | UNIDO | Individual
consideration |

¹ UNEP/OzL.Pro/ExCom/97/1

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS

Egypt

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

(II) LATEST ARTICLE 7 DATA (Annex C, Group I)	Year: 2024	215.09 ODP tonnes
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(III) LATEST COUNTRY PROGRAMME SECTORAL DATA (ODP tonnes)								Year: 2024	
Chemical	Aerosol	Foam	Firefighting	Refrigeration		Solvent	Process agent	Lab use	Total sector consumption
				Manufacturing	Servicing				
HCFC-22					215.09				215.09

(IV) CONSUMPTION DATA (ODP tonnes)			
2009–2010 baseline:	386.30	Starting point for sustained aggregate reductions:	484.61
CONSUMPTION ELIGIBLE FOR FUNDING			
Already approved:	386.41	Remaining:	98.20

(V) ENDORSED BUSINESS PLAN		2025	2026	2027	Total
UNIDO	ODS phase-out (ODP tonnes)	0.00	10.00	34.19	44.19
	Funding (US \$)	0	933,800	3,192,662	4,126,462
UNEP	ODS phase-out (ODP tonnes)	0.00	0.00	0.00	0.00
	Funding (US \$)	0	0	0	0

(VI) PROJECT DATA			2025	2026	2027	2028	2029	2030	Total
Montreal Protocol consumption limits (ODP tonnes)			125.54	125.54	125.54	125.54	125.54	0.00	n/a
Maximum allowable consumption (ODP tonnes)			115.54	115.54	96.57	96.57	57.94	0.00	n/a
Project costs requested in principle (US \$)	UNIDO	Project costs	4,104,387	0	3,285,469	0	818,459	0	8,208,315
		Support costs	287,307	0	229,983	0	57,292	0	574,582
	UNEP	Project costs	485,000	0	332,500	0	140,000	0	957,500
		Support costs	58,415	0	40,048	0	16,862	0	115,325
Total amounts recommended in principle (US \$)	Project costs		4,589,387	0	3,617,969	0	958,459	0	9,165,815
	Support costs		345,722	0	270,031	0	74,154	0	689,907
	Total funds		4,935,109	0	3,888,000	0	1,032,613	0	9,855,722

(VII) Request for approval of funding for the first tranche (2025)		
Implementing agency	Funds recommended (US \$)	Support costs (US \$)
UNIDO	4,104,387	287,307
UNEP	485,000	58,415
Total	4,589,387	345,722

Secretariat's recommendation:	Individual consideration
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PROJECT DESCRIPTION

Background

1. On behalf of the Government of Egypt, UNIDO as the lead implementing agency has submitted a request for stage III of the HCFC phase-out management plan (HPMP), at a total cost of US \$9,997,909, consisting of US \$8,341,200, plus agency support costs of US \$583,884, for UNIDO, and US \$957,500, plus agency support costs of US \$115,325, for UNEP, 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 \$5,706,593, consisting of US \$4,825,400, plus agency support costs of US \$337,778, for UNIDO, and US \$485,000, plus agency support costs of US \$58,415, for UNEP, as originally submitted.

Status of implementation of stage II of the HCFC phase-out management plan

3. Stage II of the HPMP for Egypt was originally approved at the 79th meeting³ and revised at the 84th meeting⁴ to phase out 212.41 ODP tonnes of HCFCs used in the refrigeration and air-conditioning (RAC) servicing sector, RAC manufacturing sector, and the foam sector, and to meet the 67.5 per cent reduction from the baseline by 2025, at a total cost of US \$21,881,486, plus agency support costs. Stage II of the HPMP will be completed by December 2026, as stipulated in the Agreement between the Government of Egypt and the Executive Committee.

Report on HCFC consumption

4. The Government of Egypt reported a consumption of 215.09 ODP tonnes of HCFCs in 2024, which is 44 per cent below the HCFC baseline for compliance. The 2020–2024 HCFC consumption is shown in table 1.

Table 1. HCFC consumption in Egypt (2020–2024 Article 7 data)

HCFC	2020	2021	2022	2023	2024	Baseline
Metric tonnes (mt)						
HCFC-22	4,481.91	3,759.59	3,244.76	4,302.55	3,910.80	4,367.16
HCFC-123	0.00	7.75	2.50	0.00	0.00	5.25
HCFC-124	0.00	0.34	0.00	0.54	0.00	0.00
HCFC-141b	0.00	0.00	0.00	0.00	0.00	1,178.26
HCFC-142b	52.93	34.14	18.37	0.00	0.00	251.69
Total (mt)	4,534.84	3,801.81	3,265.63	4,303.09	3,910.80	5,802.36
HCFC-141b in imported pre-blended polyols*	0.00	0.00	0.00	0.00	0.00	894.00**
ODP tonnes						
HCFC-22	246.51	206.78	178.46	236.64	215.09	240.19
HCFC-123	0.00	0.16	0.05	0.00	0.00	0.11
HCFC-124	0.00	0.01	0.00	0.01	0.00	0.00
HCFC-141b	0.00	0.00	0.00	0.00	0.00	129.61
HCFC-142b	3.44	2.22	1.19	0.00	0.00	16.36
Total (ODP tonnes)	249.95	209.16	179.71	236.65	215.09	386.27
HCFC-141b in imported pre-blended polyols*	0.00	0.00	0.00	0.00	0.00	98.34**

* Country programme (CP) data.

** Average consumption between 2007 and 2009.

² As per the letter of 7 August 2025 from the Ministry of Environment of Egypt to UNIDO.

³ Decision 79/34

⁴ Decision 84/72

5. As reported to the 94th meeting, HCFC-22, which is used exclusively to service RAC equipment, increased in 2023 due to stockpiling by refrigerant suppliers given expected increases in the price of HCFC-22 and the anticipated reduction in quotas in 2025.⁵ While lower than in 2023, consumption of HCFC-22 in servicing remained elevated in 2024 relative to 2022 and prior years given the easing of hard currency challenges experienced previously that allowed for increased imports and possible stockpiling in advance of the 2025 quota reduction. The overall reduction in HCFC-22 since 2020 has been attributed to the project to convert five enterprises in residential air-conditioning (AC) manufacturing to HFC-32 and the project to phase-out HCFC-142b in the manufacture of extruded polystyrene (XPS) foam, which was used as a co-blowing agent with HCFC-22. The latter was phased out, in line with the 1 January 2023 ban on the use of HCFCs in the manufacture of XPS foam. Small quantities of HCFC-123 and HCFC-124 are used intermittently to service RAC equipment.

Country programme implementation report

6. The Government of Egypt reported HCFC sector consumption data under the 2024 CP implementation report that is consistent with the data reported under Article 7 of the Montreal Protocol. There were small differences between the reported consumption for HCFC-22 and HCFC-142b in 2020 and 2021; the country has updated its 2020 CP data accordingly and will further revise its CP data for 2021.

Status of progress and disbursement

7. The activities remaining as of the fourth tranche of stage II have progressed as follows:⁶

- (a) The 15 refrigerant identifiers have been procured and delivered to customs and import agents;
- (b) Five workshops took place to train customs officials and related stakeholders on controlling the import and export of controlled substances;
- (c) Of the 440 technicians remaining to be certified under stage II, 40 are planned to be certified in October 2025 and 100 in 2026, for a total 200 certified under stage II; the remaining 200 will now be certified under stage III;
- (d) Training of a further 375 RAC technicians on good servicing practices is planned to be completed by 31 December 2025;
- (e) The technical committee completed the revision of the RAC technician certification programme; a ministerial decree will be issued from the minister of labour on the updated testing and certification scheme;
- (f) A study tour was organized by UNIDO for AGChem to an internationally recognized reclamation centre to assist in the operation of the two reclamation centres being developed under stage II; purchase of equipment to operate the second centre is expected to be finalized by December 2025;
- (g) Support tools for AC after-sales centres were supplied to five domestic AC manufacturers;

⁵ UNEP/OzL.Pro/ExCom/94/33

⁶ A progress report on the implementation of activities of the fourth tranche of stage II of the HPMP as of the 96th meeting can be found in paragraphs 6 to 20 of document UNEP/OzL.Pro/ExCom/96/32. Decision 96/26 further requested the Government, through UNIDO, to include when submitting the request for stage III of the HPMP a detailed report on the progress of implementing the remaining activities under stage II.

- (h) The pilot inspection and certification of one or two buildings as part of the refrigerant containment and leakage prevention programme for large RAC equipment is still expected by December 2026;
- (i) Quick response (QR) codes for refrigerant cylinders, as part of the refrigerant tracking system, are still expected to be mandatory by 31 December 2026;
- (j) Five awareness-raising workshops for 60 customs stakeholders on the QR code refrigerant tracking system are expected to take place by December 2025;
- (k) The update of local codes and standards to support the refrigerant containment and leakage prevention programme and the four awareness-raising workshops to enforce the updated codes are expected to be completed by December 2025; and
- (l) The development of policies and measures to ensure the sustainability of the conversion in the commercial AC manufacturing sector is expected to be completed by December 2025.

8. Stage II of the HPMP will be completed by 31 December 2026 as established in paragraph 14 of the Agreement.

Level of fund disbursement

9. As of September 2025, of the US \$21,881,486 approved so far, US \$17,916,076 had been disbursed (US \$13,817,319 for UNIDO, US \$929,300 for UNEP, US \$2,962,157 for UNDP, and US \$207,300 for the Government of Germany), as shown in table 2. The balance of US \$3,965,410 will be disbursed in 2025 and 2026.

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

Tranche		UNIDO	UNEP	UNDP	Germany	Total	Disbursement rate (%)
First	Approved	3,356,641	230,000	1,042,352	-	4,628,993	100
	Disbursed	3,348,302	229,800	1,042,042	-	4,620,144	
Second	Approved	4,668,214	279,500	1,836,750	207,300	6,991,764	97
	Disbursed	4,659,894	279,500	1,601,363	207,300	6,748,057	
Third	Approved	4,664,196	260,000	816,620	-	5,740,816	77
	Disbursed	3,865,993	260,000	318,752	-	4,444,745	
Fourth	Approved	2,300,298	180,000	-	-	2,480,298	84
	Disbursed	1,928,666	160,000	-	-	2,088,666	
Fifth	Approved	1,934,115	105,500	-	-	2,039,615	1
	Disbursed	14,464	0	-	-	14,464	
Total	Approved	16,923,464	1,055,000	3,695,722	207,300	21,881,486	82
	Disbursed	13,817,319	929,300	2,962,157	207,300	17,916,076	
	Balance	3,106,145	125,700	733,565	0	3,965,410	

Stage III of the HCFC phase-out management plan

Remaining consumption eligible for funding

10. After deducting 386.41 ODP tonnes of HCFCs associated with stages I and II of the HPMP, the remaining consumption eligible for funding in stage III amounts to 98.20 ODP tonnes.

Sector distribution of HCFCs

11. There are approximately 100,000 technicians (of which women comprise approximately 5 per cent) and 24,000 workshops consuming HCFC-22 in the servicing sector. Among these, 75,000 technicians (including 3,000 women) are specialized in AC, while 25,000 technicians (including approximately 2,000 women) are specialized in refrigeration. Approximately 35 per cent of the workforce is employed in formal workshops that adhere to industry standards and regulations, and the remaining 65 per cent work in informal workshops with limited regulatory oversight. Two reclamation centres are being established under stage II (one is operational), and a pilot technician certification project was implemented and is in the process of being updated and finalized; the final certification scheme will be mandatory, competency-based, and enable the national ozone unit (NOU) to certify technicians at any training centre where a qualified assessor is located with the presence of representatives from the Ministry of Labour.

12. HCFC-22 is consumed to service window and split AC units, packaged and rooftop commercial AC systems, chilled water systems, stand-alone commercial refrigeration units, and condensing and distributed commercial refrigeration systems, as well as industrial and transport refrigeration, as shown in table 3. In 2024, HCFC-22 represented approximately 41 per cent of refrigerants used in the servicing sector in metric tonnes, followed by HFC-134a (38 per cent), R-410A (13 per cent), R-404A (7 per cent), and other HFCs (1 per cent). Use of HCFCs in the manufacturing sector was phased out under stage II.

Table 3. Estimation of demand for HCFC-22 in the RAC servicing sector in Egypt (2024)

Sector/application	Annual need for servicing (mt)
Room AC (unitary and split)	2,275
Commercial AC (rooftop, multi-split units, chillers)	231
Commercial refrigeration (medium condensing units)	392
Industrial refrigeration (medium to large condensing units, centralized systems)	588
Chillers	424
Total	3,910

Phase-out strategy

13. Stage III of the HPMP will focus on strengthening regulatory and monitoring systems; further strengthening the capacity of the servicing sector, including support to the certification scheme; establishing a refrigerant management network; promoting sector-specific sustainable cooling technologies; providing technical assistance to small enterprises; and educating the public and stakeholders on phase-out activities.

Proposed activities

14. Activities proposed for implementation in the servicing sector under stage III and in the first tranche and their cost breakdown are presented in table 4.

Table 4. Servicing sector activities and their costs under stage III of the HPMP for Egypt as submitted

Activity	Agency	Cost (US \$)	
		Stage III	First tranche
Strengthening customs and the regulatory framework (US \$400,000)			
Strengthen the regulatory and policy framework: Update policies and bylaws to ban HCFC-22, conduct consultation meetings, support the authority ensuring adherence to good practices in the RAC servicing sector, adopt measures to improve and implement codes and standards, carry out a study on the market acceptance of refillable cylinders and the effect of banning disposable refrigerant cylinders, prepare an	UNEP	200,000	120,000

Activity	Agency	Cost (US \$)	
		Stage III	First tranche
operational manual for recovery, recycling, and reclamation (RRR) centres, and prepare guidelines for the establishment of new reclamation centres.			
Build capacity of customs with refresher trainings on controlled substances: Train 315 customs officers, enforcement officers, environmental officers, importers, and brokers on legal revisions, illegal trade, quota procedures, and substance identification using the updates customs training programme being developed under the KIP.		105,000	65,000
Organize three technological awareness training programmes: Hold six sessions to train 90 large-scale AC engineers and operators on ammonia and low-GWP alternatives in industrial AC; hold ten sessions to train 200 technicians and stakeholders on safety in flammable refrigerants handling; and design and implement five technical internship programmes for 75 engineering students and graduates.		95,000	55,000
Capacity-building of RAC technicians (US \$3,797,500)			
Update RAC sector guidelines and training curricula: Evaluate the current training curricula, define requirements for updates in collaboration with stakeholders, recommend updates to the curricula, and disseminate the outcome through workshops.	UNEP	40,000	20,000
Support the RAC certification scheme: Update and digitize the national registry of certified technicians, track technicians to gauge progress in RRR, and hold meetings and workshops with stakeholders at ministries and associations.		50,000	20,000
Train 45 assessors for RAC certification.		67,500	45,000
Train 2,000 RAC technicians on leak reduction, refrigerant recovery and storage, brazing, and the safe use of flammable refrigerants; and certify at least 1,600 (80 per cent) of those trained.		400,000	160,000
Improve training capacities of five private and non-governmental organization training centres: Carry out a study to determine which centres need support, supply tools and equipment ⁷ based on the study, and launch of the activities.	UNIDO	230,000	215,000
Provide approximately seven educational training platforms ⁸ to training and education centres (e.g., general refrigeration cycle, split-AC module, commercial refrigeration trainer, industrial refrigeration trainer), with needs and quantities to be determined by a consultant under the project management unit (PMU).		340,000	340,000
Provide tools ⁹ for 1,050 RAC workshops to enable refrigerant recovery, leak detection, handling flammable refrigerants, and proper recharging of equipment; and provide HFC-32 AC units to supplement training resources at training and education centres.		2,670,000	1,602,000
Strengthening the refrigerant RRR network (US \$1,518,700)			
Establish an RRR centre in upper Egypt: Procure reclamation, laboratory, and testing equipment; install equipment and provide training; and logistics and launch.	UNIDO	300,000	100,000

⁷ To be determined based on the outcome of the study, and likely to include a combination of demonstration units (i.e., basic refrigeration cycle, split AC, or condensing unit trainer unit), leak detectors, recovery tools, and basic servicing tools and equipment.

⁸ Platforms may include advanced digital learning solutions, including augmented and virtual reality systems, and smart classroom solutions for interactive digital learning.

