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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Ninety-fourth Meeting
Montreal, 27-31 May 2024
Item 9(d) of the provisional agenda[1]

PROJECT PROPOSALS: TUNISIA

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

Phase-down

- Kigali HFC implementation plan (stage I, first tranche) — UNIDO and UNEP

Energy efficiency

- Pilot project to maintain and/or enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down (non-investment activities) — UNIDO

[1] UNEP/OzL.Pro/ExCom/94/1

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS

Tunisia

PROJECT TITLE	AGENCY
Kigali HFC implementation plan (stage I)	UNIDO (lead), UNEP

LATEST ARTICLE 7 DATA (Annex F)	Year: 2022	741.48 mt	1,637,099 CO_2-eq tonnes

SECTORAL HFC CONSUMPTION DATA (CO_2-eq tonnes) AND ACTIVITIES

	Aerosol	Foam	Fire-fighting	AC and refrigeration				Solvent	Other
				Manufacturing			Servicing		
				Refrigeration	AC	Other			
As submitted (average 2020-2022)	62,585	15,106	3,294	4,740	210,863	0	1,244,093	0	0
Latest CP report (2022)	68,102	15,540	9,882	11,834	185,921	0	1,361,397	0	0
KIP stage I activities as agreed (Y/N)	N	N	N	N	Y	N	Y	N	N

AVERAGE 2020-2022 HFC CONSUMPTION IN SERVICING	565.09 mt	1,244,093 CO_2-eq tonnes

BASELINE CONSUMPTION DATA (CO_2-eq tonnes)	2020	2021	2022	Average 2020-2022
HFC annual consumption	1,719,614	1,219,943	1,637,099	1,525,552
HCFC baseline (65%)				842,288
HFC baseline				2,367,840

HFC CONSUMPTION ELIGIBLE FOR FUNDING	
Starting point for sustained aggregate reductions	TBD
Previously approved HFC phase-down investment projects	No
Aggregate reductions from previously approved projects (CO_2-eq tonnes)	n/a

PROJECT DATA AS AGREED			2024*	2025-2026	2027	2028	2029	2030	Total
Consumption (CO_2-eq tonnes)	Montreal Protocol limits		2,367,840	2,367,840	2,367,840	2,367,840	2,131,056	2,131,056	n/a
	Maximum allowable		2,367,840	2,367,840	2,367,840	2,367,840	2,131,056	1,803,694	n/a
	Maximum allowable (%)		100	100	100	100	90	76.2	n/a
Amounts recommended in principle (US $)	UNIDO	Project costs	1,526,566	0	435,875	0	0	104,740	2,067,181
		Support costs	106,860	0	30,511	0	0	7,332	144,703
	UNEP	Project costs	50,000	0	45,000	0	0	15,000	110,000
		Support costs	6,500	0	5,850	0	0	1,950	14,300
	Total project costs		1,576,566	0	480,875	0	0	119,740	2,177,181
	Total support costs		113,360	0	36,361	0	0	9,282	159,003
	Total funds		1,689,926	0	517,236	0	0	129,022	2,336,184

* Recommended for approval at the present meeting

Reduction from stage I in CO_2-eq tonnes	629,563

Secretariat's recommendation:	Individual consideration

PROJECT DESCRIPTION

1. The present document contains the following sections:

I. Summary of the proposal as submitted

II. Background: Implementation status of the country's HCFC phase-out management plan and previous HFC-related projects

III. HFC consumption: Overview of the country's HFC consumption levels, trends, and sectoral uses

IV. Stage I of the Kigali HFC implementation plan, as submitted: Overarching strategy and plan of implementation for the first tranche

V. Secretariat's comments, including the agreed cost of activities

VI. Recommendation

I. Summary of the proposal as submitted

2. On behalf of the Government of Tunisia, UNIDO as the lead implementing agency has submitted a request for stage I of the Kigali HFC implementation plan (KIP), at a total cost of US $3,380,132, consisting of US $3,042,834, plus agency support costs of US $212,998 for UNIDO and US $110,000, plus agency support costs of US $14,300 for UNEP, as originally submitted.[2] The pilot project to maintain and/or enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down (non-investment activities) will be considered in paragraphs 74 to 95 below.

3. The implementation of stage I of the KIP will assist the Government of Tunisia in meeting the target of 10 per cent reduction from its HFC baseline consumption by 1 January 2029 and further to achieve a reduction of 23.0 per cent from its HFC baseline consumption by 1 January 2030, as originally submitted.

4. The first tranche of stage I of the KIP being requested at this meeting amounts to US $2,354,867, consisting of US $2,148,007, plus agency support costs of US $150,360 for UNIDO and US $50,000, plus agency support costs of US $6,500 for UNEP, as originally submitted for the period of June 2024 to December 2027.

II. Background

Status of implementation of the HCFC phase-out management plan

5. Table 1 presents information on the HCFC phase-out management plan (HPMP) in Tunisia as of May 2024.

Table 1. HPMP implementation status for Tunisia

	Stage I	**Stage II**
Meeting when HPMP was approved/updated	72nd / 83rd	84th
Reduction from baseline	15% by 2018	68% by 2025
Total project cost (US $)	700,458*	1,564,946
Date of completion (actual/planned)	31 December 2021	31 December 2026

* Revised at the 83rd meeting following cancellation of the air-conditioning (AC) sector plan and the associated project management and agency support costs (US $1,206,919 including, agency support costs)

[2] As per the letter of 1 February 2024 from the Ministry of Environment of Tunisia to UNIDO.

Status of implementation of previous HFC-related activities

6. Table 2 presents an overview of activities implemented in Tunisia in the context of the Kigali Amendment that have been funded by the Multilateral Fund.

Table 2. Previously approved HFC-related activities in Tunisia

Approval meeting	Project title	Implementing agency	Cost (US $)	Date of completion
74th	Survey of ODS alternatives	UNIDO	110,000	December 2017
80th*	Enabling activities for HFC phase-down	UNIDO/Italy	150,000	August 2021

* Extended at the 83rd meeting

III. HFC consumption overview

HFC consumption levels

7. Tunisia only imports HFCs for use in servicing residential, commercial, and industrial refrigeration and air-conditioning (RAC) and mobile air-conditioning (MAC) equipment; for manufacturing of aerosols, residential RAC equipment, commercial refrigeration equipment and imported pre-blended polyols for the manufacture of polyurethane foam. The most consumed substances according to 2022 data submitted under Article 7 of the Montreal Protocol were R-404A (40.4 per cent of total HFC consumption in CO_2-equivalent (CO_2-eq) tonnes), HFC-134a (29.0 per cent), R-410A (28.2 per cent) R-407C (1.8 per cent), HFC-227ea (0.6 per cent), and negligible amounts of other HFCs. Table 3 presents the country's HFC consumption as reported to the Ozone Secretariat under Article 7 of the Montreal Protocol.