⁹ Including recovery unit, hoses, cylinders, digital scale, vacuum pump, leak detectors, manifold, micron gauge, brazing torch, and basic toolset.

Activity	Agency	Cost (US \$)	
		Stage III	First tranche
Provide mobile reclamation machines to workshops and operators of large commercial and industrial equipment: Carry out a study to determine recipients, procure and distribute 27 reclamation machines and 81 100-lb cylinders, provide logistics and training, and monitor and disseminate results.		518,700	397,000
Provide refrigerant identifiers: Provide at least an additional 50 identifiers to customs points and training centres.		300,000	200,000
Supply gas chromatographs and ancillary equipment: Procure and install chromatographs, moisture testers, and laboratory equipment to six customs regional offices; and provide training.		400,000	100,000
Sector-specific activities in commercial and industrial RAC (US \$1,394,000)			
Support leak reduction in large RAC equipment and systems: Map large commercial and industrial RAC installations; procure approximately 130 sets of sensors and remote leak alarm systems; provide training, installation, and monitoring; and disseminate results.	UNIDO	164,000	20,000
Promote uptake of ammonia technology in the industrial refrigeration sector: Develop a database of selected sites and prepare technical specifications; replace up to three chillers with a capacity of up to 300 kW; train 50 technicians on servicing ammonia equipment; monitor and analyze, performance, maintenance, and energy use and share with stakeholders; and promote adoption of ammonia-based systems in other sectors.		500,000	375,000
Support hybrid indirect evaporative cooling direct-expansion air-conditioning (IEC-H) technology in the hospitality sector by demonstrating the technology by procuring and installing four 30 kW IEC-H units at two hotels or resorts in the Sharm-el-Sheikh region; monitor performance, maintenance needs, and energy efficiency; and publish and disseminate the results.		150,000	35,000
Test IEC-H commercial AC units in climatic zones not included in previous tests (zones 3 and 4: northern and southern upper Egypt): ¹⁰ procure commercially available IEC-H units, undertake tests, monitor and analyze data, and prepare final report.		120,000	0
Develop evaporative cooling guidelines and roadmap for promoting the technology: Gather testing data, create a code of practice, and develop guidelines for IEC-H systems; and hold a workshop to present and discuss the guidelines with stakeholders.		50,000	10,000
Introduce liquid desiccant (LD) cooling technology: Provide technical assistance to develop two LD-IED-H prototypes, test the prototypes at an independent testing facility and compare their performance against two direct-expansion AC units that will be procured, field test the prototypes in two climatic zones including installation and monitoring; and carry-out a financial, market, and regulatory evaluation and feasibility assessment; prepare reports; and present results in a workshop to stakeholders.		410,000	240,000
Technical assistance (US \$1,160,000)			
Establish an accredited testing laboratory for commercial RAC equipment: Test module construction (1,500-18,000 m³/h air flow, 100 kW capacity, using air enthalpy test method and capacity to test water enthalpy and flow), including procurement and installation of laboratory equipment and materials; and training and support for accreditation, the management system, and test administration.	UNIDO	800,000	720,000

¹⁰ Paragraph 16 of document UNEP/OzL.Pro/ExCom/96/32.

Activity	Agency	Cost (US \$)	
		Stage III	First tranche
Technical assistance to small- and medium-sized enterprises (SMEs): Carry out a study to identify SMEs and installers in the commercial AC sector consuming HCFCs and determine their needs; hold workshops to provide information on new technologies, including improvements, installation, leakage reduction, and proper technology selection; and arrange visits to provide assistance and ensure the sustainability of the project.		360,000	60,000
<i>Awareness-raising (US \$300,000)</i>			
Outreach campaigns on certification, RRR, and sustainable cooling: Outreach material, roundtable events (two per year), two stakeholder workshops, and digital and in-person engagement activities.	UNIDO	300,000	120,000
<i>PMU (US \$728,500)</i>			
Project coordination and management activities (see paragraph 15).	UNIDO	728,500	291,400
Subtotal for UNIDO		8,341,200	4,825,400
Subtotal for UNEP		957,500	485,000
Total		9,298,700	5,310,400

Project implementation and monitoring

15. The system established under stages I and II of the HPMP will continue into stage III, with the NOU and UNIDO monitoring activities, reporting on progress, and working with stakeholders to phase out HCFCs. The cost of those activities amounts to US \$728,500 for UNIDO, including national and international consultants (US \$302,000), meetings and consultations (US \$280,000), travel (US \$100,000), and miscellaneous costs (US \$46,500).

Total cost of stage III of the HCFC phase-out management plan

16. The total cost of stage III of the HPMP for Egypt has been estimated at US \$9,298,700 (plus agency support costs), as originally submitted, for achieving a 100 per cent reduction by 2030. The proposed activities and cost breakdown are summarized in table 4 above.

Implementation plan for the first tranche of stage III of the HCFC phase-out management plan

17. The first funding tranche of stage III of the HPMP was submitted at a total amount of US \$5,310,400, to be implemented between January 2026 and December 2027. Detailed information on the activities included in the first tranche, indicating adjustments made and the level of funds agreed, is presented in table 6 below.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

18. The Secretariat reviewed stage III of the HPMP in light of stages I and II, the policies and guidelines of the Multilateral Fund, including the criteria for funding HCFC phase-out in the consumption sector for stage II of HPMPs (decisions 74/50 and 90/31), and the 2025–2027 business plan of the Multilateral Fund.

Overarching strategy

HCFC reductions between 2025 and 2029

19. The Government has already established quotas that are below the maximum allowable consumption levels between 2025 and 2029 that are lower (i.e., reductions of 70 per cent of the baseline in 2025 and 2026, 75 per cent in 2027 and 2028, and 85 per cent in 2029) than those established by the Montreal Protocol. The Secretariat notes with appreciation the commitment of the Government of Egypt to achieve those reductions, which are reflected in the Agreement between the Government and the Executive Committee.

Total HCFC phase-out and use of the servicing tail

20. In the plan as submitted, the Government of Egypt proposed to meet a 97.5 per cent reduction of its HCFC baseline consumption by 2030 and to maintain this level of consumption for the 2030–2040 period. Noting that, in line with paragraph 8 ter(e)(i) of Article 5 of the Protocol,¹¹ the last consumption target in the Agreement for total HCFC phase-out plans should be zero (and not 2.5 per cent of the baseline), the Government of Egypt agreed to adjust to zero the maximum annual consumption of HCFCs for the year 2030 in the Agreement between the Government and the Executive Committee. The National Ozone Committee had set a quota for 2030 that allows imports of up to 2.5 per cent of the baseline between 2030 and 2040. As further described in paragraph 23 below, the Government will make the necessary adjustments to clarify that HCFC consumption should be zero from 2030, but that there will be flexibility to consume HCFCs in compliance with paragraph 8 ter(e)(i) of Article 5 of the Montreal Protocol with regard to the servicing tail for the period 2030–2040.

21. In line with decision 86/51, to allow for consideration of the final tranche of its HPMP, the Government of Egypt agreed to submit a detailed description of the regulatory and policy framework in place to implement measures to ensure that HCFC consumption is in compliance with paragraph 8 ter(e)(i) of Article 5 of the Montreal Protocol for the period 2030–2040, and, if Egypt intends to have consumption during the period 2030–2040, in line with paragraph 8 ter(e)(i) of Article 5 of the Montreal Protocol, proposed modifications to its Agreement with the Executive Committee covering the period beyond 2030.

Legal framework

22. The country upgraded its licensing system to include an operational electronic system to monitor imports under its enabling activities project; however, the electronic system only includes the registration of importers and the issuance of licences and does not include the quota system and a system to track imports and exports against licences that have been issued. Rather, Egypt uses a manual system for such record-keeping and, therefore, upon a suggestion from the Secretariat, it was agreed to allocate up to US \$150,000 from the activities to strengthen the regulatory framework for technical assistance to e-upgrade the quota, import and export tracking system. Technical assistance will include developing a unique electronic system to facilitate customs clearance through a unique electronic system linking importers and exporters; the NOU and Egyptian Environmental Affairs Agency; and the General Organization for Export and Import Control. UNIDO will also seek to integrate the reclamation centres established under stages II and III, and the refrigerant tracking system based on QR codes for refrigerant cylinders being developed under stage II.

23. The Secretariat sought clarification of the proposed ban on HCFC-22 and noted that the country intended to use the servicing tail in the 2030–2040 period, which would allow continued imports of HCFC-22 until 2040 for the uses specified in paragraph 8 ter(e)(i) of Article 5 of the Montreal Protocol.

¹¹ 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.

UNIDO clarified that of the funding allocated to update policies and bylaws, US \$25,000 had been set aside for technical assistance to enable the country to comply with the provisions specified in paragraph 8 ter(e)(i) of Article 5. UNIDO confirmed that the Government had implemented a ban on the import and manufacture of HCFC-based residential air conditioners in 2024 and will extend that ban to all HCFC-based equipment by 1 January 2030. Regarding a possible ban on the use of disposable cylinders, UNIDO clarified that under stage III a study to assess the prevalence of disposable cylinders in the market and the feasibility of implementing a ban will be undertaken; based on the study results, the Government would consider implementing such a ban.

Technical and cost-related issues

Establishment of an accredited testing laboratory for commercial RAC equipment

24. Egyptian stakeholders have clearly expressed a need for the establishment of a testing laboratory for commercial RAC equipment that would have the capability to test medium- to large-capacity commercial RAC equipment, including packaged units and small chillers, up to approximately 175 kW. Such a laboratory would enable the testing of both locally manufactured and imported energy-efficient, low-GWP-based commercial RAC equipment, and further the goals of the HPMP and the KIP as well as the country's energy efficiency goals. However, this activity is not eligible under stage III of the HPMP for Egypt, noting that Egypt only has consumption of HCFC-22 in the servicing sector and that energy efficiency is not an eligible incremental cost under HPMPs. As further discussed below, it was agreed to instead allocate the US \$800,000 initially proposed for this activity to train and certify at least an additional 1,000 RAC technicians.

Training and certification of RAC technicians

25. Based on the combined number of technicians expected to be certified under stage II (i.e., 200 RAC technicians),¹² stage I of the KIP (i.e., 1,600 RAC technicians), and stage III (i.e., 2,000 RAC technicians trained, of which between 1,600 and 1,800 are expected to be certified, as submitted), less than 4 per cent of the estimated RAC technicians in the country will be certified by 2030. The Secretariat recalled that fewer RAC technicians will be certified under stage II of the HPMP than planned, and suggested that increasing the number of RAC technicians to be trained and certified should be further prioritized under stage III of the HPMP, particularly given the increasing use of flammable refrigerants in the country.

26. Accordingly, and further to discussions with UNIDO, it was agreed that in addition to the 1,600-1,800 technicians expected to be certified under stage III, training would be provided to at least an additional 1,000 RAC technicians, targeting RAC technicians in the informal sector that are subcontractors of the RAC manufacturing enterprises in the country. A total of US \$800,000 that had been allocated to establishing a testing centre will be used for this activity, comprising a survey and needs assessment of informal technicians (US \$50,000); training and testing for certification (US \$200,000), and purchase and distribution of toolkits (US \$550,000, where each toolkit would include a recovery machine, cylinder and ancillary tools).

27. In order to further enhance the implementation of the certification scheme, the Secretariat proposed to link the provision of tools and equipment, for which US \$2,670,000 was budgeted, to a commitment to have certified RAC technicians on staff. Subsequent to a discussion, and rationalization of costs that resulted in an increase in the number of workshops to be assisted from 1,050 to 1,300, it was agreed that the workshops to which equipment and tools would be provided will commit to have at least two certified RAC technicians on staff. Other activities planned under stage III, including digitizing the national registry

¹² A total of 500 RAC technicians had been planned to be certified under the pilot certification scheme under stage II of the HPMP. As noted in paragraph 7(c) of the present document, the number of RAC technicians expected to be certified decreased to 200 given challenges in implementing the certification scheme.

of certified technicians; developing mechanisms to track RAC technician progress in implementing RRR, and awareness-raising activities, will also contribute to the implementation of the certification scheme.

28. The Secretariat recalled that a mobile vocational training centre had been procured under stage II, and inquired whether that centre would be used as part of the trainings to be conducted under stage III and whether procuring a second mobile training centre would allow RAC technicians from the informal sector to better access the trainings. UNIDO confirmed that the mobile centre would be used under stage III but considered it premature to procure a second mobile training centre as additional time was needed to assess the cost-effectiveness of the existing mobile unit. Following that assessment, Egypt could, if it so wished, procure a second mobile training centre under stage II of its KIP.

Reclamation of HCFC-22 and other refrigerants

29. Stage III aims to build a cohesive refrigerant management system that extends beyond the two reclamation centres established during stage II of the HPMP (in Cairo and Port Said) by establishing a third reclamation centre that will be in upper Egypt (e.g., Alexandria) and procuring and distributing mobile reclamation machines. The third reclamation centre is expected to recover and reclaim approximately 40 mt/year and 20 mt/year of refrigerants, respectively, once operational. The mobile reclamation machines will enable technicians and operators of large commercial and industrial RAC equipment not located close to a reclamation centre to rent the mobile reclamation machines¹³ and to recover and reclaim the refrigerant where the equipment is located (i.e., the machine comes to the refrigerant rather than the refrigerant coming to the machine), avoiding the complexity of a model built on economies of scale used by reclamation centres.

30. The Secretariat and UNIDO had detailed discussions on the proposed costs of the new reclamation centre, which were agreed at US \$270,000 based on a rationalization of costs for transportation, logistics, installation, and training, and for the mobile reclamation machine activities, which were agreed as submitted based on the procurement of 30 mobile reclamation machines and 90 cylinders. In addition, in order to enable the effective implementation of reclamation in the three reclamation centres, it was agreed to allocate US \$20,382 for technical assistance and trainings for RRR targeting the three reclamation centres and national and local waste management authorities (approximately one training or technical assistance activity per year). UNIDO will include information on the status of implementation of reclamation, including the quantities and types of refrigerants reclaimed, in tranche implementation reports.

Promotion of ammonia and IEC-H technology in the industrial refrigeration and hospitality sectors

31. UNIDO estimated that there are approximately 130 HCFC-22-based industrial chillers operating in the industrial refrigeration sector and several thousand commercial air conditioners in the hospitality sector. Both projects include among the selection criteria the availability of power consumption data and maintenance logs, agreement by the beneficiary to monitor the performance of the installed unit for at least one year, and a commitment by the beneficiary to adopt the technology for other installation on the premises or in other locations by the same owner/operator. The former will enable a robust assessment of both the energy efficiency gains and reduced maintenance costs achieved through the equipment replacement; the latter will enhance the sustainability of the project. Beneficiaries will be required to provide co-financing, which was agreed to be at least 50 per cent of the cost of the chiller or IEC-H unit; in light of that co-financing, the number of chillers to be procured was increased from three to six, and the number of IEC-H units from four to eight. UNIDO noted that including a 50 per cent co-financing in the criteria for

¹³ In addition to HCFC-22, the mobile reclamation machines can reclaim CFC-12, HFC- 32, R-500, R-502, HFC-134a, R-404A, R-410A, R-507A, and R-509A. In addition, the machines can recover (but not reclaim) CFC-114, HCFC-124, R-403B, R-407C, R-407D, R-412A, R-413A, R-417A, R-422A, R-422D, and R-423A.

selecting beneficiaries could be time consuming and, therefore, proposed to shift US \$295,000 from the first to the second tranche for the activity to enhance ammonia in the industrial refrigeration sector.

32. In order to further enhance replicability, the Secretariat suggested UNIDO consider developing a mechanism to recover a portion of the energy cost savings to co-finance additional equipment replacements; however, as it was not possible for UNIDO to receive funds from the private sector, it was agreed that beneficiaries would commit to use part of savings accrued through the improved energy efficiency of the replacement technology to raise awareness of the technology and its associated benefits.

33. While large gains in energy efficiency are expected from the replacement of the HCFC-22-based equipment with chillers based on ammonia and IEC-H units, such gains could also be achieved with HFC-based equipment currently available in the market. Accordingly, beneficiaries that also have HFC-based equipment will be prioritized so that the performance of the alternate technology can also be compared with the performance and energy use of equivalent HFC-based equipment, which will help encourage end users to select ammonia-based chillers and IEC-H units over HFC-based alternatives when replacing HCFC-22-based equipment.

34. UNIDO confirmed the baseline HCFC-22 equipment will be disposed of appropriately and the HCFC-22 contained in the units would be recovered and recycled or reclaimed, and that the refrigerant in the direct-expansion component of the IEC-H unit will be HFC-32 or another low-GWP refrigerant and not R-410A. In line with decision 92/36(g), UNIDO confirmed that it will, upon completion of the demonstration projects, submit a final report on their implementation, including the HCFC phase-out and energy efficiency gains achieved.

Introduction of liquid desiccant cooling technology

35. In humid climates, most of the energy used by direct-expansion (DX) air conditioners may be associated with humidity reduction (i.e., conditioning) rather than cooling. Accordingly, LD-IED-H cooling has the potential of providing substantial energy efficiency benefits relative to conventional DX cooling systems. In-situ testing would provide proof of the applicability of the technology to the Egyptian climatic zones and give confidence to its accessibility. The target cooling capacity of the units to be developed is 20–25 kW, suitable for medium-scale commercial applications (e.g., shopping malls, hospitals, hotels, and supermarkets); the technology is not expected to be cost-effective below 10 kW capacity, while for capacities above 150 kW, further adaptation would be required. The system will combine liquid desiccant with indirect evaporative cooling. A small DX chiller unit of about 10–15 kW capacity, using HFC-32 or another low-GWP refrigerant, will be integrated.

36. UNIDO and the Secretariat had detailed discussions on the expected costs to develop the prototypes, test the prototypes, and the extent of technical assistance required. Following constructive discussions, it was agreed that three rather than two prototypes would be developed, and that those prototypes would be field tested in three rather than two climatic zones; and that rather than procuring DX units for comparability testing, existing DX units will be used.

37. In line with decision 92/36(g), UNIDO confirmed that it will, upon completion of the demonstration project, submit a final report on its implementation, including the HCFC phase-out and energy efficiency gains achieved. In addition, UNIDO confirmed that the local manufacturer to whom assistance would be provided would not own the intellectual property (IP) of the technology (and therefore could not patent it) but rather the IP would belong to the Multilateral Fund, whose objective is to assist all Article 5 countries. Accordingly, the final report would be made publicly available and, if the technology was successful, the Secretariat would encourage manufacturers in other Article 5 countries to learn from Egypt's experience and replicate the technology.

Green procurement

38. Stage III of the HPMP includes considerable investments in demonstrating energy-efficient, low-GWP technologies that have not yet been accepted in the Egyptian market, including LD-IEC-H technology, IEC-H technology, and the use of ammonia chillers in industrial refrigeration. Given the rapid pace of construction in the country, including the development of new cities, green procurement promises to be another mechanism to enable the market uptake of those technologies. Stage II of the HPMP included training for Government officers on green procurement; it was agreed to allocate US \$10,000 for continued technical assistance in green procurement as part of the activities to strengthen the regulatory and policy framework.

Project management unit

39. The Secretariat noted the overlapping period of implementation of stage I of the KIP and stages II and III of the HPMP; in addition, there was an overlap with the two energy efficiency projects submitted to the present meeting. As all of the projects include funding related to the PMU, the Secretariat considered that careful coordination across the projects would enable the costs for the PMU to be rationalized. Following constructive discussions, funding for the PMU was agreed at US \$605,233 for UNIDO, including national and international consultants (US \$275,352), meetings and consultations (US \$216,569), travel (US \$77,346), and miscellaneous costs (US \$35,966).

Total project cost

40. The total cost for stage III of the HPMP amounts to US \$9,165,815 to phase out 98.09 ODP tonnes (1,783.45 mt) of HCFC-22; an additional 0.11 ODP tonnes (5.50 mt) of HCFC-123 will be deducted from the country's remaining HCFC consumption eligible for funding, resulting in an overall cost-effectiveness of the project of US \$5.12/kg. The agreed activities and costs are summarized in table 5 (changes shown in bold).

Table 5. Servicing sector activities and their costs under stage III of the HPMP for Egypt as agreed

Activity	Agency	Cost (US \$)	
		Submitted	Agreed
Strengthening customs and the regulatory framework (US \$400,000)			
Strengthen the regulatory and policy framework: E-upgrade the quota, import and export tracking system , update policies and bylaws to ban HCFC-22, and technical assistance for green procurement.	UNEP	200,000	200,000
Build capacity of customs with refresher trainings on controlled substances.		105,000	105,000
Organize three technological awareness training programmes.		95,000	95,000
Capacity-building of RAC technicians (US \$4,597,500)			
Update RAC sector guidelines and training curricula.	UNEP	40,000	40,000
Support the RAC certification scheme.		50,000	50,000
Train 45 assessors for RAC certification.		67,500	67,500
Train 2,000 RAC technicians and certify at least 1,600 (80 per cent) of those trained.		400,000	400,000
Improve training capacities of five private and non-governmental organization training centres.	UNIDO	230,000	230,000
Provide approximately seven educational training platforms to training and education centres.		340,000	340,000

Activity	Agency	Cost (US \$)	
		Submitted	Agreed
Provide tools for 1,300 RAC workshops, on the understanding that each workshop will have within one year of receiving the equipment at least two technicians that are certified on staff; and provide HFC-32 AC units to supplement training resources at training and education centres.		2,670,000	2,670,000
Training and certification of an additional 1,000 RAC technicians, including provision of toolkits for technicians.		0	800,000
<i>Strengthening the refrigerant RRR network (US \$1,509,082)</i>			
Establish an RRR centre in upper Egypt.	UNIDO	300,000	270,000
Technical assistance and trainings for RRR targeting reclamation centres and national and local waste management authorities.		0	20,382
Provide mobile reclamation machines, including procuring and distributing 30 reclamation machines and 90 100-lb cylinders.		518,700	518,700
Provide refrigerant identifiers.		300,000	300,000
Supply gas chromatographs and ancillary equipment.		400,000	400,000
<i>Sector-specific activities in commercial and industrial RAC (US \$1,394,000)</i>			
Support leak reduction in large RAC equipment and systems.	UNIDO	164,000	164,000
Promote uptake of ammonia technology in the industrial refrigeration sector, including replacement of six chillers.		500,000	500,000
Support IEC-H technology in the hospitality sector, including by procuring and installing eight 30 kW IEC-H units at hotels or resorts in the Sharm-el-Sheikh region.		150,000	150,000
Test IEC-H commercial AC units in climatic zones not included in previous tests.		120,000	120,000
Develop evaporative cooling guidelines and roadmap.		50,000	50,000
Introduce LD-IED-H cooling technology, including by developing three prototypes and field testing in three climatic zones.		410,000	410,000
<i>Technical assistance (US \$360,000)</i>			
Establish an accredited testing laboratory for commercial RAC equipment.	UNIDO	800,000	0
Technical assistance to SMEs.		360,000	360,000
<i>Awareness-raising (US \$300,000)</i>			
Outreach campaigns on certification, RRR, and sustainable cooling.	UNIDO	300,000	300,000
<i>PMU (US \$605,233)</i>			
Project coordination and management activities.	UNIDO	728,500	605,233
Subtotal for UNIDO		8,341,200	8,208,315
Subtotal for UNEP		957,500	957,500
Total		9,298,700	9,165,815

Agreed implementation plan for the first tranche of stage III of the HCFC phase-out management plan

41. The agreed plan of action will include the activities and costs shown in table 6.

Table 6. Servicing sector activities and their costs under the first tranche of stage III of the HPMP for Egypt as agreed

Activity	Agency	Cost (US \$)
<i>Strengthening customs and the regulatory framework (US \$240,000)</i>		
Strengthen the regulatory framework: Initiate technical assistance activities to e-upgrade the quota, import and export tracking system, and for green procurement.	UNEP	120,000
Build capacity of customs with refresher trainings: Train 195 customs officers, enforcement officers, environmental officers, importers, and brokers on legal		65,000

Activity	Agency	Cost (US \$)
revisions, illegal trade, quota procedures, and substance identification using the updated customs training programme developed under the KIP.		
Organize three technological awareness training programmes: Hold three sessions to train 45 large-scale AC engineers and operators on ammonia and natural refrigerants in industrial AC; hold four sessions to train 135 technicians and stakeholders on safety in flammable refrigerants handling; and design and implement five technical internship programmes for 75 engineering students and graduates.		55,000
Capacity-building of RAC technicians (US \$2,762,000)		
Begin update of RAC sector guidelines and training curricula.	UNEP	20,000
Support the RAC certification scheme: Initiate digitization of the national registry of certified technicians.		20,000
Train 30 assessors for RAC certification.		45,000
Train, test and certify 800 RAC technicians on leak reduction, refrigerant recovery and storage, brazing, and the safe use of flammable refrigerants.		160,000
Improve training capacities of five private and non-governmental organization training centres: Carry out a study to determine which centres need support and supply tools and equipment based on the study and launch of the activities.	UNIDO	215,000
Provide approximately seven educational training modules to training and education centres.		340,000
Provide tools for 780 RAC workshops to enable refrigerant recovery, leak detection, handling flammable refrigerants, and correct recharging of equipment; and provide HFC-32 AC units to supplement half of the training resources at training and education centres.		1,602,000
Additional training and certification of 450 RAC technicians from the informal sector, including distribution of toolsets to those technicians		360,000
Strengthening the refrigerant RRR network (US \$797,000)		
Establish an RRR centre in upper Egypt: Initiate procurement of reclamation, laboratory, and testing equipment.	UNIDO	100,000
Provide mobile reclamation machines to workshops and operators of large commercial and industrial equipment: Carry out a study to determine recipients; and procure and distribute 20 reclamation machines and 60 100-lb cylinders.		397,000
Provide refrigerant identifiers: Procure 33 identifiers for customs points and training centres		200,000
Supply gas chromatographs and ancillary equipment: Procure chromatographs, moisture testers, and laboratory equipment for one customs regional office.		100,000
Sector-specific activities in commercial and industrial RAC (US \$385,000)		
Support leak reduction in large RAC equipment and systems: Map large commercial and industrial RAC installations.	UNIDO	20,000
Promote uptake of ammonia technology in the industrial refrigeration sector: Develop a database of selected sites and prepare technical specifications; and select beneficiaries that will receive the replacement chillers.		80,000
Begin support of IEC-H technology in the hospitality sector by determining where the technology can be showcased and developing technical specifications; and initiate beneficiary selection.		35,000
Initiate development of evaporative cooling guidelines and roadmap.		10,000
Introduce LD cooling technology: Provide technical assistance to develop three LD-IED-H prototypes and initiate testing of the prototypes.		240,000
Technical assistance (US \$60,000)		
Technical assistance to SMEs: Carry out a study to identify SMEs and installers in the commercial AC sector consuming HCFCs and determine their needs; hold workshops to provide information on new technologies; and arrange site visits to the SMEs.	UNIDO	60,000
Awareness-raising (US \$120,000)		
Outreach campaigns on certification, RRR, and sustainable cooling.	UNIDO	120,000

Activity	Agency	Cost (US \$)
<i>PMU (US \$225,387)</i>		
Project coordination and management activities, including national and international consultants (US \$102,540), meetings and consultations (US \$80,650), travel (US \$28,804), and miscellaneous costs (US \$13,393).	UNIDO	225,387
Subtotal for UNIDO		4,104,387
Subtotal for UNEP		485,000
Total		4,589,387

42. Given that sustained reductions of 75 per cent and 85 per cent of the baseline will be achieved by 2027 and 2029, respectively, in advance of the Montreal Protocol targets, it was agreed to maintain the third and final tranche in 2029 rather than 2030. This schedule also coincides with the third tranche of the KIP.

Co-financing

43. All projects to demonstrate low-GWP technologies at end-user sites will be co-financed by the beneficiary end users.

2025–2027 draft business plan of the Multilateral Fund

44. UNIDO and UNEP are requesting US \$9,165,815, plus agency support costs, for the implementation of stage III of the HPMP for Egypt. The total requested value of US \$8,823,109, including agency support costs for the period of 2025–2027, is US \$4,696,647 above the amount in the business plan.

Gender policy implementation

45. Progress was made during the implementation of stage II to increase women's involvement in the RAC sector, and efforts will continue to be carried out under stage III of the HPMP and stage I of the KIP. Stage II includes measurable targets and indicators, and support of women's participation will be incorporated into training activities, codes of good practice, outreach campaigns, recruitment, and the internship programme. Further, the NOU prepared a draft outline for a policy to promote women's participation that includes improving reporting and monitoring systems to track and record their participation; incorporating women's engagement in the design and implementation of new projects; capacity-building, such as specific courses for female RAC technicians; and allocating sufficient resources for the policy. The Government has developed policies and mechanisms to reduce discrimination in the country.

Sustainability of the HCFC phase-out and assessment of risks

46. While Egypt has remained in compliance with the targets specified in the Agreement between the country and the Executive Committee, and consumption has been in line with allocated quotas, the use of HCFC-22 in the servicing sector did not decrease as much as could be anticipated given the assistance provided to the servicing sector under stage II of the HPMP. Numerous activities remain to be completed under stage II, including the training of a further 375 RAC technicians and the certification of 140 RAC technicians; the issuance of the ministerial decree on the updated testing and certification scheme; the pilot inspection and certification of one or two buildings as part of the refrigerant containment and leakage prevention programme; and the implementation of mandatory QR codes for refrigerant cylinders. The successful implementation of those activities will support the successful implementation of both stage III of the HPMP and stage I of the KIP. UNIDO will include an update on the implementation of those activities as part of the request for the second tranche of stage III of the HPMP.

47. The Secretariat considers the formalization of the RAC technician workforce through the implementation of Egypt's certification scheme to be key to mitigating risks to both the HCFC phase-out

and the HFC phase-down; accordingly, the focus on increasing the number of RAC technicians to be trained and certified under stage III is strategic. UNIDO will include detailed progress in the implementation of those activities, including the number of technicians certified, in tranche implementation progress reports to ensure the Executive Committee is informed of the progress achieved. Similarly, UNIDO will include in those reports information on the implementation of Egypt's reclamation scheme, including the quantity and type of refrigerants reclaimed.

48. Stage III includes several projects to demonstrate technology at a limited number of end users. Such demonstration projects are inherently risky: if the technology were already broadly accepted, there would be no need for the demonstration project. The co-financing to be provided by end users, the technical assistance provided under the project, including the development of guidelines for evaporative cooling, a roadmap to promote the technology, and technical assistance for green procurement, and workshops and other awareness-raising activities, are appropriate measures to mitigate the risk that the market will not accept the technology. UNIDO will include in tranche implementation reports an update on progress in implementing the demonstration projects and associated technical assistance activities, as well as information on the uptake of the technology in the market.

49. Egypt imports and exports considerable amounts of controlled substances. The e-upgrade to Egypt's quota, import and export tracking system will help the country control consumption, enforce its licensing and quota system, and mitigate the risk of illegal trade. Egypt has an effective licensing and quota system in place that will enable the country to reduce its HCFC consumption in advance of the Montreal Protocol control targets. The country has already implemented a ban on the import and manufacture of HCFC-based residential air conditioners, on the use of HCFCs to manufacture XPS foam, on the import of R-406A, and on the import and use of HCFC-141b pure and pre-blended. Those bans, and the forthcoming ban on all HCFC-based equipment that will be implemented by 1 January 2030, will help ensure the sustainability of the HCFC phase-out. The successful implementation of the country's reclamation scheme will help ensure the country is able to service equipment, including equipment existing in the country by 1 January 2030, and thereby assist the country in remaining within its consumption limits in the 2030–2040 period.

Impact on the climate

50. The activities proposed in the servicing sector, which include better refrigerant containment through training and provision of equipment, will reduce the use of HCFC-22 in servicing. Each kilogram of HCFC-22 not emitted due to better refrigeration practices results in the 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 Egypt, including its efforts to promote low-GWP alternatives, as well as refrigerant RRR, indicate that the implementation of the HPMP will reduce the emission of refrigerants into the atmosphere, resulting in climate benefits.

Draft Agreement

51. A draft Agreement between the Government of Egypt and the Executive Committee for stage III of the HPMP is contained in annex I to the present document.