Table 3. HFC consumption in Tunisia (2018–2022 Article 7 data)

HFC	GWP	2018	2019	2020	2021	2022
Metric tonnes (mt)						
HFC-32	675	0.00	0.00	4.58	1.13	0
HFC-134a	1,430	358.90	288.81	329.15	314.75	331.44
R-404A	3,922	81.74	131.33	160.25	85.79	168.63
R-407C	1,774	22.37	6.34	23.25	11.94	16.80
R-410A	2,088	125.52	150.36	273.42	195.28	221.10
Others*		1.67	0.15	1.22	1.70	3.52
Total (mt)		**590.20**	**576.99**	**791.88**	**610.59**	**741.48**
HFC-365mfc/HFC-227ea in imported pre-blended polyols**	964	n/a	0.00	14.06	16.85	16.12
CO_2-eq tonnes						
HFC-32	675	0	0	3,092	759	0
HFC-134a	1,430	513,220	413,000	470,690	450,093	473,959
R-404A	3,922	320,544	515,024	628,436	336,438	661,299
R-407C	1,774	39,688	11,237	41,238	21,187	29,792
R-410A	2,088	262,033	313,879	570,766	407,653	461,540
Others*		4,545	483	5,391	3,813	10,509
Total (CO_2-eq tonnes)		**1,140,030**	**1,253,622**	**1,719,614**	**1,219,943**	**1,637,099**
HFC-365mfc/HFC-227ea in imported pre-blended polyols**	964	n/a	0	13,554	16,243	15,540

* Including HFC-23, HFC-227ea, R-407A, R-448A, R-507A, R-462A

** CP data. Blend with a composition of 93 per cent HFC-365mfc and 7 per cent HFC-227ea

Established HFC baseline

8. The Government of Tunisia reported the Article 7 data for 2020-2022. The country's HFC consumption baseline was established at 2,367,840 CO_2-eq tonnes by adding 65 per cent of its HCFC baseline (expressed in CO_2-eq tonnes) to its average HFC consumption in 2020-2022, as shown in table 4.

Table 4. HFC baseline calculation for Tunisia (CO_2-eq tonnes)

Baseline calculation components	2020	2021	2022
HFC annual consumption	1,719,614	1,219,943	1,637,099
HFC average consumption in 2020-2022			1,525,552
HCFC baseline (65%)			842,288
HFC baseline			**2,367,840**

Country programme implementation report

9. The sectoral HFC consumption data provided by the Government of Tunisia in its country programme (CP) implementation report for 2022 is consistent with the data reported under Article 7 of the Montreal Protocol. The country had not yet submitted its 2023 CP implementation report at the time of finalization of the present document.

HFC consumption trends

10. Data submitted by Tunisia since 2018 shows an increasing trend in HFC consumption. The country experienced a sharp increase in consumption in 2020 (37 per cent in CO_2-eq tonnes) due to the widespread conversion of the manufacturing of individual split air conditioners operating with HCFC-22 to R-410A in 2018 to 2019, that also coincided with an improvement in the economy and growth in the tourism sector, which lead to an increased demand for refrigerants in early 2020. Commercial refrigeration units and central units (especially for cold rooms) have fully shifted from HCFC-22 to R-404A, demand for which was also driven by the growth in tourism. In 2021, there was a sharp decrease (29 per cent) attributed to the COVID-19 pandemic and a recovery of HFC consumption in 2022. The refrigerant HFC-23, which has a very high global warming potential (GWP) was imported to recharge a small negative refrigeration installation, used in a laboratory at minus 60 degrees Celsius. Since 2020 the national ozone unit (NOU) has not received other requests to obtain supplies of this refrigerant. Small quantities of R-448A and R-462A were imported for testing with commercial refrigeration equipment but have not replaced R-404A due to high cost, and there have been no additional such imports.

HFC consumption by sector

11. HFCs are consumed in the servicing sector (79 per cent in mt and 81.5 per cent in CO_2-eq tonnes of total consumption) with the remaining consumption in the manufacture of residential AC, commercial refrigeration equipment and aerosols, as well as some use in firefighting equipment. HFCs are mainly consumed for servicing in the following subsectors: commercial refrigeration (18.4 per cent in mt and 25.5 per cent in CO_2-eq tonnes), followed by industrial and transport refrigeration (13.4 per cent in mt and 18.5 per cent in CO_2-eq tonnes), commercial AC (16.5 per cent in mt and 15.3 per cent in CO_2-eq tonnes), mobile AC (16.9 per cent in mt and 11.3 per cent in CO_2-eq tonnes) and other subsectors, as shown in tables 5 and 6.

Table 5. HFC consumption in Tunisia by sector in mt (average for 2020-2022)

Sector	HFC-32	HFC-134a	HFC-227ea	R-404A	R-407C	R-410A	HFC-365mfc/ HFC-227ea pre-blended polyol	Total	Share of total (%)
Manufacturing									
Residential RAC	0.00	5.05	0.00	0.00	0.00	97.55	0.00	102.60	*14.4*
Commercial refrigeration	0.00	1.51	0.00	0.66	0.00	0.00	0.00	2.17	*0.3*
Subtotal HFCs in manufacturing	*0.00*	*6.56*	*0.00*	*0.66*	*0.00*	*97.55*	*0.00*	*104.77*	*14.7*
Other manufacturing									
Polyurethane (PU) foam	0.00	0.00	0.00	0.00	0.00	0.00	15.67	15.67	n/a
Subtotal HFC pre-blended polyol in manufacturing	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*15.67*	*15.67*	*n/a*
Servicing*									
Refrigeration subsectors									
Domestic	0.00	42.84	0.00	0.00	0.00	0.00	0.00	42.84	6.0
Commercial	0.00	50.98	0.00	80.11	0.00	0.44	0.00	131.53	18.4
Industrial and transport	0.00	30.67	0.00	56.03	1.68	7.39	0.00	95.77	13.4
Air-conditioning subsectors									
Residential	0.00	0.00	0.00	0.00	0.00	19.57	0.00	19.57	2.7
Commercial	1.90	13.77	0.00	1.22	12.25	88.71	0.00	117.85	16.5
Industrial	0.00	15.99	0.00	0.21	3.40	16.27	0.00	35.87	5.0
Mobile	0.00	120.55	0.00	0.00	0.00	0.00	0.00	120.55	16.9
*Subtotal servicing**	*1.90*	*274.80*	*0.00*	*137.57*	*17.33*	*132.38*	*0.00*	*563.98*	*79.0*
Other sectors									
Firefighting	0.00	0.00	1.02	0.00	0.00	0.00	0.00	*1.02*	*0.0*
Aerosols	0.00	43.77	0.00	0.00	0.00	0.00	0.00	43.77	*6.1*
Subtotal other sectors	*0.00*	*43.77*	*1.02*	*0.00*	*0.00*	*0.00*	*0.00*	*44.79*	*6.3*
Total HFCs**	**1.9**	**325.13**	**1.02**	**138.22**	**17.33**	**229.93**	**n/a**	**713.54**	**100.00**

* Excluding 1.11 mt of HFC-23, R-507A, R-462A and R-448A used in the servicing sector but not included in the detailed sectoral breakdown that focused on the dominant HFCs.