RECOMMENDATION

52. The Executive Committee may wish to consider:

- (a) Approving, in principle, stage III of the HCFC phase-out management plan (HPMP) for Egypt for the period from 2025 to 2030 for the complete phase-out of HCFC consumption, in the amount of US \$9,855,722, consisting of US \$8,208,315, plus agency support costs of US \$574,582, for UNIDO, and US \$957,500, plus agency support costs of US \$115,325,

for UNEP, on the understanding that no more funding from the Multilateral Fund will be provided for the phase-out of HCFCs;

- (b) Noting:
 - (i) The commitment of the Government of Egypt to completely phase out HCFCs by 1 January 2030, and that HCFCs will 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;
 - (ii) The commitment of the Government to ban the import and manufacture of HCFC-based equipment by 1 January 2030;
 - (iii) That upon completion of the end-user demonstration projects included in stage III of the HPMP, UNIDO will submit a final report on their implementation in line with decision 92/36(g), including the HCFC phase-out and energy efficiency gains achieved;
- (c) Deducting 98.20 ODP tonnes of HCFCs from the remaining HCFC consumption eligible for funding;
- (d) Approving the draft Agreement between the Government of Egypt 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;
- (e) That, to allow for consideration of the final tranche of its HPMP, the Government of Egypt 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;
 - (ii) If Egypt were intending to have consumption during the period 2030–2040, in line with paragraph 8 ter(e)(i) of Article 5 of the Montreal Protocol, proposed modifications to its Agreement with the Executive Committee covering the period beyond 2030;
- (f) Requesting UNIDO to submit a final progress report on the implementation of the work programme associated with the fifth and final tranche of stage II of the HPMP as part of the request for the second tranche of stage III of the HPMP; and
- (g) Approving the first tranche of stage III of the HPMP for Egypt, and the corresponding tranche implementation plan, in the amount of US \$4,935,109, consisting of US \$4,104,387, plus agency support costs of US \$287,307, for UNIDO, and US \$485,000, plus agency support costs of US \$58,415, for UNEP.

PROJECT EVALUATION SHEET – NON-MULTI-YEAR PROJECTS**Egypt****PROJECT TITLE****BILATERAL/IMPLEMENTING AGENCY**

Project to convert hermetic compressors at Fresh Compressor Factory to inverter compressor technology	UNIDO
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PROJECT OBJECTIVE

To convert hermetic compressors at Fresh Compressor Factory from HFC-134a to R-600a and introduce inverter compressor technology resulting in a marginal impact on energy efficiency of approximately 5 per cent from the refrigerant conversion and 30 per cent energy savings from the inverter technology, as well as phasing down 200 mt of HFC-134a annually.
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NATIONAL CO-ORDINATING AGENCY	Egyptian Environmental Affairs Agency (EEAA)
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LATEST ARTICLE 7 DATA (Annex F)	Year: 2024	9,253.34 mt	17,259,729 CO ₂ -eq tonnes
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Particulars	Investment activities	
HFCs used in refrigeration manufacturing as reported in country programme implementation report (CP) data for 2024	HFC-134a	637.90 mt
		912,197 CO ₂ -eq tonnes
	R-404A	20.34 mt
		79,765 CO ₂ -eq tonnes
	R-407C	49.95 mt
		88,602 CO ₂ -eq tonnes
Project duration (months):	36 months	
Initial amount requested (US \$):	2,705,000	
Final project costs (US \$)	1,255,250	
Implementing agency support cost (US \$):	87,868	
Total cost of project to Multilateral Fund (US \$):	1,343,134	
Energy efficiency savings* (US \$/kWh/year):	0.009	
Status of counterpart funding (Y/N):	Y	
Project monitoring milestones included (Y/N):	Y	
Minimum energy performance standards available for the relevant sector (Y/N):	N	

* For the first year of the project following project completion. Additional benefits will be accrued each subsequent year, based on the operation of equipment manufactured in that and in subsequent years.

SECRETARIAT'S RECOMMENDATION	Individual consideration
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PROJECT DESCRIPTION

Background

53. On behalf of the Government of Egypt, UNIDO has submitted, in line with decision 95/87, a request for a project to convert hermetic compressors at Fresh Compressor Factory to inverter compressor technology in the amount of US \$2,705,000, plus agency support costs of US \$189,350, as originally submitted.¹ As described in paragraphs 81 to 115 of the present document, UNIDO has also submitted, under decision 94/60, a project to improve the energy efficiency in the manufacturing of domestic refrigerators and chest freezers at enterprises that would use the hermetic compressors manufactured by Fresh Compressor Factory.

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

54. At the 81st meeting, Egypt received funding for enabling activities for HFC phase-down (US \$250,000), implemented jointly by UNIDO and UNEP, which were completed in June 2022. The enabling activities project, among other activities, strengthened the partnership with the Ministry of Electricity and Renewable Energy's (MERE), Climate Change Department to identify the linkage between the HFC phase-down and energy efficiency, and it was agreed that the national ozone unit (NOU) would work with the Egyptian Organization for Standardization (EOS) to implement minimum energy performance standards (MEPS) for refrigeration and air-conditioning (RAC) equipment.

55. In 2023, at the 93rd meeting, the Executive Committee approved technical assistance to maintain and/or enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down in the amount of US \$285,000. The project proposed to align MEPS with new seasonal energy-efficiency ratio (SEER) levels for residential air-conditioning (AC) units, set to go into effect in June 2024; to further upgrade the MEPS based on the latest standards and technologies; upgrade three accredited calorimetric testing laboratories in Egypt for AC units and refrigerators using refrigerants with a low/lower global-warming potential (GWP); build the testing capacity of laboratories in Egypt including processes for certification/accreditation and methods for how to do SEER and MEPS testing; develop a university-level course for engineers on the design and operation of calorimetric laboratories; conduct awareness and capacity-building activities on SEER and labelling that include upgrading quick-response (QR) codes to include the SEER and show the GWP of the refrigerant based on a color-coded scale.

Energy-efficiency project

56. At the 96th meeting stage I of the Kigali HFC implementation plan (KIP) for Egypt was approved, which included projects in five manufacturing sectors (polyurethane foam, extruded polystyrene, domestic refrigeration, commercial refrigeration and residential AC sectors). Non-investment activities under the KIP included campaigns in various sectors (metered-dose inhalers, mobile AC and RAC) to raise awareness on HFC phase-down, energy efficiency and sustainable cooling.

Policy, regulatory and institutional framework

57. The Government of Egypt has adopted a National Energy Efficiency Action Plan (NEEAP) with a target to reduce Egypt's energy consumption by 18 per cent by 2030. The NEEAP underscores the importance of standards and labelling as measures to improve energy efficiency in the country. The MERE oversees managing and regulating the generation, transmission, and distribution of electricity in the country.

¹ As per the letter of 11 June 2025 from the Egyptian Environmental Affairs Agency to UNIDO. The funds requested in the amount of US \$2,705,000 is pursuant to decision 95/87 and relate to manufacturing energy-efficient R-600a-based compressors; the enterprise will co-finance the conversion from HFC-134a to R-600a.

Energy-efficiency activities are implemented in coordination with the MERE, the EOS, the New and Renewable Energy Authority (NREA), and the NOU.

58. The EOS is responsible for the preparation and issuance of all standards through technical committees and experts and inspects locally manufactured appliances together with the Industrial Control Authority; this is the key organization that defines and enforces energy-efficiency standards in Egypt. The NREA has the authority to promote and develop renewable-energy projects and manages specialized labs for testing the efficiency of different appliances. The NREA also has a laboratory to test air conditioners before they can enter the market.

59. A decree was issued in 2023 by the Minister of Environment adding a representative from the MERE to the National Ozone Committee, which already included a representative of the EOS. In January 2024, Egypt issued Ministerial Decree 502/2023 adopting standard ES 3795-2023 for seasonal energy-efficiency regulation for room and ducted air conditioners and unifying the requirements for both fixed-speed and inverter AC. There are no specific MEPS in Egypt for compressors. However, there are MEPS and energy-efficiency labels for domestic refrigerators and chest freezers² which are periodically revised to reflect technological advancements and to ensure harmonization with international benchmarks, including the International Electrotechnical Commission (IEC) standards. The second energy-efficiency project submitted to this meeting, summarised in paragraphs 87 to 115, would enhance energy efficiency in the domestic refrigeration manufacturing sector.

Report on HFC consumption

60. The HFC baseline for Egypt has been established at 19,290,350 CO₂-equivalent (CO₂-eq) tonnes, which the country has committed to reducing by 22 per cent in 2029. The Government of Egypt reported a consumption of 17,259,729 CO₂-eq tonnes of HFCs in 2024, which is a 16 per cent increase over the 2023 consumption of 14,890,881 CO₂-eq tonnes, and 11 per cent lower than the established baseline.

Project objective

61. The objective of the project is to upgrade the compressor manufacturing lines in one enterprise, Fresh Compressor Factory, through the introduction of inverter compressor technology that allows variable-speed operation to improve energy efficiency, which is expected to deliver energy savings of approximately 30 per cent. While the compressor facility is currently manufacturing HFC-134a-compatible compressors for refrigeration equipment, the enterprise is using its own resources to convert its compressor manufacturing facility to manufacture compressors designed for R-600a refrigerant.³ Shifting output to supply compressors optimized for R-600a would have downstream implications, as appliance manufacturers, mainly in domestic markets, would be more likely to adopt R-600a as the refrigerant in their products. The indirect phase-out of HFC-134a anticipated from this project is 200 metric tonnes (mt) or 286,000 CO₂-eq tonnes per year,⁴ in compressors manufactured for refrigeration equipment. The change in refrigerant is also expected to result in marginal energy-efficiency gains (estimated at around 5 per cent).

62. The Egyptian market for hermetic compressors is approximately 3,400,000 compressors annually; this is estimated assuming that about 56 per cent of all manufactured compressors are used in domestic refrigeration, 20 per cent in chest freezers, 15 per cent in water dispensers and 9 per cent in different

² The following standards have been adopted in Egypt by the EOS: ES 3794-2024, ES 6000-3/2018 and ES 3794-2018. Household refrigerating appliances must be in compliance with IEC 62552-3.

³ This includes adjusting internal components (e.g., motor winding, oil type, valve design) to maximize performance, safety, and efficiency with R-600a.

⁴ This is estimated assuming an HFC-134a refrigerant charge of 100 grams per unit for the entire capacity of 2 million compressors, and no greenhouse gas emissions from R-600a.

applications in small enterprises. Most manufacturers of domestic refrigerators in Egypt have started introducing R-600a products; however, chest freezers still rely solely on HFC-134a.

63. Currently, the Fresh Compressor Factory is the only compressor manufacturer in Africa, and the price of their products is comparable to imported compressors. The Fresh Group, which owns the Fresh Compressor Factory, also manufactures domestic refrigerators and freezers and has the highest market share for those products in Egypt, and this share is expected to grow with in-house availability of more efficient compressors. In addition to the Fresh Group, there are five other enterprises⁵ (excluding small and medium-sized enterprises) manufacturing domestic refrigerators in Egypt that in 2024 collectively consumed 306.9 mt (438,870 CO₂-eq tonnes) of HFC-134a. Fresh is currently sourcing compressors to manufacture refrigerators and freezers from its in-house subsidiary (i.e., Fresh Compressor Factory) as well as imported compressors.

Enterprise background and equipment manufactured

64. Fresh Compressor Factory was established in 1989 as Misr Compressor Manufacturing Company, which manufactured HFC-134a compressors and was acquired by Fresh in 2023. Since the acquisition, Fresh has started to upgrade one of its two manufacturing lines. Fresh Compressor Factory has two manufacturing lines for electromotor and compressor housing and other compressor components. The reported installed capacity is two million compressors annually. Five laboratories are available on the premises to test and inspect the performance and reliability of compressors and relevant components and consumables. The quantities manufactured over the last three years is shown in table 1 below. Information related to the energy performance of different models of compressors manufactured by the enterprise are considered confidential and are available to Executive Committee members upon request.

Table 1. Quantity of compressors manufactured over the last three years (2022 to 2024)

Year	2022	2023	2024	3-year average
Manufacturing volume	280,632	78,029*	189,347	182,669

* In 2023, the manufacturing volumes were low, as the enterprise was undergoing a management transition and certain plant modifications resulted in lower volumes of manufacturing.

Proposed activities and costs requested

65. The project would upgrade both of the compressor manufacturing lines as well as the five laboratories and would be completed in 36 months. The enterprise commits to manufacturing compressors with a 35 per cent energy-efficiency performance improvement by project completion,⁶ and to make best efforts to continue to improve the energy efficiency of the compressors beyond the project's duration at its own cost. While Fresh Compressor Factory currently does not export compressors, should it do so in the future, the enterprise commits to ensuring that the exported compressors would have energy performance over and above those sold domestically. The performance of compressors covered under the project would be monitored for a period of two years from the date of completion of the project by the NOU and the implementing agency.

Policy-level activities

66. Currently, there are no regulations or standards for the energy-performance level of compressors in Egypt. The energy performance level of compressors in Egypt is measured based on other standards like ASHRAE and CECOMAF.⁷ Thus, the adoption of energy-efficient compressors would primarily be driven

⁵ Electro Star, Alaska, Kiriazi, Fresh, El Araby, and Unionaire.

⁶ This includes 5 per cent improvement resulting from refrigerant change and 30 per cent from using energy efficient variable speed compressor.

⁷ ASHRAE stands for American Society of Heating, Refrigerating and Air-Conditioning Engineers; CECOMAF stands for Comité Européen de Construction d'Appareils à Moteur et à Fluides.

by the higher energy-efficiency standards of the equipment manufactured with compressors, which would, in turn, be determined by the MEPS levels of different equipment.

67. The Government of Egypt commits to periodically upgrading MEPS regulations and labelling programmes for RAC equipment, and to undertaking awareness and information outreach activities to ensure that information on the target energy-efficiency levels under the project for the equipment is publicized among different stakeholders. The Government will also take steps to implement regulations to ensure that the manufacturing, import and sale of compressors would achieve at least the target energy-efficiency levels, at the latest by three years from the date of completion of the project, to ensure the sustainability of the project's target energy-efficiency levels by creating a level playing field among enterprises in the compressor market. Additional details relating to this are presented in paragraphs 96 to 100 of the present document.

Funding requested

68. Table 2 below presents the incremental capital costs (ICCs) for conversion of the two manufacturing lines and includes both the conversion costs from HFC-134a to R-600a and the costs for improving the energy performance of the compressors. The enterprise would contribute to the project and would cover the cost of upgrading manufacturing line 1, the cost to convert its manufacturing from HFC-134a to R-600a and would co-finance the costs of modifications in laboratories.

Table 2. Proposed ICCs to upgrade laboratories and two manufacturing lines, and amount requested

Activity	No. of units	Cost (US \$)	Funds requested from MLF (US \$)
<i>Modifications in electric motor manufacturing line 1</i>			
Moving pallets for assembly line 1	150	58,500	0
Refrigerator compressor test machine for pre-assembly (2), assembly line repair (1), final check lines (2), final check lines repair (1)	6	69,600	0
Stator manufacturing line	1	708,542	0
High-speed punching lamination moulds	1	111,153	0
Rotor die-casting moulds	1	57,000	0
Installation and training	1	30,000	0
<i>Subtotal modifications in electric motor manufacturing line 1</i>		<i>1,034,795</i>	<i>0</i>
<i>Product design and development</i>			
Technical personnel for design and development of energy-efficient compressor	1	350,000	350,000
<i>Product design and development</i>		<i>350,000</i>	<i>350,000</i>
<i>Modifications in electric motor manufacturing line 2</i>			
Moving pallets for assembly line 2	150	58,500	0
Refrigerator compressor test machine for pre-assembly (2), assembly line repair (1), final check lines (2), final check lines repair (1)	6	69,600	0
Stator manufacturing line	1	800,000	800,000
High-speed punching lamination moulds	1	115,000	115,000
Rotor production line	1	600,000	600,000
High-speed press	1	300,000	300,000
Rotor die-casting moulds	1	60,000	60,000
Die-casting machine	1	100,000	75,000
Heat treatment oven	1	100,000	100,000
Rotor tester	1	70,000	70,000
Installation and training		30,000	30,000
<i>Subtotal modifications in electric motor production line 2</i>		<i>2,303,100</i>	<i>2,150,000*</i>
<i>Modifications in manufacturing facilities and equipment lines 1 and 2</i>			

Activity	No. of units	Cost (US \$)	Funds requested from MLF (US \$)
Crankcase line: new rough machining line compatible with R-600a models	1	1,100,000	0
Shell welding: new line to weld copper tubes (3 machines)	3	99,000	0
Shell welding: automatic welding machine for bottom support springs	1	52,000	0
Quality control: new gauges for testing components machining accuracy	1	100,000	0
<i>Subtotal modifications in manufacturing facilities and equipment lines 1 and 2</i>		<i>1,351,000</i>	<i>0</i>
<i>Modifications in laboratories</i>			
Calorimeter test device	1	250,000	100,000
Startability test device	1	150,000	75,000
Repair of old calorimeter and locked rotor test	1	50,000	0
<i>Subtotal modification in laboratories</i>		<i>450,000</i>	<i>175,000</i>
Total		**5,488,895	2,675,000

* The enterprise will provide US \$153,100 toward the modifications in electric motor manufacturing line 2

** The total funding of US \$5,488,895, as submitted, includes activities related to converting the manufacturing facility from HFC-134a-based to R-600a-based compressor manufacturing. The funding provided by the Multilateral Fund (MLF) would result in an additional 30 per cent energy-efficiency improvement in compressors, over and above the increase in energy efficiency due to refrigerant change.