** Excluding HFCs contained in imported pre-blended polyols

Table 6. HFC consumption in Tunisia by sector in CO_2-eq tonnes (average 2020-2022)

Sector	HFC-32	HFC-134a	HFC-227ea	R-404A	R-407C	R-410A	HFC-365mfc/ HFC-227ea pre-blended polyol	Total	Share of total (%)
Manufacturing									
Residential RAC manufacturing	0	7,222	0	0	0	203,642	0	210,863	13.9
Commercial refrigeration manufacturing	0	2,159	0	2,580	0	0	0	4,740	0.3
Subtotal HFCs in manufacturing	*0*	*9,381*	*0*	*2,580*	*0*	*203,642*	*0*	*215,603*	*14.2*
Other manufacturing									
PU foam manufacturing	0	0	0	0	0	0	15,106	15,106	**n/a**
Subtotal HFC pre-blended polyol in manufacturing	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*15,106*	*15,106*	*n/a*

Sector	HFC-32	HFC-134a	HFC-227ea	R-404A	R-407C	R-410A	HFC-365mfc/ HFC-227ea pre-blended polyol	Total	Share of total (%)
Servicing*									
Refrigeration subsectors									
Domestic	0	61,261	0	0	0	0	0	61,261	4.0
Commercial	0	72,901	0	314,159	0	919	0	387,979	25.5
Industrial and transport	0	43,858	0	219,710	2,980	15,427	0	281,975	18.5
Air-conditioning subsectors									
Residential	0	0	0	0	0	40,852	0	40,852	2.7
Commercial	1,284	19,691	0	4,784	21,728	185,182	0	232,669	15.3
Industrial	0	22,866	0	824	6,031	33,964	0	63,684	4.2
Mobile	0	172,387	0	0	0	0	0	172,387	11.3
*Subtotal servicing**	*1,284*	*392,964*	*0*	*539,478*	*30,739*	*276,343*	*0*	*1,240,808*	*81.5*
Other sectors									
Fire fighting	0	0	3,294	0	0	0	0	3,294	0.22
Aerosols	0	62,585	0	0	0	0	0	62,585	4.11
Subtotal other sectors	*0*	*62,585*	*3,294*	*0*	*0*	*0*	*0*	*65,879*	*4.33*
Total HFCs**	**1,284**	**464,930**	**3,294**	**542,058**	**30,739**	**479,985**	**n/a**	**1,522,290**	**100.0**

*Excluding 3,285 CO_2-eq tonnes of HFC-23, R-507A, R-462A and R-448A used in the servicing sector but not included in the detailed sectoral breakdown that focused on the dominant HFCs.

** Excluding HFCs contained in imported pre-blended polyols

Manufacturing sectors

Residential RAC manufacturing

12. The manufacturing of residential air conditioners and cold-water dispensers accounts for 13.9 per cent in CO_2-eq tonnes of the total HFC consumption in the country (14.4 per cent in terms of mt). R-410A is used in the manufacture of residential AC equipment (96 per cent of consumption in the subsector) and there is one enterprise manufacturing HFC-134a-based cold-water dispensers; there is no longer manufacturing of HFC-134a-based domestic refrigerators in the country as all manufacturers already converted their lines to R-600a. Eight local enterprises manufacture approximately 73,750 residential AC units per year; one of those enterprises also manufactures approximately 4,000 HFC-134a-based cold-water dispensers per year. Under stage I of the HPMP, Tunisia proposed the conversion of four manufacturers[3] of single split AC units from HCFC-22 to R-290. The project could not be implemented due to difficulty sourcing R-290-based components on the international market and the local market did not have the necessary capacities to adopt this technology. Consequently, the four enterprises converted to R-410A using their own funding, the project was cancelled at the 83rd meeting, and the corresponding funds returned to the Multilateral Fund.

Commercial refrigeration manufacturing

13. The local manufacturing sector of commercial refrigeration units comprises four enterprises. The use of HFCs (HCF-134a and R-404A) for commercial refrigeration manufacturing is less than 0.5 per cent in terms of CO_2-eq tonnes and mt of total HFC consumption and has been stable, however, consumption by these enterprises to service existing equipment has been increasing.

[3] Of the enterprises proposed for conversion under stage I of the HPMP (Hachicha High World, Société Afrivision, Société Electrostar and Société Industrielle), three are no longer operational and one, Société Industrielle now Société Industrielle Méga, is proposed as part of the conversion projects under stage I of the KIP.

Aerosols

14. HFC-134a is used as propellant by two local manufacturers of metered dose inhalers and accounts for 4.1 per cent of the country's overall HFC consumption (6.1 per cent in mt).

Polyurethane foam

15. Seven Tunisian-owned enterprises have been identified as users of HFCs contained in imported pre-blended polyols for the manufacture of PU foam in three different applications: the manufacturing of solar thermal systems, the manufacturing of commercial refrigeration units and the manufacturing of insulation panels. All the manufacturers purchase polyols pre-blended with a mix of HFC-365mfc and HFC-227ea.

Refrigeration and air-conditioning servicing sector

16. There are approximately 10,157 technicians and 2,769 workshops consuming HFCs in Tunisia, and a labour shortage is reported with only 50 per cent of graduates from relevant professional programs continuing on to work in the RAC servicing sector. The demand for technicians is partly met in the informal sector. There are 32 training centres with relevant technician training programmes as well as eight training centres specific to the fishery sector. Under stages I and II of the HPMP the regulatory and institutional framework for the introduction of a certification system for enterprises and technicians in the RAC servicing sector was developed and some initial RAC trainers were certified; the system is expected to be approved by the Ministry of Environment to become mandatory in 2024. One training centre was provided tools and equipment and five training centres received refrigerant identifiers. A business model was established for the development of a recovery, recycling, and reclamation (RRR) system and the regulatory framework for HCFCs and HFCs to support the RRR project is expected to be in place be in 2025.

Domestic, commercial, industrial and transport refrigeration servicing

17. Domestic refrigeration sector appliances initially were dominated by HFC-134a-based units but have increasingly been replaced with R-600a-based refrigerators. The average 2020-2022 consumption of HFC-134a in the sector accounted for roughly 4 per cent of the total HFC consumption in CO_2-eq tonnes (6 per cent in mt). It is anticipated that HFC-134a will no longer be used in this sector from 2040.

18. The largest consumer of HFCs in terms of CO_2-eq tonnes (25.5 per cent) and in terms of mt (18.4 per cent) is the commercial refrigeration subsector, which uses primarily R-404A (61 per cent of total consumption in the subsector in CO_2-eq tonnes) and HFC-134a (39 per cent of total consumption in the subsector) as well as very small quantities of R-410A. This subsector includes stand alone, condensing units and centralized units.

19. The industrial and transport refrigeration subsectors account for the second largest consumers of HFCs in terms of CO_2-eq tonnes (18.5 per cent). The main refrigerants used are HCFC-22 and R-404A, followed by ammonia (R-717) and HFC-134a with a very small consumption of R-407C and R-410A. The use of ammonia and R-410A are both linked to the agricultural industry. HFO-123ze is expected to be used as an alternative in the industrial refrigeration subsector in the coming years; however, no consumption has been identified so far.

Residential, commercial, and industrial air-conditioning servicing

20. Servicing of small-split residential AC units amounts to roughly 2.7 per cent of the HFC consumption in CO_2-eq tonnes and in mt. R-410A-base-equipment is used exclusively in this subsector which has been the replacement for HCFC-22-based equipment.

21. Commercial AC is the third largest subsector with 15.3 per cent of the total HFC consumption in terms of CO_2-eq tonnes (16.5 per cent and fourth largest user in mt). This subsector uses primarily technologies based on R-410A (accounting for roughly 80 per cent of total consumption within the subsector in CO_2-eq tonnes) and to a lesser degree R-407C, HFC-134a, R-407A and HFC-32. Some stand-alone units based on R-290 have entered the market. Equipment serviced in this subsector includes large single and multi-split units, variable refrigerant flow (VRF) systems, and ducted and packaged rooftop units.

22. The industrial AC subsector accounts for only 4.2 per cent of the total HFC consumption in CO_2-eq tonnes (5.0 per cent in mt). It relies on R-410A (53 per cent of use within the subsector and HFC-134a at 36 per cent) and R-404A and R-407C are used to a lesser extent. Some large distributed systems were found to use R-717 (ammonia).

Mobile air-conditioning servicing

23. The MAC sector is the fifth largest subsector in terms of its consumption of HFCs in CO_2-eq tonnes amounting to 11.3 per cent of total HFC consumption (fourth in mt at 16.9 per cent). HFO-1234yf is starting to be used in the mobile air-conditioning sector, as an alternative to HFC-134a, although only 630 kg of this substance was consumed in 2022.