Total cost of the pilot project

69. The Government of Egypt is requesting a total of US \$2,705,000, including US \$30,000 in project management costs and US \$2,675,000 to upgrade laboratories and manufacturing line 2 at Fresh Compressor Factory, plus agency support costs, to introduce inverter compressor technology and enable the enterprise to manufacture R-600a-based compressors, which are approximately 35 per cent more energy efficient than the baseline single-speed, HFC-134a-based compressors. The project would be implemented between January 2026 and December 2028.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

70. The project described above relates only to the compressor-project component; the overall proposal includes projects in both compressor manufacturing and enterprises manufacturing domestic refrigerators, commercial refrigeration equipment and air conditioners, as well as policy-level activities. This section covers the Secretariat's review based on decision 95/87 for the compressor component; the analysis of the other project components, including the overall policy-level activities and the project monitoring components are covered in paragraphs 96 to 115 of the present document.

Policy, regulatory and institutional framework

71. The Secretariat had discussions with UNIDO on how the manufacturing of energy-efficient compressors can be sustained, as there are currently no energy-efficiency standards for compressors. UNIDO explained that although there are no MEPS specifically for compressors in Egypt, MEPS are in place for the domestic refrigeration appliances for which these compressors are manufactured. Since the compressor is a key component that directly affects the overall energy efficiency of refrigeration appliances, manufacturers need to use higher-efficiency compressors to meet the MEPS requirements for refrigerators. Thus, MEPS on refrigeration equipment, which are implemented by EOS indirectly drives the manufacture and use of more energy-efficient compressors; those MEPS are and will continue to be periodically

upgraded by EOS. More details relating to EOS's interventions on the MEPS of equipment are provided in paragraphs 96 to 100 of the present document.

Technical and cost-related issues

Enterprise-level activities

72. Noting the low levels of manufacturing relative to the enterprise's nominal capacity, the Secretariat sought reassurance that the manufacturing of compressors by the enterprise was financially viable and would continue upon completion of the project. UNIDO confirmed that the enterprise was financially viable and noted that it would also manufacture energy-efficient, hydrocarbon-based compressors for commercial refrigeration equipment, and that the Fresh Group's manufacturing of domestic refrigerators and commercial refrigeration equipment would account for approximately 60 per cent⁸ of the Fresh Compressor Facility's nominal capacity. Regarding the business case for the purchase of the compressor manufacturing facility by the Fresh Group, UNIDO explained that the main reasons for the purchase of the facility were to establish a compressor manufacturing facility that would accelerate access to the Egyptian market through local manufacturing, shorten procurement turnaround time through local procurement, and avoid costs associated with importation and the need for foreign currencies.

73. Further, on the status of manufacturing compressors using HFC-134a, UNIDO explained that the enterprise is currently investing its own resources to convert its facility from manufacturing HFC-134a-based compressors for domestic and commercial refrigeration equipment to compressors that can use hydrocarbons. This conversion is expected to be completed by December 2027. The modifications to manufacture inverter compressor technology for enhanced energy-efficiency would be implemented alongside this conversion, resulting in greater availability of low-GWP-refrigerant-based energy-efficient compressors in the market.

74. Noting that the declared capacity for the two lines manufacturing compressors was two million units per year and that the actual manufacturing volumes in the last three years were significantly lower,⁹ the Secretariat requested additional information on how the manufacturing capacity of two million units had been assessed. UNIDO explained that the Industrial Registration Certificate for Fresh Compressor Factory indicates a manufacturing capacity of only one million units per year. The actual manufacturing volume was lower than the manufacturing capacity mainly due to current low market uptake of the compressors. The drop in manufacturing over the last three years was also a result of the transition in management following the acquisition of the facility by the Fresh Group, and of the manufacturing line modifications. Once the factory has completed the conversion process from HFC-134a to R-600a-based compressors (expected by December 2027), UNIDO expects the enterprise will be manufacturing close to the facility's nominal capacity.

75. The Secretariat noted that the reference costs for the compressor manufacturing facility for refrigerators and freezers were estimated at US \$2,675,000 for a capacity of two million units per year.¹⁰ This is equal to the requested funding level for the conversion to manufacturing energy-efficient, low-GWP-refrigerant-based compressors. Taking into consideration the methodology explained in paragraph 9 of document UNEP/OzL.Pro/ExCom/95/87, the following adjustments were agreed with UNIDO:

⁸ Based on a nominal capacity of 1 million units per year as explained in paragraph 74 below.

⁹ Table 1 in document UNEP/OzL.Pro/ExCom/87/25 on a project for "Conversion of refrigeration compressor manufacturing facility from HFC-134a-based compressors to R-600a-based compressors at Misr Compressor Manufacturing Co. (MCMC)" shows that maximum manufactured volumes of compressors for refrigeration equipment is about 350,000 per year.

¹⁰ Table 1 of document UNEP/OzL.Pro/ExCom/95/87.

- (a) The manufacturing volume of compressors was considered at one million units per year based on the maximum manufactured volumes in the past 10 years adjusted for three-shift operations at the manufacturing facility, and consistent with the facility's Industrial Registration Certificate; and
- (b) Based on the above manufacturing volumes, the cost of modifications to the manufacturing facility was adjusted proportionately for the manufacturing volume of one million compressors per year to US \$1,075,000; no change in funding was made for product design and development, and prototype manufacturing and testing, resulting in agreed funding of US \$1,600,000.

76. In addition to the changes above, the Secretariat noted that 11 enterprises manufacturing domestic refrigerators in Egypt were requesting funding at the present meeting to improve the energy efficiency of their products,¹¹ which included funding associated with additional component costs. The additional cost of energy-efficient compressors constituted, on average, 58.3 per cent of the aggregate additional component costs for the manufacturers. Given that funding was being provided to the Fresh Compressor Facility to improve the energy efficiency of its compressors, in line with paragraph 11 of document UNEP/OzL.Pro/ExCom/95/87, it was agreed to adjust the total eligible costs for the energy-efficiency projects based on that percentage, and the percentage of Fresh Compressor Facility's manufacturing capacity relative to the total manufacturing volume of domestic refrigerators and chest freezers (i.e., 2,496,827 units) in Egypt, i.e., 40 per cent, resulting in a net adjustment of US \$344,750. The Secretariat considered that this adjustment could be made against the additional component costs of the domestic refrigeration and chest freezer manufacturing enterprises participating in the project or, if the Government so chose, the Fresh Compressor Facility. The Government chose to make the adjustment against the latter, resulting in agreed eligible funding of US \$1,255,250 for the Fresh Compressor Facility to increase the energy efficiency of its compressors by approximately 30 per cent, and to exclusively manufacture inverter compressors. The Fresh Compressor Facility will finance its conversion from HFC-134a-based to R-600a-based manufacturing with its own resources.

77. The Secretariat considered it meaningful to aggregate the costs related to monitoring and reporting across the Fresh Compressor Factory (agreed at US \$15,000) and the equipment manufacturers into a single component, as further described in paragraph 110 of the present document.

Sustainability of the pilot project and assessment of risks

78. Egyptian manufacturers of domestic refrigerators and chest freezers will have a choice as to whether to import energy-efficient inverter compressors or to purchase such compressors from Fresh Compressor Factory. The largest risk to the project is the ability of Fresh Compressor Factory to compete against international compressor manufacturers, many of which benefit from significant economies-of-scale. The commitment of the enterprise to make best efforts to continue to improve the energy efficiency of compressors beyond the project's duration, and the Government's commitment to periodically upgrade MEPS regulations and labelling programmes; undertake awareness and information outreach activities; and take steps to implement regulations to ensure that the manufacturing, import and sale of compressors achieve at least the target energy-efficiency levels, at the latest by three years from the date of completion of the project, will mitigate that risk and help ensure the sustainability of the project. UNIDO also explained that locally available compressors are preferred over imported compressors due to challenges in dollar-based payments.

79. One possible option for supporting energy-efficient compressor manufacturing is a prohibition on single-speed compressors for domestic refrigerators. Regarding such a ban, it is noted that this would require consultations among different ministries and stakeholders, and the elaboration, approval and entry

¹¹ Paragraphs 81-115 of the present document.

into force of the necessary regulation, for which considerable time may be needed. Further, given that this relates to energy efficiency, EOS and other relevant organizations need to be involved and consider the timing of issue of the ban. Consequently, the NOU could not confirm at this time whether such a ban could be implemented upon completion of the project. The Secretariat noted that MEPS set at an appropriate level would be likely to effectively preclude domestic refrigerators based on single-speed compressors from the market. Further, this matter can be considered by EOS in its consultative process of upgrading MEPS and discussed with relevant stakeholders, and outcomes of the consultation can be reported to NOU and UNIDO.

RECOMMENDATION

80. The Executive Committee may wish to consider approving the project to convert hermetic compressors at Fresh Compressor Factory to manufacture inverter compressor technology, in the amount of US \$1,255,250, plus agency support costs of US \$87,868 for UNIDO, noting:

- (a) That the Government of Egypt has committed to the conditions referred to in paragraphs 7 to 10 and paragraphs 11 to 17, respectively of UNEP/OzL.Pro/ExCom/95/87;
- (b) The commitment of the Fresh Compressor Factory to only manufacture inverter compressors by the completion of the project;
- (c) That, the agreed funding for Fresh Compressor Factory including agency support costs would be allocated to the funding window approved under decision 94/60; and
- (d) That the project would be operationally completed no later than 31 December 2028, and a detailed project report would be submitted to the Executive Committee within six months of the date of completion of the project.

PROJECT EVALUATION SHEET – NON-MULTI-YEAR PROJECTS**Egypt****PROJECT TITLE****BILATERAL/IMPLEMENTING AGENCY**

Project to enhance energy efficiency in the manufacturing of domestic refrigerators, chest freezers, and residential air conditioners in Egypt	UNIDO
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PROJECT OBJECTIVE

The project aims to raise the energy efficiency of domestic refrigerators, chest freezers, and residential air conditioners manufactured in 28 facilities at 19 enterprises to the targeted energy-efficiency levels.

NATIONAL CO-ORDINATING AGENCY	Egyptian Environmental Affairs Agency (EEAA)
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LATEST ARTICLE 7 DATA (Annex F)	Year: 2024	9,253.34 mt	17,259,729 CO ₂ -eq tonnes
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Particulars	Investment activities	
HFCs used in refrigeration manufacturing as reported in CP report data for 2024	HFC-134a	637.90 mt
		912,197 CO ₂ -eq tonnes
	R-404A	20.34 mt
		79,765 CO ₂ -eq tonnes
	R-407C	49.95 mt
		88,602 CO ₂ -eq tonnes
HFCs used in AC manufacturing as reported in CP report data for 2024	HFC-134a	45.56 mt
		69,707 CO ₂ -eq tonnes
	HFC-32	66.72 mt
		45,036 CO ₂ -eq tonnes
	R-407C	1.31 mt
		2,331 CO ₂ -eq tonnes
	R-410A	1,548.71 mt
		3,232,924 CO ₂ -eq tonnes
Project duration (months):	36 months	
Initial amount requested (US \$):	14,318,818	
Final project costs (US \$)	16,004,281	
Implementing agency support cost (US \$):	1,120,300	
Total cost of project to Multilateral Fund (US \$):	17,124,581	
Energy efficiency savings* (US \$/kWh/year):	0.014	
Status of counterpart funding (Y/N):	Y	
Project monitoring milestones included (Y/N):	Y	
Minimum energy performance standards available for the relevant sector (Y/N):	N	

* For the first year of the project following project completion. Additional benefits will be accrued each subsequent year, based on the operation of equipment manufactured in that and in subsequent years.

SECRETARIAT'S RECOMMENDATION	Individual consideration
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PROJECT DESCRIPTION

Background

81. On behalf of the Government of Egypt, UNIDO has submitted, in line with decision 94/60, a request for a project to enhance energy efficiency in the manufacture of domestic refrigerators, chest freezers, and residential air conditioners (ACs) in the amount of US \$14,318,818, plus agency support costs of US \$1,002,317, as originally submitted.¹

82. The status of implementation of energy-efficiency-related activities funded by the Multilateral Fund is provided in paragraphs 54 to 55 of the present document. Additionally, investment projects in the refrigeration and AC manufacturing sectors were approved at the 96th meeting as part of the stage I of the Kigali HFC Implementation Plan (KIP) for the country. The project in the domestic refrigeration sector approved in the amount of US \$4,552,856 will convert the sector to R-600a, eliminating the use of 376.97 mt (539,066 CO₂-eq tonnes) of HFC-134a. The project in the residential AC sector approved in the amount of US \$1,948,253 will eliminate the use of 163.75 mt (341,819 CO₂-eq tonnes) of R-410A, in addition to 716.92 mt (1,496,571 CO₂-eq tonnes) under the HCFC phase-out management plan (HPMP), in the residential AC manufacturing sector to be replaced by HFC-32. The Executive Committee decided when approving the country's KIP that irrespective of decision 84/72(e)(iii), the enterprises El Araby, Fresh, Miraco, Power and Unionaire would be eligible for a project to improve the energy efficiency of residential AC units that they manufactured under decision 94/60, subject to the criteria of decision 94/60 (decision 96/38(b)(vi)). The phase-down of HFCs with high-global-warming-potential (GWP) in the domestic refrigeration and residential AC manufacturing sectors will be sustained by a ban on the manufacture and import of R-410A residential ACs and HFC-based domestic refrigerators and stand-alone commercial refrigeration equipment by 1 January 2029.

Energy-efficiency project

Policy, regulatory and institutional framework

83. The Government of Egypt has adopted ES:3794-2024, ES:6000-3/2018 and ES:3794-2018 for domestic refrigerators and chest freezers which are periodically revised to reflect technological advancements and to ensure harmonization with international benchmarks and International Electrotechnical Commission (IEC) standards. Additionally, household refrigerating appliances must be in compliance with IEC 62552-3. Egypt's regulation refers to ISO 16358-1:2013 AMD 1:2019 for high ambient temperatures recognizing that Egypt is a high-ambient-temperature country.

84. The current ES 3794-2024 standards generally allow for a higher maximum annual energy consumption (AEC_{Max}) than those recommended by United for Efficiency (U4E), a UNEP-led initiative that has four categories for equipment. However, the Egyptian standard has more categories and covers more specific product types, as shown in table 1 below.

Table 1. AEC_{Max} for the Egyptian ES 3794-2024 standards compared to U4E by equipment type

ES:3794-2024 Category	U4E Category	AEC _{Max} – ES:3794-2024	AEC _{Max} – U4E*
Refrigerator	Refrigerator	0.48 AV +245	0.17 AV + 106
Single door refrigerator – manual defrost	Refrigerator-Freezers	0.48 AV +530	0.23 AV + 167
Double door refrigerator – semi-no-frost		0.37 AV + 650	
Multi-Door refrigerator – no-frost		0.57 AV + 800	
Small refrigerators with freezers < 14 l		0.84 AV + 295	
Vertical freezer – manual defrost		0.36 AV + 370	0.214 AV + 197

¹ As per the letter of 11 June 2025 from the Egyptian Environmental Affairs Agency to UNIDO.

ES:3794-2024 Category	U4E Category	AEC _{Max} – ES:3794-2024	AEC _{Max} – U4E*
Vertical freezer – no-frost	Freezers	0.53 AV + 420	
Chest freezer		0.39 AV + 490	

* AEC_{Max} - U4E is adjusted for the 25°C-test condition used by Egypt. This issue is further discussed in paragraph 101.