Firefighting sector

24. No manufacturers of fire extinguishers have been identified in Tunisia. The imports of HFC-227ea are exclusively used to refill existing firefighting equipment and accounted for less than 1 per cent of the total HFC consumption in Tunisia in 2022.

IV. Stage I of the Kigali HFC implementation plan as submitted

Institutional, policy and regulatory framework

25. The Government of Tunisia updated HS codes in 2018 for better identification of HFCs and ratified the Kigali Amendment on 27 August 2021. The Government of Tunisia implements an electronic licensing and quota system for HFCs since 1 January 2024. A National Commission for the Protection of the Ozone Layer (NOC) comprising the HPMP Steering Group, the Legislative Group and the Technical Group is responsible for setting import quotas for controlled substances and operating the licensing system for the import and export of HCFCs and HFCs.

26. HFC quotas are allocated by the NOC in February or early March to importers based on previous imports and the required reduction. There is close coordination among the NOU, Customs, and the National Institute of Statistics to control and record the imports of HCFCs and HFCs. Importers are requested to submit quarterly import reports detailing the itemized sale of refrigerants in the local market to the NOU. Any importer exceeding the authorized quota of HFCs without a license will be liable to sanctions imposed by the Ministry of Trade and Export Development and will be deprived of opportunity to have any quota from the NOC for the following year.

27. Decrees for the ban on the manufacturing, assembling and import of RAC equipment containing HCFCs and a ban on the import of HCFC-141b contained in pre-blended polyols have been submitted to the Prime Ministry and are expected to be approved in 2024.

Phase-down strategy for stage I of the Kigali HFC implementation plan

Overarching strategy

28. Tunisia's KIP will be divided into three stages: stage I from June 2024 to 31 December 2030, stage II from 1 January 2031 to 31 December 2040, and stage III from 1 January 2041 to 31 December 2045. Stage I includes the freezing of HFCs consumption in 2024, a reduction by 10 percent in 2029 and achieving a 23 per cent reduction from the baseline by 2030.

Proposed activities

29. Stage I includes the following activities, as originally submitted:

(a) Three investment projects as follows:

(i) The conversion of eight[4] enterprises in the residential RAC manufacturing sector to phase out R-410A and HFC-134a in the local manufacturing of single split AC units and cold-water dispensers through conversion to HFC-32 and R-600a;

(ii) The conversion of seven enterprises manufacturing PU foam to methyl formate-based foaming technology to phase out HFCs contained in imported pre-blended polyols;

(iii) Technical assistance to four enterprises manufacturing commercial RAC equipment for the proper management of HFC-134a and the R-404A; and

(b) Non-investment activities in the servicing sector delivered under four components: strengthening the institutional and legal framework, support to the RAC servicing sector with a special focus on MAC servicing, provision of equipment for the RRR system, and awareness-raising activities.

Residential RAC manufacturing sector

30. An investment project is proposed for the conversion of seven locally owned manufacturers (Sicad Coala, Société New Star, El Athir, Société Industrielle Méga, 3 Stars Electronics, Novatech West Point, and Star One) while the eighth manufacturer would convert with its own resources as it was established after the cut-off date for eligible capacity. All enterprises exclusively manufacture for the local market with the exception of Sicad Coala that exports approximately 10 per cent of its products to other Article 5 countries in the region. The enterprises would convert their manufacturing of residential AC units from R-410A to HFC-32. In addition, the enterprise consuming HFC-134a to manufacture cold-water dispensers would convert this line to R-600a as shown in table 7 below.

Table 7. Residential RAC manufacturers products, consumption, and proposed conversion

Enterprise	**Product manufactured**	**Average consumption 2020-2022**				**Proposed conversion**
		R-410A (mt)	HFC-134a (mt)	R-410A (CO_2-eq tonne)	HFC-134a (CO_2-eq tonne)	
Sicad Coala	Residential AC units	27.33	0.00	57,051	0	HFC-32
	Cold-water dispensers	0.00	5.00	0	7,150	R-600a
Société New Atar	Residential AC units	3.16	0.05[a]	6,597	72[a]	HFC-32
El Athir	Residential AC units	22.90	0.00	47,804	0	HFC-32

[4] One of the enterprises was established after the cut-off date for eligible capacity; accordingly, that enterprise will convert its manufacturing with its own resources.

Enterprise	Product manufactured	Average consumption 2020-2022				Proposed conversion
		R-410A (mt)	HFC-134a (mt)	R-410A (CO_2-eq tonne)	HFC-134a (CO_2-eq tonne)	
Société Industrielle Méga	Residential AC units	35.03	0.00	73,125	0	HFC-32
3 Stars Electronics	Residential AC units	6.83	0.00	14,258	0	HFC-32
Novatech West Point	Residential AC units	0.90	0.00	1,879	0	HFC-32
	Domestic freezers	0.00	0.00[b]	0	0 [b]	Not included
Star One	Residential AC units	1.40	0.00	2,923	0	HFC-32
Total to be phased out		**97.55**	**5.05**	**203,636**	**7,150**	HFC-32

[a] Consumption to be phased out without assistance from the Multilateral Fund.

[b] Small manufacturing of 88 units and very small consumption to be phased out without assistance from the Multilateral Fund.

31. Incremental capital costs (ICCs) requested for all seven enterprises include a recovery station for HFC-32, and transportation of equipment, installation and testing. For six enterprises (Société New Star, El Athir, Société Industrielle Méga, 3 Stars Electronics, Novatech West Point, and Star One) the requested equipment also includes charging stations for HFC-32, safety systems suitable for charging an A2L[5] refrigerant, HFC-32 supply pumps and lines, and a leak detector for HFC-32. For the seventh enterprise (Sicad Coala) similar equipment is requested but for both R-600a and HFC-32 and in addition a blow-off pump for R-600a in the repair area; fan, controller and ventilation pipes and safety system for the supply area (R-600a/HFC-32) are requested. For enterprises without an ultrasonic welding machine and performance test equipment, such equipment was requested with the latter depending on the capacity of equipment to be tested (i.e., less than 24,000 British thermal units (BTUs), more than 24,000 BTU, or both), as shown in table 8 below. Incremental operating costs (IOCs) are not requested given the lower price of HFC-32 relative to that of R-410A.

Table 8. ICCs for the residential RAC manufacturing investment project (US $)

Description of item	Sicad Coala	Société New Atar	El Athir	Société Industrielle Méga	3 Stars Electronics	Novatech West Point	Star One
Charging station (US $60,500 per unit for HFC-32 and US $82,500 for a dual refrigerant (HFC-32/R-600a) unit)	82,500	60,500	121,000	60,500	60,500	60,500	60,500
Safety system for charging area (US $11,000/safety system for A2L and US $33,000 for A3 refrigerant)	33,000	22,000	44,000	22,000	22,000	22,000	22,000
Supply pump for flammable refrigerant (US $11,000 per unit) and accumulators for HFC-32 (US $5,500) and supply refrigerant pump for R-600a and accessories (US $27,500)	44,000	16,500	33,000	16,500	16,500	16,500	11,000
Supply line and accessories	11,000	5,280	5,500	5,500	2,640	1,320	1,320
Leak detector multi-gas HFC-32/R-600a (US $36,300 to US $50,300 per unit) / industrial leak detector HFC-32 (US $14,000 to US $15,400), Hande-held leak detector HFC-32 (US $550)	36,300	15,400	50,300	36,300	0	1,100	15,400
Ultrasonic welding machine	27,500	27,500	27,500	27,500	27,500	27,500	0

[5] A2L refrigerants are refrigerants with a low burning velocity and lower toxicity.

Description of item	Sicad Coala	Société New Atar	El Athir	Société Industrielle Méga	3 Stars Electronics	Novatech West Point	Star One
Performance test monophase less than 24,000 BTU (US $4,400) and more than 24,000 BTU ($8,800)	30,800	22,000	30,800	61,600	0	8,800	22,000
Recovery station	2,750	2,750	5,500	1,650	2,750	2,750	2,750
Blow-off pump for R-600a in repair area (US $5,500); fan, controller and ventilation pipes (US $16,500) and safety system for R-600a/HFC-32 supply area (US $33,000)	55,000	0	0	0	0	0	0
Transportation, installation, testing, and training	33,000	22,000	27,500	22,000	22,000	22,000	22,000
Total ICCs per enterprise	**355,850**	**193,930**	**345,100**	**253,550**	**153,890**	**162,470**	**156,970**
Total ICCs	**1,621,760**						

32. Accordingly, the total funding requested to convert the seven enterprises is US $1,621,760 and would result in the phase-out of 151,520 CO_2-eq tonnes, based on the enterprises' average 2020-2022 consumption and after taking into account the phase-in of HFC-32. The Government would ban the import, manufacture and distribution of residential AC units with a GWP higher than 700 upon completion of the conversions; the import and manufacture of HFC-134a-based cold-water dispensers would similarly be banned.

Polyurethane foam manufacturing sector

33. Seven locally owned enterprises (Biome Solar Industry, Soften, Almia Refrigeration, ETS Abdelkader, Frigomeuble, Société Tunisienne Equipment and Sofrifac) manufacturing rigid PU foam for thermal solar energy systems, commercial refrigeration equipment and insulation panels for the local market would phase out their use of 15.67 metric tonnes (15,106 CO_2-eq tonnes) of pre-blended polyols based on HFC-365mcf and HFC-227ea by converting to methyl formate-based technology. The consumption for each enterprise is as shown in table 9 below.

Table 9. Consumption of HFC-365mfc/227ea contained in pre-blended polyols per PU foam manufacturer 2020-2022 (mt)

Product line	Enterprise	2020	2021	2022	Average
Thermal solar systems	Biome Solar Industry	4.80	5.40	8.25	6.15
	Soften	6.05	6.93	4.25	5.74
Commercial refrigeration	Frigomeuble	0.62	0.86	0.5	0.66
	Almia Refrigeration	0.63	0.25	0.16	0.35
	ETS Abdelkader Mellouli	0.32	0.35	0.32	0.33
	Société Tunisienne d'Équipement	0.23	0.24	0.3	0.26
Insulation panels	Sofrifac	1.41	2.81	2.34	2.19
	Total	**14.06**	**16.85**	**16.12**	**15.67**

34. Funding was requested to retrofit each enterprise's foaming machine, including mixing heads and improved mold heating systems to facilitate the minimum temperature before foam injection (US $10,000 per enterprise); engineering and ventilation drawings for ventilation improvements to ensure occupational safety in regard to exposure to isocyanate and methyl formate fumes (US $8,000 for the thermal solar and the insulation panel enterprises and US $2,000 for the commercial refrigeration enterprises), and testing and foaming trials, product evaluation, technology transfer and training (US $20,000 for the thermal solar

and insulation panel enterprises and US $14,000 for the commercial refrigeration enterprises), resulting in a cost of US $38,000 per enterprise for the two thermal solar and the insulation panel enterprises and US $26,000 per enterprise for the four commercial refrigeration enterprises. IOCs are requested for a total of US $81,478 for one year of operation, due to the higher cost of technology, the increase in cost of polyol-blend, and the increase of foam density and lambda value, as shown in table 10 below.

Table 10. ICCs and IOCs for the residential RAC manufacturing investment project (US $)

Enterprise	Total ICC requested	Total IOC requested	Total cost requested
Thermal solar systems			
Biome Solar Industry	38,000	30,750	68,750
Soften	38,000	28,728	66,728
Commercial refrigeration			
Frigomeuble	26,000	1,744	27,744
Almia Refrigeration	26,000	1,644	27,644
ETS Abdelkader Mellouli	26,000	3,293	29,293
Société Tunisienne d'Équipement	26,000	1,275	27,275
Insulation panels			
Sofrifac	38,000	14,044	52,044
Total	**218,000**	**81,478**	**299,478**

Commercial refrigeration and air-conditioning manufacturing sector

35. Technical assistance to reduce refrigerant leakage and ensure proper refrigerant management would be provided to four locally-owned enterprises (Frigomeuble, Almia refrigeration, ETS Abdelkader Mellouli and Société Tunisienne d'Équipement) manufacturing display cabinets for small-and-medium-size shops using HFC-134a and the R-404A. Tools and equipment[6] (US $23,976) would be provided and training sessions (US $10,000) would be organized for each enterprise, at a total cost of US $33,976 (or US $8,494 per enterprise). The enterprises both manufacture and service commercial refrigeration equipment as shown in table 11 below.

Table 11. Consumption of HFCs in commercial RAC manufacturing enterprises 2020-2022 (mt)

Activity	Substance	2020	2021	2022	Average
Manufacturing	HFC-134a	1.56	1.55	1.41	1.51
	R-404A	0.63	0.66	0.68	0.66
Subtotal		*2.19*	*2.21*	*2.09*	*2.16*
Servicing	HFC-134a	1.62	1.91	2.19	1.91
	R-404A	1.02	1.1	1.16	1.09
Subtotal		*2.64*	*3.01*	*3.35*	*3.00*
Total		**4.83**	**5.22**	**5.44**	**5.16**

Servicing sector activities

36. Stage I of the KIP proposes non-investment activities in the servicing sector under four components The related activities for each project component and the respective costs are presented in table 12:

[6] Including tube cutters, deburring tool set, flaring and swaging toolkit, tube expander tools set, leak detectors, digital manifold, electronic scale, refrigerant recovery unit, vacuum gauge, vacuum pump, recovery cylinders for refrigerants and other tools.

Table 12. Planned servicing sector activities and costs by agency (US $)

Project component	Planned activities	Agency	Cost
Strengthening the institutional and legal framework	License system: regulation for equipment labelling (including domestic equipment; including information on HFCs; to be integrated in the license system in the future)	UNEP	15,000
	Regulations targeting end-users: - Introduction of mandatory reporting through logbooks (US $15,000) - Taxing the importation of HFCs and equipment containing them, based on the GWP plus green public procurement (US $30,000)	UNEP	45,000
	Codes and standards: -Updating and adopting safety codes and standards (US $15,000) - Training of 100 environmental inspectors (US $30,000)	UNIDO	45,000
	Customs: Training of 200 customs officers on the control of HFCs	UNEP	50,000
	Customs: Provision of 10 identifiers	UNIDO	50,000
		Subtotal	*205,000*
Support to the RAC servicing sector with special focus on MAC servicing	Training and certification of technicians: -Updating the training curricula of the certification system to include the MAC sector (US $10,000) - Training and evaluation of 1,000 technicians for certification under the updated system, including 45 instructors for the MAC sector (US $285,000)	UNIDO	295,000
	Training centers: Provision of tools and equipment[7] to five training centers for correct handling of HFCs and alternatives (including recovery tools and training units)	UNIDO	125,000
	Servicing enterprises: Provision of tools and equipment[8] for ten workshops and end-users with their own servicing personnel (big commercial and industrial facilities, professional associations)	UNIDO	100,000
	MAC servicing: - Six training workshops for 150 MAC technicians on good practices (US $15,000) - Provision of tools and equipment[9] to five MAC workshops (US $55,000)	UNIDO	70,000
		Subtotal	*590,000*
Support for the RRR system	RRR facilities: Provision of 200 recovery cylinders for the RRR centers	UNIDO	21,000
		Subtotal	*21,000*
Awareness-raising activities	End-users: Fourteen information and awareness-raising events for end-users on HFC alternatives (supermarkets, agroindustry, fisheries, hotel associations, public administration, retailers of domestic devices)	UNIDO	70,000