85. The current standards and regulations for labelling domestic refrigeration equipment can vary from A ($IEE^2 \leq 45$) to E ($75 < IEE \leq 85$) with the minimum energy performance standards (MEPS) equal to IEE 85; and these will be enforced in 2025 through to 31 December 2026. The index is set to be updated in 2027 to A ($IEE \leq 35$) to E ($65 < IEE \leq 75$) with the MEPS equal to IEE 75. The seasonal energy efficiency standard in Egypt for room and ducted ACs and the requirements for both fixed-speed and inverter ACs are ES:3795-2023.³ The standard refers to international best practices for measurements.⁴ The labelling standards set out seven levels (S1-S7) for the Seasonal Energy-Efficiency Ratio (SEER) for equipment, with S1 being the MEPS for fixed-speed equipment and S2 being the MEPS for variable-speed or inverter technologies. The current SEER labelling values and those scheduled for 2027 are shown in table 2 below. Further background information on the policy and regulatory and institutional framework is presented in paragraphs 57 to 59 of the present document.

Table 2. SEER labelling index for AC equipment, in Egypt

Label	2025 to 31 December 2026		Starting in 2027	
	<i>Ducted-ACs</i> Btu/Wh	<i>Window or split type ACs</i> Btu/Wh	<i>Ducted ACs</i> Btu/Wh	<i>Window or split type ACs</i> Btu/Wh
S8	-	-	SEER ≥ 16	SEER ≥ 19.5
S7	SEER ≥ 15	SEER ≥ 18	16 > SEER ≥ 15	19.5 > SEER ≥ 18
S6	15 > SEER ≥ 14	18 > SEER ≥ 16.5	15 > SEER ≥ 14	18 > SEER ≥ 16.5
S5	14 > SEER ≥ 13	16.5 > SEER ≥ 15	14 > SEER ≥ 13	16.5 > SEER ≥ 15
S4	13 > SEER ≥ 12	15 > SEER ≥ 13.5	13 > SEER ≥ 12	15 > SEER ≥ 13.5
S3	12 > SEER ≥ 11	13.5 > SEER ≥ 12	12 > SEER ≥ 11	13.5 > SEER ≥ 12
S2	11 > SEER ≥ 10	12 > SEER ≥ 10.5	11 > SEER ≥ 10	12 > SEER ≥ 10.5
S1	10 > SEER ≥ 9	10.5 > SEER ≥ 9.5	-	-

Report on HFC consumption

86. An overview of HFC consumption is provided in paragraph 60 of the present document and in the project evaluation sheet. Table 3 provides a more detailed breakdown of the HFC consumption in the refrigeration and AC manufacturing sectors as reported in country programme implementation reports.

Table 3. HFC consumption in the refrigeration and AC manufacturing sectors (average in baseline years and 2022–2024)

Substance	GWP	Refrigeration manufacturing				AC manufacturing			
		2020–2022 Average	2022	2023	2024	2020–2022 Average	2022	2023	2024
mt									
HFC-32	675	0.00	0.00	0.00	0.00	3.35	10.04	11.49	66.72
HFC-134a	1,430	478.75	530.00	603.46	637.90	41.71	41.76	33.70	45.56
R-404A	3,922	13.75	15.22	14.16	20.34	0.00	0.00	0.00	0.00

² IEE is the index for energy efficiency; according to ES 3794-2024, this is calculated as 100*annual energy consumption (actual) / annual energy consumption (maximum) for the product.

³ The standard applies to residential ACs of capacities up to 3 tons of refrigeration (TR), equivalent to 10.5 kW, for window-type ACs, and 5.4 TR, equivalent to 19 kW, for split units for both fixed-speed and inverter units.

⁴ The Egyptian Standards Versions for ISO 5151, ISO 13253, ISO 817, IEC 60335-2-40 and refers to ISO 16358-1 for seasonal performance evaluation.

Substance	GWP	Refrigeration manufacturing				AC manufacturing			
		2020–2022 Average	2022	2023	2024	2020–2022 Average	2022	2023	2024
mt									
R-407C	1,774	46.00	50.93	37.67	49.95	1.18	2.79	0.96	1.31
R-410A	2,088	0.00	0.00	0.00	0.00	1,250.67	1,558.00	1,268.79	1,548.71
Total		538.50	596.15	655.29	708.19	1,296.89	1,612.58	1,314.94	1,662.30
CO ₂ -eq tonnes									
HFC-32	675	0	0	0	0	2,258	6,774	7,752	45,036
HFC-134a	1,430	684,608	757,900	862,952	912,197	59,641	59,717	48,194	65,151
R-404A	3,922	53,922	59,687	55,546	79,765	0	0	0	0
R-407C	1,774	81,600	90,333	66,816	88,602	2,084	4,940	1,710	2,331
R-410A	2,088	0	0	0	0	2,610,767	3,252,325	2,648,605	3,232,924
Total		820,130	907,920	985,313	1,080,564	2,674,749	3,323,756	2,706,262	3,345,441

Project objective

87. The objective of the project is to improve the energy efficiency of appliances in the domestic refrigeration, chest freezers and residential AC manufacturing subsectors. The project would support energy-efficiency enhancements in 15 enterprises (11 in the AC sector and eight in refrigeration sector, with four enterprises manufacturing in both sectors) with a total of 28 manufacturing facilities. All but one enterprise has previously received funding from the Multilateral Fund for conversions from HCFC or high-GWP HFCs. Table 4 below summarizes the project objectives as submitted.

Table 4. Project objectives by application

Objective	Domestic refrigerators	Chest freezers	Residential ACs
Number of manufacturing enterprises	9	5	11
Number of manufacturing facilities	11	6	11
Improvement in energy efficiency (%)	27.4	28.3	31.3

Enterprise background and equipment manufactured

88. The beneficiary enterprises are 100 per cent Egyptian-owned, except Miraco that has 37.5 per cent non-Article 5 ownership. Details on the type of equipment and number of models, date of establishment, manufacturing capacity, and funding requested for the eight refrigeration manufacturers and the 11 AC manufacturers are provided in tables 5 to 7.

Table 5. Summary of details for domestic refrigerator manufacturers

Enterprise	Year est.	# of models	Average EE* improvement (%)	Capacity (units/year)	Additional capital cost (US \$)	Additional component cost (US \$)	Total (US \$)
Alaska Refrigerators	1978	18	28.1	120,982	250,000	308,180	558,180
El Araby Refrigerators	**2014	17	18.4	1,070,001	750,000	364,321	1,114,321
Electrostar Refrigerators	1985	10	49.5	116,798	250,000	30,391	280,391
Fresh Refrigerators	1985	15	14.9	341,445	250,000	288	250,288
Kiriazi Refrigerators	2007	65	29.9	559,888	250,000	280,060	530,060
Sital	1984	13	23.9	100,966	250,000	70,485	320,485
Tredco Refrigerators	1985	7	30.1	50,000	150,000	16,818	166,818

Enterprise	Year est.	# of models	Average EE* improvement (%)	Capacity (units/year)	Additional capital cost (US \$)	Additional component cost (US \$)	Total (US \$)
Unionaire (Defrost)	2003	6	30.0	151,790	250,000	454,457	704,457
Unionaire (No frost)	2003	8	40.0	***150,307	250,000	134,614	384,614
Total				2,662,177	2,650,000	1,659,614	4,309,614

* Weighted average energy efficiency (EE) improvement.

** The three facilities for El Araby were established at different times, the latest of which is 2014.

*** Total capacity to manufacture no frost and defrost chest freezers (shown in table 6 below).

Table 6. Summary of details for chest freezer manufacturers

Enterprise	Year est.	# of models	Average EE improvement (%)	Capacity (units/year)	Additional capital cost (US \$)	Additional component cost (US \$)	Total (US \$)
Alaska Chest Freezers	1978	5	39.0	120,000	180,000	537,336	717,336
Electrostar Chest Freezers	2007	22	35.7	163,807	180,000	443,752	623,752
Fresh Chest Freezers	1985	10	13.2	267,059	180,000	22,755	202,755
Kiriazzi Chest Freezers	1997	8	29.3	359,670	180,000	84,105	264,105
Tredco Chest Freezers	1985	7	28.2	100,000	180,000	70,841	250,841
Unionaire (Defrost)	2003	4	25.0	*	0	36,377	36,377
Total				1,010,536	900,000	1,195,166	2,095,166

* Capacity to manufacture defrost chest freezers shared with no frost manufacturing capacity (shown in table 5 above).

Table 7. Summary of details for AC manufacturers

Name	Year est.	# of models	Average EE improvement (%)	Capacity (units/year)	Additional capital cost (US \$)	Additional component cost* (US \$)	Total (US \$)
El Araby	2004	15	30.4	500,000	250,000	1,089,404	1,339,404
Free Air	2016	13	36.0	120,000	250,000	218,682	468,682
Fresh AC	2006	26	28.2	250,000	250,000	973,604	1,223,604
Haier AC	2024	9	24.1	98,000	39,200	152,278	402,278
Kiriazzi AC	2018	12	29.0	192,000	250,000	102,661	141,861
Miraco	2019	34	25.0	600,000	156,250	2,019,850	2,176,100
Power	2016	19	29.8	10,000	91,300	349,911	599,911
Raya	2019	8	32.0	300,000	250,000	19,596	110,896
Teriak	2018	17	25.7	80,000	120,000	40,638	160,638
Tiba	2010	10	49.9	100,000	120,000	249,568	499,568
Unionaire AC	2003	79	32.9	200,000	250,000	111,095	231,095
Total				2,450,000	2,026,750	5,327,287	7,354,037

* Calculated based on the additional component costs for an AC unit with capacity of 1.5 TR and adjusted based on the weighted average cooling capacity of ACs manufactured by the respective enterprise.

89. The estimated energy savings in GWh/year for domestic refrigerators, chest freezers and ACs is 290.5, 136.0 and 784.5, respectively; based on carbon emission intensity of electricity generation in Egypt (0.572 kg CO₂/kWh), the carbon emission reduction estimated to be achieved is 166,166, 77,792 and 48,734 CO₂-eq tonnes per year, respectively.

Proposed activities

90. The energy efficiency of the products under consideration would be verified upon completion of the project and the quantity of products manufactured for one year after completion of the project would be used to assess energy-efficiency performance. Each enterprise commits to manufacturing equipment with at least the target energy-efficiency performance after project completion, and to make best efforts to continue to improve the energy efficiency of those products beyond the project duration at its own cost. Exported equipment would have energy performance over and above minimum domestic mandatory energy-efficiency standards. The performance of equipment covered under the project would be monitored for a period of two years from the date of completion of the project by the national ozone unit (NOU), and by UNIDO as the implementing agency.

Policy-level activities

91. The Government of Egypt commits to upgrading the MEPS regulations and labelling programmes and undertaking awareness-raising activities among different stakeholders. The Government would take steps to implement regulations to ensure that the manufacturing, import and sale of the equipment would at least achieve the target energy-efficiency performance levels, at the latest by three years from the date of completion of the project.

92. To ensure successful implementation, monitoring, verification, and reporting for the project, Egypt is requesting a total of US \$560,000 based on an allocation of US \$20,000 per facility for 28 facilities. The funding will cover technical consultation and oversight throughout the three-year implementation period, as well as continued follow-up and reporting for an additional two-years post-completion, which extends the support through 2030.

Funding requested as submitted

93. The additional capital and component costs per enterprise were calculated based on table 1 to 4 in document UNEP/OzL.Pro/ExCom/94/61. A summary of the additional capital and additional component costs is given in table 8 below.

Table 8: Summary of the additional capital and additional component costs for the equipment manufacturers and project monitoring and reporting, as submitted (US \$)

Cost item	Additional capital cost	Additional component cost	Total
Domestic refrigerators	2,650,000	1,659,614	4,309,614
Chest freezers	900,000	1,195,166	2,095,166
Residential ACs	2,026,750	5,327,287	7,354,037
Monitoring and reporting			560,000
Total*	5,576,750	8,182,068	14,318,818

*Rounding-off difference of US \$1.

Total cost of the pilot project

94. The total cost of the project to enhance energy efficiency in the manufacture of domestic refrigerators, chest freezers and residential ACs amounts to US \$14,318,818, as submitted. The project would be implemented between January 2026 and December 2028.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

95. While the project is focused on enterprise-level activities, policy-level activities are also required for the successful implementation of the project. The Secretariat reviewed the project aimed at enhancing energy efficiency in the manufacturing of domestic refrigerators, chest freezers, and residential air conditioners, as well as policy-level activities from both proposed projects based on decision 94/60. The Secretariat's review, based on decision 95/87, of the compressor component of Egypt's overall proposal, is presented in paragraphs 53 to 80.

Policy, regulatory and institutional framework

Development and implementation of minimum energy performance standards

96. UNIDO explained that EOS develops and enforces regulations relating to energy-efficiency standards for refrigeration, AC and heat pump (RACHP) equipment. Standards are currently available for domestic refrigerators, chest freezers, and residential ACs.

97. The Secretariat noted that the target MEPS (in kWh/year/litre) for domestic refrigerators and chest freezers, as submitted, are significantly higher (i.e., less energy efficient) than the target energy efficiency performance levels of the different models of equipment committed under the project as well as the U4E model regulation standards for domestic refrigerators and chest freezers. UNIDO explained that the Egyptian market has different market segments, and that the affordability of domestic refrigerators and chest freezers is an important criterion for customers in selecting the product. The national MEPS standards established by EOS took this industry structure into consideration while finalizing the standards in consultation with the industry.

98. The Egyptian domestic refrigerator and chest freezer market includes both domestic manufacturers and importers. MEPS levels that are set too low (i.e., very energy efficient) could pose a challenge for domestic manufacturers that have more limited capability of achieving such energy efficiency than larger international manufacturers. The Secretariat and UNIDO discussed in detail appropriate MEPS levels that could be achieved by Egypt. Based on those discussions, UNIDO confirmed that the Government of Egypt, through the EOS, would make best efforts to increase the energy efficiency performance standards in the country to the levels specified in the 2019 U4E model regulations for domestic refrigerators and chest freezers,⁵ and the 2021-U4E model regulations for ACs.⁶ The NOU will coordinate with EOS on this matter and in the last meeting of every year, provide an update on the status of update of energy efficiency standards for domestic refrigerators, chest freezers and ACs until those standards are met.

99. In the case of ACs, the Secretariat noted that the 2030 target standards for SEER are lower (i.e., less energy efficient) than the standards recommended for such equipment by U4E in 2021. UNIDO explained that similar to domestic refrigerators and chest freezers, the cost and limited availability of components (e.g., variable-speed compressors, controls) and the strong consumer need for affordable products are factors that slow the adoption of energy-efficiency standards at the national level.

100. The Secretariat also consulted UNIDO on other measures that would be implemented by the Government of Egypt to ensure the sustainable high energy-efficiency performance of domestic refrigerators, chest freezers and ACs. Based on the consultations, it was agreed that the NOU and EOS will:

- (a) In line with paragraph 37 of document UNEP/OzL.Pro/ExCom/94/61, monitor the energy-efficiency performance of the products covered under the project for a period of

⁵ https://united4efficiency.org/wp-content/uploads/2019/11/U4E_Refrigerators_Model-Regulation_20191029.pdf

⁶ https://united4efficiency.org/wp-content/uploads/2021/11/U4E_AC_Model-Regulation_EN_2021-11-08.pdf

two years from the date of completion of the project with support from UNIDO, and confirm that the enterprises are making their best efforts to continue to improve the energy efficiency of the products beyond the project implementation duration;

- (b) In line with paragraph 36 of document UNEP/OzL.Pro/ExCom/94/61, ensure that the project implementation is operationally completed no later than 36 months from the date of approval and return the funding relating to the additional component costs and any other remaining balances that had not already been obligated if the project is not completed by 36 months;
- (c) In line with paragraph 38 of document UNEP/OzL.Pro/ExCom/94/61, ensure the periodic upgrading of MEPS regulations, labelling programmes and awareness and outreach activities to ensure that the target energy-efficiency levels under the project for the equipment are publicized among different stakeholders. The Government will also take steps to implement regulations to ensure that the manufacturing, import and sale of the equipment at least achieve the target energy-efficiency performance levels, at the latest by three years from the date of completion of the project;
- (d) Implement awareness and outreach initiatives to publicize the activities undertaken under this project including implementation timelines for MEPS standards for domestic refrigerators, chest freezers and residential ACs. This includes coordination with stakeholders and alignment with other national or regional programmes promoting energy-efficient RACHP technologies;
- (e) To the extent feasible, introduce and implement other complementary policies and measures that promote the adoption of energy-efficient equipment in refrigeration and AC applications, ensuring long-term sustainability for project beneficiaries;
- (f) Ensure timely implementation of both the KIP stage I projects and the proposed energy-efficiency initiatives in the RACHP sector, in accordance with agreed timelines, policies, and regulatory frameworks; and
- (g) Submit a detailed report on the implementation of the project, including the additional capital and component costs incurred for the models covered in the project, the energy efficiency gains accrued, and challenges faced while implementing the project.