[7] Including: domestic refrigerator/freezer/AC training modules, small portable refrigerant recovery unit (single cylinder), connection hoses, refrigerant recovery cylinder, simple two valve refrigeration manifold, simple refrigeration weighing scale, dual stage vacuum pump, micron gauge, saddle clamp, piercing pliers, lockring lockbox connection set, brazing torch, tool trolley, deburring tool, electronic leak detector (CFC, HCFC, HFC, HFO), nitrogen regulator and leak detection sprayer

[8] Including: small portable refrigerant recovery unit, connection hoses, refrigerant recovery cylinder, simple two-valve refrigeration manifold, simple refrigeration weighing scale, dual stage vacuum pump, micron gauge, saddle clamp piercing pliers, lockring lockbox connection set, brazing torch, tool trolley, deburring tool, electronic leak detector, nitrogen regulator, leak detection sprayer thermometers

[9] Including: small portable refrigerant recovery unit, refrigerant recovery cylinder, simple two valve refrigeration manifold, simple refrigeration weighing scale, dual stage vacuum pump, tube and hose repair set, tool trolley, deburring tool, electronic leak detector (CFC, HCFC, HFC, HFO), nitrogen regulator, leak detection sprayer, automotive RRR system, thermometers

Project component	Planned activities	Agency	Cost
	Women in the RAC sector: Five information and awareness-raising events on women in the RAC servicing sector oriented to educational entities and the entrepreneurial sector	UNIDO	25,000
		Subtotal	*95,000*
Total servicing			***911,000***

37. Based on the average HFC consumption in servicing in the baseline years (565.09 mt, or 1,244,093 CO_2-eq tonnes) and the requested funding of US $911,000, the reduction from remaining HFC consumption eligible associated with the servicing sector is 393,262 CO_2-eq tonnes.

Project implementation, coordination, and monitoring

38. To support project implementation, US $286,621 has been requested for project coordination, implementation, and monitoring. The project management costs requests have been divided between consultants (US $210,000), travel costs (US $58,000) and other operational expenses (US $18,621).

Gender policy implementation

39. A study about women in the Tunisian RAC servicing sector was undertaken in 2020 under the country's Kigali Amendment enabling activities. The study identified the degree of involvement of women in the RAC sector and concluded *inter alia* that despite low participation of women in the sector, it is not perceived as a men-only sector, and numerous barriers to the equitable participation of women in the sector were identified. Tunisia will apply a gender-balanced approach to all the KIP activities, informed by the results of the study and in line with the operational policy on gender mainstreaming for Multilateral-Fund-supported projects. In particularly, the activities related to training and awareness raising will seek gender parity among the participants, and four of these events will focus on the specific topic of women in the RAC servicing sector. Also, the experts recruited for the provision of technical assistance in the different components of the KIP will be evaluated and selected in a gender-balanced basis. Finally, the Ministry of Family, Women, Children and the Elderly will be invited to the awareness-raising and information events under the KIP or other related programmes, in order to build synergies in the promotion of women in the RAC servicing sector in the country.

Coordination of activities in the servicing sector under HCFC phase-out and HFC phase-down plans

40. The stage II of the HPMP is expected to be completed in 2026; the stage III of the HPMP is expected to be submitted in 2026 for implementation until 2031. Accordingly, the HPMP and KIP will be jointly implemented between 2024 and 2031. Activities for the phase-down of HFCs were designed to be harmonized with the phase-out of HCFC consumption to the extent possible, by identifying opportunities for complementary efforts and avoiding duplication. Stage III will be planned in coordination with the activities from previous stages and the proposed KIP.

41. The proposed schedule of phase-down commitments and funding tranches under stage I of the KIP and the schedule of phase-out commitments and funding tranches under stage II of the HPMP are presented in annex I. Annex II provides an overview of activities of stage II of the HPMP and stage I of the KIP (2024-2031), showing that activities planned under the KIP either avoid duplication of planned activities under the HPMP or are adding a new element or focus to complement the HPMP activities.

Total cost of stage I of the Kigali HFC implementation plan

42. The budget for stage I has been established at US $3,152,834, as submitted. The costs of activities in the refrigeration servicing sector of US $911,000 have been proposed in line with decision 92/37. In the

absence of cost funding guidelines, the funding requested for activities in the manufacturing sectors is the best available estimate provided by UNIDO. The proposed costs and phase-out for stage I of the KIP are summarized in table 13 below.

Table 13. Proposed cost of activities to be implemented in stage I of the KIP for Tunisia (US $)

Stage I of the KIP sectoral activity	Phase-out (CO_2-eq tonnes)	Cost (US $)
Manufacturing sector		
Conversion of seven enterprises manufacturing residential AC and cold-water dispensers	151,520	1,621,760
Conversion of seven enterprises manufacturing PU foam	15,106*	299,477
Technical assistance to four commercial refrigeration manufacturing enterprises	0	33,976
Servicing sector activities	393,262	911,000
Project management	0	286,621
Total	**559,888****	**3,152,834**

* HFCs contained in imported pre-blended polyols

** Including phase-out of 15,106 CO_2-eq tonnes of HFCs contained in imported pre-blended polyols

Implementation of the first tranche of stage I of the Kigali HFC implementation plan

43. The first funding tranche of stage I of the KIP, in the total amount of US $2,198,007, will be implemented between June 2024 and December 2027 and will include the following activities:

(a) The conversion of seven enterprises in the residential RAC manufacturing sector (UNIDO) (US $1,621,760);

(b) Development of the institutional and legal framework: training of 200 customs officers on the control of HFCs (UNEP) (US $50,000); updating of relevant safety codes and standards and the provision of 10 refrigerant identifiers (UNIDO) (US $65,000);

(c) Support to the RAC servicing sector with special focus on the MAC servicing sector: (UNIDO) updating the training curricula, and training and certification of 160 technicians (US $55,000); provision of tools and equipment to five training centers (US $125,000); provision of tools and equipment for ten workshops and end-users (US $100,000); six training workshops for 150 technicians of the MAC sector on good practices (US $15,000);

(d) Awareness-raising activities: (UNIDO) six information and awareness-raising events for end-users on HFC alternatives (US $ 33,000) and two information and awareness-raising events on the topic of women in the RAC servicing (US $10,000); and

(e) Project coordination and monitoring (UNIDO) (US $123,247) including consultants (US $90,000), travel costs (US $25,000) and other operational expenses (US $8,247).

SECRETARIAT'S COMMENTS AND RECOMMENDATION

V. Comments

Overarching strategy

44. In line with decision 92/44, the Government of Tunisia has submitted a letter demonstrating its strong commitment to support reductions in advance of the Montreal Protocol targets. The Government will achieve those reductions through a combination of investment and non-investment activities, including phasing out the consumption at eight enterprises in the RAC manufacturing sector, implementing bans to support that phase-out, implementing the country's HFC licensing and quota system, policy and regulatory support, and activities in the servicing sector. Tunisia is included in the list of countries in Appendix II of decision XXVIII/2 operating under the high-ambient-temperature exemption. The Government confirmed it would not avail itself of the high-ambient temperature exemption.