Technical and cost-related issues

Domestic refrigerators and chest freezers

101. Egypt's test conditions for domestic refrigerators and chest freezers are different than those used by U4E. Because the funding levels specified in table 2 of document UNEP/OzL.Pro/ExCom/94/61 are based on the U4E's test conditions, the target energy performance levels need to be adjusted to Egypt's test conditions. This was done using linear interpolation between the optional reference temperatures for AEC_{Max} of 20°C and 32°C specified by U4E and the 25°C test condition used by Egypt, as further explained in Annex II of the present document.

102. The Secretariat assessed the eligible incentives for the enterprises in line with decision 94/60. In particular, the Secretariat determined the incentives following the methodology outlined in annex II and based on the additional capital costs and additional component costs specified in tables 1 and 2 of document UNEP/OzL.Pro/ExCom/94/61. The key observations and the revision in costs relating to the project are:

- (a) For five enterprises manufacturing domestic refrigerators, namely El Araby – Factory A and B, Kiriazi, Electrostar and Fresh Refrigerators, the target energy efficiency of models, as submitted, was insufficient (i.e., not sufficiently energy efficient) to qualify for the additional component cost incentive for 75 per cent or more of the models manufactured, weighted by the respective model manufacturing volume. The Secretariat considers that this poses a substantial risk to the sustainable manufacturing of energy-efficient equipment by those enterprises and therefore considered that any enterprise that did not manufacture at least one quarter of its equipment with a target energy efficiency sufficient to qualify for the incentive under the project would not be eligible, and encouraged UNIDO to work with those enterprises so that they could consider improved energy-efficiency targets that would allow the enterprises to at least meet that 25 per cent threshold. Following constructive discussions between UNIDO and the enterprises, the enterprises revised the target energy efficiency of models they manufacture such that all enterprises exceeded the 25 per cent threshold and, therefore, could be assisted under the project. Table 9 provides the percentage of equipment manufactured by the enterprises that qualify for the incentive, as submitted, and as revised.

Table 9. Percentage of domestic refrigerators manufactured qualifying for the energy efficiency incentive, as submitted and revised

Name	As submitted		Revised	
	Qualifying for incentive (per cent)	Average EE improvement (per cent)	Qualifying for incentive (per cent)	Average EE improvement (per cent)
Alaska Refrigerators	48.8	28.1	48.8	28.1
El Araby - Factory A	21.7	18.2	46.0	29.3
El Araby - Factory B	22.5	24.2	100.0	30.4
El Araby - Factory C	63.7	12.8	63.7	12.8
Electrostar Refrigerators	11.5	49.5	100.0	57.1
Fresh Refrigerators	Insignificant	14.9	30.0	17.8
Kiriazi Refrigerators	23.6	29.9	33.0	30.0
Siltal	35.6	23.9	54.9	24.2
Tredco Refrigerators	49.5	30.1	49.5	30.1
Unionaire (Defrost)	83.5	30.0	83.5	30.0
Unionaire (Nofrost)	100.0	40.0	100.0	40.0

- (b) For two enterprises manufacturing domestic refrigerators, namely Kiriazi and Fresh Refrigerators and one enterprise manufacturing chest freezers, namely Fresh Chest Freezers, the manufacturing volume of equipment with a target energy efficiency sufficient to qualify for an incentive during the last three years was greater than 25 per cent and lower than 50 per cent of the manufacturing volume, as submitted. While such enterprises pose a lower risk than the enterprises described in paragraph (a) above, the Secretariat considered it meaningful to explore with UNIDO whether an additional guarantee or assurances could be provided to mitigate the risk that, due to market factors, the manufacturing volume of models qualifying for an incentive decreased while the manufacturing volume of models with an insufficient target energy efficient increased. Following constructive discussions between the Secretariat and UNIDO, it was agreed that the NOU and UNIDO will monitor

the enterprises' progress, including by receiving periodic updates from those enterprises on their progress toward achieving the agreed energy efficiency performance levels; that if an enterprise does not achieve its target performance levels, EOS will implement a prohibition on the sale of the equipment where the target performance committed under the project were planned but not achieved; and the NOU will reduce the HFC quotas for an enterprise that did not meet the target performance and that had AC manufacturing at appropriate levels as a mechanism to incentivize all enterprises to meet the energy efficiency targets.

- (c) Even though the energy efficiency of all equipment manufactured by the enterprises will be improved under the project, not all models of domestic refrigerators and chest freezers qualify for the incentive scheme. UNIDO confirmed that all models manufactured by the enterprises would achieve the specified target performance levels for each model manufactured by those enterprises, irrespective of whether the model qualified for an incentive. Further, the MEPS that the Government has agreed to enforce by the end of the project and by 1 January 2030 will be applicable to the entire industry (i.e., domestic manufacturing, imports and exports of domestically manufactured products) and thus the energy-efficiency levels committed to in the project would be sustainable; and
- (d) UNIDO also confirmed that by the end of the project, all enterprises would continue to manufacture and sell the different products manufactured at their facility, both on domestic markets and export markets, at either the target energy-performance level, a higher energy-performance level, or specified MEPS levels, whichever resulted in higher energy performance for the different models.

103. Table 10 presents by application the agreed additional capital costs and additional component costs, where the latter is determined by model based on the average 2022-2024 manufacturing volume and target energy performance of that model.

Table 10. Agreed additional capital and component cost for enterprises manufacturing domestic refrigerators and chest freezers (US \$)

Application (# enterprises)	As submitted				Agreed			
	Additional capital cost	Additional component cost	Total	EE* (%)	Additional capital cost	Additional component cost	Total	EE* (%)
Domestic refrigerators (9)	2,650,000	1,659,615	4,309,615	27.4	2,650,000	1,950,330	4,600,330	30.0
Chest freezers (6)	900,000	1,195,166	2,095,166	28.3	900,000	1,195,166	2,095,166	28.3

* Average improvement in energy efficiency

104. As submitted, the average energy savings for domestic refrigerator manufacturers was 27.4 per cent compared to the baseline and with the changes in the number of qualifying models as explained in paragraph 102(a) and table 9 above, this increased to 30 per cent. In case of chest freezers, the average energy efficiency improvement was 28.3 per cent. The Secretariat considers it likely that technological advances and market factors could allow the enterprises to improve the energy efficiency of their products beyond the agreed levels.

Air conditioner manufacturing

105. The Secretariat assessed the eligible incentive for the AC manufacturing enterprises in line with decision 94/60. In particular, the Secretariat determined the incentive following the methodology outlined in annex II of document UNEP/OzL.Pro/ExCom/94/61 and based on the additional capital cost and additional component costs specified in tables 3 and 4 of document UNEP/OzL.Pro/ExCom/94/61. Subsequent to constructive discussions with UNIDO, the following adjustments to the eligible incentive were agreed:

- (a) The Secretariat assessed the eligible incentive by model based on the methodology given in document UNEP/OzL.Pro/ExCom/94/61 and table 4 of that document, which resulted in an increase in the eligible additional component costs. This increase is because UNIDO had calculated the additional component costs based on the MEPS that will be in place in 2027, which results in a smaller relative improvement in energy efficiency and a correspondingly smaller additional component costs. Additional details of the methodology used by the Secretariat to calculate the incentive for air conditioners, which was done model-by-model, is presented in annex II of the present document.
- (b) The Secretariat noted that the baseline energy performance of 28 models (representing less than 1.4 per cent of the total number of AC units manufactured) were below the current MEPS. The additional component costs for those models were adjusted to 50 per cent of the additional component cost incentive levels; and
- (c) For Kiriazi AC, Free Air, Teriak, Raya and Tiba, the manufacturing volumes during the last three years were lower than the nominal manufacturing capacity, as submitted. The additional capital costs were adjusted to the maximum manufacturing volumes over the last three years, in line with table 3 of UNEP/OzL.Pro/ExCom/94/61.

106. In addition to the agreed changes noted above, in line with decision 96/21, no funding will be provided to Haier AC as the enterprise's manufacturing capacity was established in 2024. Table 11 presents agreed additional costs for manufacturers of ACs based on adjustments presented in paragraphs 105 and 106.

Table 11. Agreed additional capital and component costs for enterprises manufacturing residential AC equipment (US \$)

As submitted				Agreed			
Additional capital cost	Additional component cost	Total	EE (%)	Additional capital cost	Additional component cost	Total	EE (%)
2,026,750	5,327,287	7,354,037	31.3	1,427,550	7,591,235	9,018,785	31.3

107. Out of 242 models included in the project, 237 models (accounting for less than 1 per cent of the total number of ACs manufactured by the enterprises) qualified for an incentive. UNIDO confirmed that all models manufactured by the 11 enterprises would achieve the specified target performance level for each different model manufactured by those enterprises, irrespective of whether each of the models qualified for an incentive. Further, the MEPS that the Government has agreed to enforce by the end of the project would be applicable to the entire industry (i.e., domestic manufacturing, imports and exports of domestically manufactured products) and thus the energy-efficiency levels committed to in the project would be sustainable. UNIDO also confirmed that by the date of completion of the project, all enterprises would continue to manufacture and sell products manufactured at their facility, both in domestic markets and export markets, at either the target energy performance level, a higher energy performance level, or specified MEPS levels, whichever resulted in higher energy performance for the different models.

108. Annex II to the present document provides details on the methods used for calculating incentive levels for manufacturers of all the three categories of equipment, including the methodology used for adjustments in calculations for domestic refrigerators and freezers calculations at a 25°C-testing temperature.

Total energy savings and US \$/kWh/year saved

109. Based on the baseline energy consumption per model, target energy efficiency, and number of units of each model manufactured by the enterprises,⁷ the cumulative energy savings are 1,121.3 GWh/year. Based on the agreed costs of US \$15,714,281, this results in a cost effectiveness of US \$0.014/kWh/year for this component of the project.

Monitoring and reporting

110. The Secretariat and UNIDO had detailed discussions on the need for and costs associated with monitoring and reporting. UNIDO will need to monitor and report on the energy efficiency achieved by the enterprises at different points in time, which would be an additional activity for the project management unit established under the HPMP and KIP. At the same time, the Secretariat recognized that the enterprises participating in the project are also participating in the country's KIP or HPMP. In addition, all enterprises manufacturing chest freezers also manufacture domestic refrigerators, though some of such manufacturing may be in different locations. Similarly, many of the enterprises manufacturing domestic refrigerators also manufacture ACs. It was agreed that monitoring needs have to be carefully designed, noting that the project activities are new and implementation of the project also necessitates adequate support to EOS for continuous discussion on upgradation of MEPS for the refrigeration and AC equipment. Following constructive discussions, where the efficiencies noted above were taken into account, the costs as given in table 12 below were agreed for monitoring and reporting.

Table 12. Agreed costs for monitoring and reporting (US \$)

Particulars	As submitted	Agreed
Monitoring and reporting for 28 equipment manufacturing facilities	560,000	245,000
Support for EOS for strengthening MEPS for different RAC equipment	0	45,000
Monitoring and reporting for Fresh Compressor Factory	30,000	15,000
Total	590,000	305,000

Total project costs

111. The total agreed costs for the project, excluding the monitoring and reporting cost for compressor manufacturing are US \$16,004,281 as given in table 13 below.

Table 13. Agreed costs for equipment manufacturing component and project monitoring and reporting (US \$)

Equipment	Additional capital costs	Additional component costs	Total
Domestic refrigerators	2,650,000	1,950,330	4,600,330
Chest freezers	900,000	1,195,166	2,095,166
Air conditioners	1,427,550	7,591,235	9,018,785
Sub-total	4,977,550	10,736,731	15,714,281
Monitoring and reporting*			290,000
Total			16,004,281

* Excluding the monitoring and reporting for Fresh Compressor Factory, which is already included in the compressor component as per paragraph 77 above.

⁷ Information considered confidential.

Policy-level activities

112. The Secretariat and UNIDO had detailed discussions on the policies and regulations the Government will implement to sustain the energy-efficiency gains beyond the date of completion of the project. While the Government of Egypt, through EOS, will strengthen the country's MEPS, it was not possible at this time for the Government to commit to achieve the minimum U4E levels specified in the model regulations⁸ by a specified date as revising the MEPS requires detailed consultations with industry stakeholders and follows an administrative approval process. Accordingly, the following was agreed:

- (a) Consistent with decision 94/60(b)(i), and paragraph 37 of document UNEP/OzL.Pro/ExCom/94/61, the enterprises commit to meeting the minimum U4E levels by 1 January 2030;
- (b) EOS commits to continue to revise the country's MEPS and make best efforts to meeting at least the minimum levels specified by U4E by 1 January 2030;
- (c) UNIDO and the Government of Egypt will provide to the last meeting of every year an update on the outcome of process of revising the country's MEPS until the minimum U4E standards applicable to Egypt have been met; and
- (d) Noting that the above commitments would be applicable after the date of completion of the project, if under an unforeseen situation where the enterprises do not comply with the commitment above, the Executive Committee would take this into account when considering future projects for activities that are not related to compliance that are submitted by the country.

113. The Secretariat considers that the aforementioned conditions will promote the sustainability of the project and support the advancement of higher energy efficiency standards across the country. The Secretariat notes with appreciation the enterprises' commitment to improve the energy efficiency of equipment they manufacture, and to continue to do so after the date of completion of the project, which is expected to facilitate the MEPS review process, thereby fostering a level playing field between domestic manufacturers and importers.

Sustainability of the pilot project and assessment of risks

114. The enterprises participating in this project are committed to achieving better energy performance with the incentive support provided through this project. All these enterprises are in the process of phasing down their use of HFCs and, through interventions on improved product design for energy-efficient performance, the enterprises will be able to manufacture and sell products that are more energy-efficient than under a "business-as-usual" scenario, thereby enhancing the sustainability of the HFC phase-down as such products will be more attractive to consumers. The improved energy performance achieved by the enterprises, and the sectoral approach to implementation will allow the NOU to coordinate with EOS to improve the country's MEPS with a view to achieving at least the minimum levels specified under U4E by 2030, ensuring a level playing field for domestic manufacturers of equipment and more importantly, enhancing the competitiveness of Egyptian manufacturers in the international market. The periodic monitoring undertaken by the NOU and UNIDO will support project implementation and reduce the risk that unforeseen circumstances hinder the project. Further, the present project will be complemented by the project approved at the 93rd meeting under decision 91/65, including relating to strengthening MEPS,

⁸ https://united4efficiency.org/wp-content/uploads/2019/11/U4E_Refrigerators_Model-Regulation_20191029.pdf, and https://united4efficiency.org/wp-content/uploads/2021/11/U4E_AC_Model-Regulation_EN_2021-11-08.pdf.

raising awareness, and other activities that will catalyse the adoption of higher energy efficiency standards and demand for such equipment.

115. The Secretariat notes that a substantial proportion of the agreed funding (US \$10,736,731) is associated with additional component costs, half of which would be disbursed in three years, and the other half in four years, upon confirmation of total quantities manufactured at the target energy-efficiency performance levels, in line with decision 94/50(e). UNIDO confirmed it would abide by decision 94/50(e); that the funding associated with the additional component costs would not be used for any other purpose; and that UNIDO will include those balances and the interest gained from those balances as part of its regular annual financial reporting to the Executive Committee. The Secretariat therefore considers the risks associated with transferring the funding to UNIDO at the present meeting to be low.

RECOMMENDATION

116. The Executive Committee may wish to consider:

- (a) Approving the project to enhance the energy efficiency in the manufacturing of domestic refrigerators, chest freezers and residential air conditioners in Egypt, in the amount of US \$16,004,281, plus agency support costs of US \$1,120,300, for UNIDO, noting:
 - (i) That the Government of Egypt has committed to the conditions referred to in paragraph 100 of document UNEP/OzL.Pro/ExCom/97/49 to ensure that the enterprises participating in the project would continue to manufacture energy efficient products after the date of completion of the project;
 - (ii) That the Government of Egypt has committed to revise the minimum energy performance standards (MEPS) for domestic refrigerators, chest freezers and air conditioners by 1 January 2030 with a view to achieving at least the levels specified in the United for Energy (U4E) 2019 and 2021 model regulations for the relevant equipment;
 - (iii) That the project would be operationally completed no later than December 2028, and a detailed project report would be submitted to the Executive Committee within six months of the date of completion of the project;
 - (iv) That after the submission of the report referred to in subparagraph (iii) above, the Government of Egypt, through UNIDO, will submit to the last meeting of the year an update on the status of its revision to the MEPS for domestic refrigerators, chest freezers and air conditioners until the MEPS achieve at least the levels specified in the U4E 2019 and 2021 model regulations for the relevant equipment;
 - (v) That the Government commits to undertake the activities and meet the conditions specified in paragraphs 36, 37, and 38 of document UNEP/OzL.Pro/ExCom/94/61 and activities specified in paragraph 100 of document UNEP/OzL.Pro/ExCom/97/49; and
 - (vi) That if the Government does not comply with the conditions specified in paragraph 100 of document UNEP/OzL.Pro/ExCom/97/49, the Executive Committee would take this into account when considering future projects that are not related to compliance submitted by Egypt.

Annex I

DRAFT AGREEMENT BETWEEN THE GOVERNMENT OF EGYPT 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 Egypt (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, 4.2.3, 4.3.3, 4.4.3, and 4.5.3 (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 stage III of the HCFC phase-out management plan approved (“the Plan”). In accordance with subparagraph 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 subparagraph 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;
 - (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; and
- (c) 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”) and UNEP has agreed to be the cooperating implementing agency (the “Cooperating IA”) under the lead of 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 and/or Cooperating IA taking part in this Agreement.

10. The Lead IA will be responsible for ensuring coordinated planning, implementation and reporting of all activities under this Agreement, including but not limited to independent verification as per subparagraph 5(b). The Cooperating IA will support the Lead IA by implementing the Plan under the overall coordination of the Lead IA. The roles of the Lead IA and Cooperating IA are contained in Appendix 6-A and Appendix 6-B, respectively. The Executive Committee agrees, in principle, to provide the Lead IA and the Cooperating IA with the fees set out in rows 2.2 and 2.4 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 and the Cooperating IA to facilitate implementation of this Agreement. In particular, it will provide the Lead IA and the Cooperating 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 subparagraph 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 subparagraphs 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 between the Government 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	240.19
HCFC-123	C	I	0.11
HCFC-141b	C	I	129.61
HCFC-142b	C	I	16.36
Subtotal			386.27
HCFC-141b contained in imported pre-blended polyols	-	-	98.34
Total			484.61

APPENDIX 2-A: THE TARGETS, AND FUNDING

Row	Particulars	2025	2026	2027	2028	2029	2030	Total
1.1	Montreal Protocol reduction schedule of Annex C, Group I substances (ODP tonnes)	125.54	125.54	125.54	125.54	125.54	0.00	n/a
1.2	Maximum allowable total consumption of Annex C, Group I substances (ODP tonnes)	115.54	115.54	96.57	96.57	57.94	0.00	n/a
2.1	Lead IA (UNIDO) agreed funding (US \$)	4,104,387		3,285,469		818,459		8,208,315
2.2	Support costs for Lead IA (US \$)	287,307	0	229,983	0	57,292	0	574,582
2.3	Cooperating IA (UNEP) agreed funding (US \$)	485,000		332,500		140,000		957,500
2.4	Support costs for Cooperating IA (US \$)	58,415	0	40,048	0	16,862	0	115,325
3.1	Total agreed funding (US \$)	4,589,387	0	3,617,969	0	958,459	0	9,165,815
3.2	Total support costs (US \$)	345,722	0	270,031	0	74,154	0	689,907

Row	Particulars	2025	2026	2027	2028	2029	2030	Total
3.3	Total agreed costs (US \$)	4,935,109	0	3,888,000	0	1,032,613	0	9,855,722
4.1.1	Total phase-out of HCFC-22 agreed to be achieved under this Agreement (ODP tonnes)							98.09
4.1.2	Phase-out of HCFC-22 to be achieved in previously approved projects (ODP tonnes)							142.10
4.1.3	Remaining eligible consumption for HCFC-22 (ODP tonnes)							0.00
4.2.1	Total phase-out of HCFC-123 agreed to be achieved under this Agreement (ODP tonnes)							0.11
4.2.2	Phase-out of HCFC-123 to be achieved in previously approved projects (ODP tonnes)							0.00
4.2.3	Remaining eligible consumption for HCFC-123 (ODP tonnes)							0.00
4.3.1	Total phase-out of HCFC-141b agreed to be achieved under this Agreement (ODP tonnes)							0.00
4.3.2	Phase-out of HCFC-141b to be achieved in previously approved projects (ODP tonnes)							129.61
4.3.3	Remaining eligible consumption for HCFC-141b (ODP tonnes)							0.00
4.4.1	Total phase-out of HCFC-142b agreed to be achieved under this Agreement (ODP tonnes)							0.00
4.4.2	Phase-out of HCFC-142b to be achieved in previously approved projects (ODP tonnes)							16.36
4.4.3	Remaining eligible consumption for HCFC-142b (ODP tonnes)							0.00
4.5.1	Total phase-out of HCFC-141b contained in imported pre-blended polyols agreed to be achieved under this Agreement (ODP tonnes)							0.00
4.5.2	Phase-out of HCFC-141b contained in imported pre-blended polyols to be achieved in previously approved projects (ODP tonnes)							98.34
4.5.3	Remaining eligible consumption for HCFC-141b contained in imported pre-blended polyols (ODP tonnes)							0.00

* Date of completion of stage II as per stage II Agreement: 31 December 2026

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 subparagraph 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 subparagraph 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 subparagraph (a) 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 subparagraphs 1(a) to 1(d).
2. In the event that in a particular year two stages of the Plan 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. All the monitoring activities will be coordinated and managed through the national ozone unit (NOU). The Country will ensure that it conducts accurate monitoring of the activities under this Agreement. The Lead and Cooperating IA will monitor and report on the implementation of the activities in accordance with their roles and responsibilities set out in Appendix 6-A and 6-B, respectively.
2. The NOU is an integral part of the Ministry of Environment under the direct responsibility of the Egyptian Environmental Affairs Agency (EEAA). The NOU will continue to have general responsibility for the implementation of the activities under the present Agreement. To assist the NOU in these responsibilities, the project management unit (PMU) is established within the NOU and under its direct supervision.
3. The PMU oversees the day-to-day implementation of projects, training programmes, technical assistance, and awareness-raising activities included in the approved Plan to ensure the long-term sustainability of the impact of those activities on the reduction of HCFC consumption and use. The PMU will be in continuous contact with stakeholders and other market actors to monitor trends and ensure compliance with the strategy and plan put in place.
4. The Directorate General for the Control of Exports and Imports and the Customs Department, through a protocol that was signed with the National Ozone Committee, have a particularly prominent role in the monitoring of imports of controlled substances and the prevention of illegal trade. Customs records are used as a crosschecking reference in all the monitoring programmes for the different projects within the Plan.

5. The monitoring process will be managed by the NOU in close cooperation with relevant authorities with the assistance of the Lead IA and the Cooperating IA. The NOU will be responsible for monitoring the sustainability of the consumption reduction targets achieved through this Agreement.

6. The consumption of the controlled substances will be monitored and determined based on official import and export data recorded by relevant Government departments. The NOU shall compile and report on an annual basis, on or before the relevant due dates, on consumption of the substances to be submitted to the Ozone Secretariat and on the progress of implementation of the Plan to be submitted to the Multilateral Fund Secretariat.

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 Plan;
 - (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 subparagraphs 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, and should include the activities implemented by the Cooperating IA;
 - (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) Coordinating the activities of the Cooperating IA, and ensuring appropriate sequence of activities;
 - (k) 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 and the Cooperating IA, the allocation of the reductions to the different budget items and to the funding of the Lead IA and each Cooperating IA;

- (l) Ensuring that disbursements made to the Country are based on the use of the indicators;
- (m) Providing assistance with policy, management and technical support when required;
- (n) Reaching consensus with the Cooperating IA on any planning, coordination and reporting arrangements required to facilitate the implementation of the Plan; and
- (o) 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 Plan's results and the consumption of the Substances mentioned in Appendix 1-A, as per subparagraph 5(b) of the Agreement and subparagraph 1(b) of Appendix 4-A.

APPENDIX 6-B: ROLE OF THE COOPERATING IMPLEMENTING AGENCIES

1. The Cooperating IA will be responsible for a range of activities. These activities are specified in the Plan, including at least the following:

- (a) Providing assistance for policy development when required;
- (b) Assisting the Country in the implementation and assessment of the activities funded by the Cooperating IA, and refer to the Lead IA to ensure a coordinated sequence in the activities;
- (c) Providing reports to the Lead IA on these activities, for inclusion in the consolidated reports as per Appendix 4-A; and
- (d) Reaching consensus with the Lead IA on any planning, coordination and reporting arrangements required to facilitate the implementation of the Plan.

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 \$187 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 Plan 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.

Annex II

METHODOLOGY TO CALCULATE ADDITIONAL COMPONENT COSTS

Domestic refrigerators

1. UNIDO provided detailed information for each model manufactured by the nine enterprises, including (by model) the number of units sold between 2022 and 2024; volume (in litres); refrigerant and refrigerant charge; the current MEPS applicable to the model (in kWh/year); expected MEPS in 36 months; and the baseline and target energy consumption (in kWh/year). The information provided by UNIDO is considered confidential and is available upon request by Executive Committee members on the understanding that the information will not be shared and will only be used to evaluate the project.
2. The Secretariat used the information provided by UNIDO to calculate the eligible additional component costs following the methodology described in table 2 of document UNEP/OzL.Pro/ExCom/94/61. The present annex provides further explanation of the methodology and presents the calculations for two models of domestic refrigerators; for reasons of confidentiality, no information is provided on which enterprise manufactured the models, nor the quantity of each model manufactured.
3. Table 2 of document UNEP/OzL.Pro/ExCom/94/61 specifies three levels (E-low, E-medium, and E-high) based on which the additional component cost per unit is provided (US \$0/unit, US \$15/unit, and US \$20/unit, respectively), noting that eligible additional component cost per unit is determined by the baseline and target energy performance of the model, as described in paragraph 28 and the associated graphs of that document.
4. Because the test conditions of 25°C used in Egypt differ from those used in the U4E model regulations used in document UNEP/OzL.Pro/ExCom/94/61, the levels of E-low, E-medium, and E-high were adjusted to Egyptian test conditions using linear interpolation. In particular:
 - (a) For each model, based on the methodology explained in the U4E model regulations for domestic refrigerators (2019), the value for AEC_{Max} was calculated at a standard test temperature of 25°C, based on a **linear interpolation** of the values used for calculating AEC_{Max} in table 4 of the model U4E regulations from the values given for 20°C and 32°C, according to the following equations:
 - (i) At 20°C: $AEC_{Max} = 0.134 \times AV + 84$, where AV = adjusted volume (liter) as explained in U4E's model regulations;
 - (ii) At 32°C: $AEC_{Max} = 0.220 \times AV + 137$.
 - (b) Accordingly, at 25°C, $AEC_{Max} = 0.17 \times AV + 106.08$.
 - (c) AEC_{Max} , which is in kWh/yr, was adjusted to kWh/yr/litre using the equipment capacity in litres.
 - (d) This maximum value was used as E-low, with E-medium and E-high adjusted to 0.8 and 0.59 respectively of that value. For example, for a domestic refrigerator tested at 25°C with an adjusted volume of 330 litres, AEC_{Max} was equal to 281 kWh/year, resulting in E-low, and E-medium and E-high of 0.852, 0.682 and 0.503 kWh/yr/litre. This methodology was applied to each of the 159 models of domestic refrigerators manufactured.

5. Two illustrative examples for the calculation of the eligible additional component incentive for domestic refrigerators are given in table 1 below.

Table 1. Examples for the calculation of the eligible additional component incentive for domestic refrigerators

Particulars	Units	Reference	Model A	Model B
Adjusted volume	litre	-	304	450
Baseline energy consumption	kWh/year/litre	A1	1.184	1.147
Target energy consumption	kWh/year/litre	A2	0.888	0.640
E-low	kWh/year/litre	A3	0.895	0.717
E-medium	kWh/year/litre	A4	0.716	0.573
E-high	kWh/year/litre	A5	0.528	0.423
Additional component cost	US \$/unit	A*	0.61	8.03
Eligible additional component incentive	US \$/unit	B=A*/3	0.20	2.68
Note : $A^* = 15 \times (A3-A2)/(A3-A4)$				

Chest freezers

6. The same methodology explained above for domestic refrigerators was used for chest freezers, noting that the AEC_{Max} for chest freezers in table 4 of the model U4E regulations is determined according to the following equations at **20°C** and **32°C**:

(a) At 20°C: $AEC_{Max} = 0.175 \times AV + 161$

(b) At 32°C: $AEC_{Max} = 0.268 \times AV + 247$.

7. Accordingly, for chest freezers at 25°C, $AEC_{Max} = 0.214 \times AV + 197$.

8. Two illustrative examples for the calculation of the eligible additional component incentive for chest freezers are given in table 2 below.

Table 2. Examples for the calculation of the eligible additional component incentive for chest freezers

Particulars	Units	Reference	Model A	Model B
Adjusted volume	litre	-	336	250
Baseline energy consumption	kWh/year/litre	A1	1.464	1.296
Target energy consumption	kWh/year/litre	A2	0.952	1.008
E-low	kWh/year/litre	A3	1.024	1.225
E-medium	kWh/year/litre	A4	0.819	0.980
E-high	kWh/year/litre	A5	0.604	0.723
Additional component cost	US \$/unit	A*	5.23	13.31
Eligible additional component incentive	US \$/unit	B=A*/3	1.74	4.44
Note : $A^* = 15 \times (A3-A2)/(A3-A4)$				

Residential air-conditioning

9. UNIDO provided detailed information for each air conditioner (AC) model manufactured by the 11 enterprises, including (by model) the number of units sold between 2022 and 2024; volume (in litres); the current seasonal energy efficiency ratio (SEER, measured in BTU/hr/W) and target EER; and the current MEPS applicable to the model (in BTU/hr/W). The information provided by UNIDO is considered confidential and is available upon request by Executive Committee members on the understanding that the information will not be shared and will only be used to evaluate the project.

10. The Secretariat used the information provided by UNIDO to calculate the eligible additional component costs following the methodology described in table 4 of document UNEP/OzL.Pro/ExCom/94/61. The present annex provides further explanation of the methodology and presents the calculations for two models of ACs; for reasons of confidentiality, no information is provided on which enterprise manufactured the models, nor the quantity of each model manufactured.

11. Table 4 of document UNEP/OzL.Pro/ExCom/94/61 specifies three levels (E-low, E-medium, and E-high) based on which the additional component cost per unit is provided (US \$0/unit, US \$34/unit, and US \$45/unit, respectively), noting that eligible additional component cost per unit is determined by the baseline and target energy performance of the model as described in paragraph 28 of document UNEP/OzL.Pro/ExCom/94/61 and further described in document UNEP/OzL.Pro/ExCom/94/61/Add.1.

12. Two illustrative examples for the calculation of the eligible additional component incentive for ACs are given in table 3 below.

Table 3. Examples for the calculation of the eligible additional component incentive for ACs

Particulars	Units	Reference	Model A	Model B
Baseline SEER to MEPS ratio	Current SEER / MEPS	A1	1.053	1.083
Target SEER to MEPS ratio	Target SEER / MEPS	A2	1.789	1.250
E-low	SEER (low) / MEPS	A3	1.000	1.000
E-medium	SEER (medium) / MEPS	A4	1.500	1.500
E-high	SEER (high) / MEPS	A5	2.000	2.000
Additional component cost	US \$/unit	A*	36.79	11.33
Eligible additional component incentive	US \$/unit	B=A*/3	12.26	3.778
Note: SEER is measured as BTU/hr / Watts				