Institutional, policy and regulatory framework

HFC licensing and quota system

45. In line with decision 87/50(g), UNIDO has confirmed that Tunisia has an established and enforceable system of licensing and quotas for monitoring HFC imports/exports in place. UNIDO confirmed that the import quotas for 2024 for HFCs has been allocated to importers by tonnes CO_2-eq tonnes giving flexibility to the importer on the substances selected. The HFC import quotas allocated in February 2024 amounted to 1,899,066 CO_2-eq tonnes. The remaining amount to reach the established baseline will be allocated later in 2024 as requested by importers.

Regulatory framework

46. Regarding regulatory measures that would support the proposed investment project in the RAC manufacturing sector the NOU confirmed that after the completion of the conversion of all the lines manufacturing water dispensers operating with HFC-134a and air conditioners operating with R-410A, a ban would be established on the import, assembly or manufacture of HFC-based equipment (including water dispensers, air conditioners, and domestic freezers) from 1 January 2027.

47. Noting that Tunisian manufacturers of domestic refrigerators have already converted their manufacturing to R-600a, which are readily available in the market, and noting that stand-alone commercial refrigeration based on R-600a- and R-290-based are also readily available, the Secretariat inquired whether the Government of Tunisa had considered banning the import of new and used HFC-based domestic refrigerators and HFC-based stand-alone commercial refrigeration units. UNIDO informed that the Government of Tunisia will work on the preparation of a regulation to prohibit the manufacture or import of domestic refrigerators and stand-alone commercial refrigeration units based on high-GWP HFCs by 1 January 2027, after the conversion of water dispenser and air conditioner manufacturers.

48. Regarding regulatory measures to support the implementation of the KIP, including those initiated under the HPMP, UNIDO confirmed that the regulation to establish the certification system is expected to enter into force in 2024 and will include a restriction on the sale of controlled substances to certified technicians only; the code of practice for RAC technician is planned to be in place by 2025. In addition, regulations to require the recovery of controlled substances during servicing of RAC; to prevent venting of controlled substances during installation, servicing and decommissioning of RAC equipment; requiring leak checking for larger equipment and controlled substances logbooks and equipment logbooks for systems; recovery of controlled substances from containers and equipment at their end-of life; and a prohibition on disposable cylinders are all planned for 2027.

49. The KIP proposes to establish a labelling system that would specify the refrigerant contained in the equipment (including HFC blends, the amount of HFC contained in the equipment, and other relevant information, such as flammability) for RAC equipment manufactured and imported in Tunisia. The labelling of equipment would be the basis for including RAC equipment in the import licensing system at a future stage of the KIP. The development of this label will be complemented by the label proposed to be developed under the pilot project to maintain and/or enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down submitted to the present meeting, and described in paragraphs 74 to 95 below, wherein the label would include both information on the HFC contained in RAC equipment and the equipment's energy efficiency.

Technical and cost-related issues

Residential RAC manufacturing sector

50. Noting that three of the residential AC manufacturing enterprises had small consumption of R-410A (i.e., Société New Star, Novatech West Point, and Star One), the Secretariat sought to better understand the capacity of those enterprises to convert to HFC-32 and confirmation of their financial viability. UNIDO clarified that while the consumption of those enterprises may be small, they were well-established manufacturers that provided a range of consumer products not based on controlled substances (e.g., gas cookstoves, kitchen hoods, blenders, etc.), already had experience working with flammable gases, and confirmed the enterprises had the capacity to implement the conversion and were financially viable. Regarding the enterprise Star One, which had not manufactured AC units in 2022 and 2023, UNIDO clarified that the decision by the enterprise not to manufacture in those years was due to particular market conditions, but the enterprise is active and operational, has re-launched its manufacturing programme in 2024, and is financially viable.

51. The project will phase out the consumption of all enterprises in the country manufacturing residential AC units with R-410A, and cold-water dispensers and freezers with HFC-134a, and the sustainability of those conversions will be supported by the implementation of a ban on the manufacture and import of such equipment. Accordingly, the Secretariat considered it important to ensure that all enterprises in the sector be able to participate in the project and, on that basis, undertook a detailed review of eligible incremental capital costs, resulting in the following agreed adjustments:

(a) For the three enterprises with consumption below 5 mt of R-410A (i.e., Société New Star, Novatech West Point, and Star One), a total of US $65,000 per enterprises comprising a basic equipment package to enable the conversion to HFC-32 (US $35,000), and technical assistance for the adoption of HFC-32 technology (US $30,000), resulting in agreed funding of US $195,000 for those three enterprises;

(b) Regarding the three larger manufacturers and 3 Star Electronics,[10] the Secretariat assessed the eligible incremental capital costs based on each enterprise's baseline equipment, Executive Committee's decisions and guidelines, and past precedent projects resulting in the following adjustments, with the revised total costs as shown in table 14:

(i) The cost of a multi-refrigerant charging machine at US $65,000, and that of an HFC-32-based charging machine at US $37,000;

(ii) The number of leak detectors was adjusted based on whether the enterprise already has a leak detector capable of detecting HFC-32, and only Sicad Coala was eligible

[10] While the enterprise's average 2021-2023 consumption was 7.70 mt, the Secretariat assessed the enterprise's eligible incremental capital costs based on its baseline equipment and determined it would be eligible for a higher level of funding than the US $65,000 recommended for the three small-consuming enterprises consuming less than 5 mt of R-410A.

for a multi-refrigerant leak detector given its planned conversion to HFC-32 and R-600a;

(iii) The number of HFC-32 recovery stations per enterprise was rationalized; and

(iv) Noting the variation in costs for equipment transportation, installation and testing, those costs were rationalized at the lower of 10 per cent of the equipment costs or US $15,400, as requested for Société Industrielle Mega.

Table 14 agreed ICCs for four residential RAC manufacturing enterprises

Agreed costs	Sicad Coala	Société Industrielle Méga	El Athir	3 Stars Electronics
Charging, supply, leak detection and safety infrastructure	266,300	86,900	162,400	68,640
Performance test (equipment)	30,800	61,600	30,800	0
Product testing and optimization	5,000	10,000	5,000	2,000
Recovery station	8,250	1,650	2,750	2,750
Equipment transportation, installation, and commissioning	15,400	15,400	15,400	7,339
Training	6,600	6,600	6,600	6,600
Total	**332,350**	**182,150**	**222,950**	**87,329**

52. Regarding the four enterprises in table 14 above, UNIDO and the Secretariat had detailed discussions on the need for an ultrasonic welding machine as a valve is typically used to seal the refrigerant circuit in the standard residential AC manufacturing process. UNIDO confirmed that the enterprises currently braze the process tube rather than using installation valves to seal the refrigerant circuit. The Secretariat understands this means that during installation of the split unit, technicians would need to use a saddle piercing valve to connect the indoor and outdoor units, which could introduce refrigerant leaks if not done properly. Not only are factory-installed valves likely to have fewer leaks, but they would also allow faster installation at the customer's residence, thus reducing installation costs. Accordingly, it was agreed that the enterprises would have flexibility to instead of purchasing an ultrasonic welding machine to purchase a Lokring kit and the necessary valves and fittings to enable them to switch their manufacturing process to the more commonly used process of using valves to seal the process tube.

53. Regarding the enterprise Star One, it was agreed to retain the enterprise in the project on the understanding that:

(a) UNIDO would include a report on the status of manufacturing of the enterprise in the second and third tranche requests; and

(b) Should the enterprise not manufacture on a commercial scale HFC-32-based residential AC units upon completion of the conversion project, and continue such manufacturing for at least three years, UNIDO would return 100 per cent of the funding associated with the conversion plus the associated PMU funding (and the associated agency support costs).

54. The phase-out achieved by the project was adjusted to include the consumption of the eighth, ineligible enterprise, Condor Tunisie, and, in line with decision taken at the 16th meeting, consumption at the eight enterprises was calculated on the basis of the average of the three years, immediately preceding project preparation, i.e., the average of 2021-2023, resulting in a phase-out of 100.41 mt of R-410A and 4.03 mt of HFC-134a (215,375 CO_2-eq tonnes), as further detailed in annex III. IOCs were agreed at zero, noting the lower cost of HFC-32 relative to R-410A, and that HFC-32-based compressors are or would likely soon be cheaper than R-410A-based compressors. Accordingly, the agreed cost for the conversion of

the eight manufacturing enterprises is US $1,019,779, for a cost-effectiveness of US $9.76/kg or US $4.73/$CO_2$-eq tonne.

Polyurethane foam manufacturing sector

55. The Secretariat noted with appreciation the proposal from the Government of Tunisia to phase out the import of HFCs contained in pre-blended polyols by converting seven enterprises manufacturing PU foam. However, as noted in document UNEP/OzL.Pro/ExCom/93/31, the Executive Committee has not yet decided whether in the context of the KIPs it will provide funding to phase out HFCs contained in imported pre-blended polyols, which are not reported under Article 7. As such, the Secretariat advised UNIDO that a project to phase out HFCs contained in imported pre-blended polyols in the PU foam sector in Tunisia would be subject to the Executive Committee consideration on whether it will fund the phase-out of HFCs contained in imported pre-blended polyols.

Commercial refrigeration and air-conditioning manufacturing sector

56. Noting that the four enterprises in the commercial refrigeration manufacturing project had an annual manufacturing consumption between 1 and 2 mt of HFC-134a, and less than 1 mt of R-404A (excluding servicing), the Secretariat sought to understand whether the enterprises were local assemblers and installers. UNIDO clarified that these enterprises are manufacturers since they manufacture the commercial refrigeration units (display cabinets, cold chambers and water dispensers) and charge the refrigerants in their own facilities, before distribution and installation.

57. UNIDO and the Secretariat discussed the possibility of implementing a conversion to low-GWP alternatives for the enterprises, but this was considered neither feasible nor sustainable considering the dominant role imported commercial refrigerant equipment had in the country's market. Given that the goal of the project was to reduce refrigerant leakage, ensure proper refrigerant management, and enable the enterprises to handle low-GWP alternatives that are flammable, it was agreed to include this activity under the servicing sector at US $31,976 based on the procurement of tools and equipment (US $23,976) and training sessions (US $8,000).

Servicing sector activities

58. With regard to the project for the training and evaluation of 1,000 technicians for certification under stage I of the KIP Secretariat inquired whether the final tranche of stage II of the HPMP would target the certification of those technicians that have already been trained, while the KIP and stage III would target technicians that have not yet undergone training. UNIDO clarified that the final tranche of the HPMP stage II will not include any certification of technicians, only training. Thus, technicians trained in the first two stages of the HPMP will be able to benefit from certification offered under stage III of the HPMP and under stage I of the KIP.

59. The Secretariat and UNIDO discussed the scope of activities to be undertaken under the servicing sector, noting that the country's baseline for compliance was 2,367,840 CO_2-eq tonnes, the country's originally proposed target for 2030 of 1,822,434 CO_2-eq tonnes, and the reductions from the country's remaining HFC consumption eligible for funding resulting from the conversion of the eight manufacturing enterprises (i.e., 215,375 CO_2-eq tonnes). Regarding the latter, it was agreed that while those reductions would be calculated in line with the methodology document UNEP/OzL.Pro/ExCom/92/46, determining the required reductions from remaining HFC consumption eligible for funding from the servicing sector to enable the country to meet the 2030 target would need to inter alia take into account the expected consumption, which would include the HFC-32 phase-in from the conversion of the eight manufacturing enterprises.

60. On that basis, the Secretariat and UNIDO had detailed discussions on the cost of the proposed activities, resulting in the following agreed adjustments, further summarized in table 15 below (changes highlighted in bold):

(a) Adjusting the price of tools and equipment (i.e., lockring set, tool trolley, and electronic leak detector) to be provided to five training centers for the correct handling of HFCs and alternatives, and for 10 workshops and end-users with their own servicing personnel, resulting in agreed costs of US $122,700 and US $95,400, respectively;

(b) As Tunisia has identified the MAC sector as a priority, increasing the number of technicians trained to 300 and rationalizing the training costs, resulting in a total of US $27,400; increasing the number of MAC servicing workshops for which tools would be provided from 5 to 7 while rationalizing those tools (i.e., tube and hose repair set, tool trolley, and electronic leak detector) resulting in an agreed cost of US $67,900;

(c) Rationalizing the costs associated with the awareness-raising events for end users and women in the RAC sector, resulting in agreed costs of US $68,600 and US $24,500, respectively; and

(d) As noted in paragraph 57, including US $31,976 for tools, equipment, and training to reduce refrigerant leakage, ensure proper refrigerant management, and enable enterprises to handle low-GWP alternatives that are flammable in the commercial refrigeration sector.

Table 15. Agreed activities and costs in the servicing sector (US $)

Project component	Planned activities	Agency	Stage I agreed cost	First tranche agreed costs
Strengthening the institutional and legal framework	License system, regulations targeting end-users, codes and standards, customs*	UNEP	50,000	50,000
		UNIDO	155,000	65,000
Support to the RAC servicing sector with special focus on MAC servicing	Training and certification of technicians*	UNIDO	295,000	55,000
	Provision of tools to five training centers (**adjustment of cost of tools**)	UNIDO	**122,700**	**122,700**
	Provision of tools for ten workshops and end-suers (**adjustment to cost of tools**)	UNIDO	**95,400**	**95,400**
	MAC servicing: - Six training workshops for **300 MAC technicians (US $27,400)** - Provision of tools and equipment to **7 workshops** of the MAC sector **(US $67,900)**	UNIDO	**95,300**	**13,700**
Support for RRR system	RRR facilities*	UNIDO	21,000	0
Awareness-raising activities	**End-users**	UNIDO	68,600	29,400
	Women in the RAC sector	UNIDO	24,500	9,800
Technical assistance to four commercial refrigeration manufacturers	**Provision of technical assistance and equipment to reduce HFC leakage and handle flammable refrigerants and associated training**	UNIDO	**31,976**	**0**
Total servicing			**959,476**	**441,000**

* No change from original proposal.

61. Based on the agreed costs of US $959,476 for the servicing sector, and in line with the methodology for converting US $/kg to US $/$CO_2$-eq tonne in the servicing sector described in annex I of document UNEP/OzL.Pro/ExCom/92/46, the reduction from the country's remaining HFC consumption

eligible for funding from the servicing sector is 414,818 CO_2-eq tonnes, as summarized in table 16 below. In light of those agreed reductions, the Government agreed to reduce its 2030 to 1,803,694 CO_2-eq tonnes, a reduction of 23.8 per cent of the country's HFC baseline for compliance.

Table 16. Agreed costs and reductions from HFC consumption eligible for funding from the servicing sector, and 2030 target

Servicing sector		
Average HFC consumption in the servicing sector in baseline years	mt	565.09
	CO_2-eq tonnes	1,244,093
Average GWP of HFC consumption in the servicing sector		2,201.58
Agreed funding	US $	959,476
Agreed cost-effectiveness threshold	US $/kg	5.1
Reductions from remaining HFC consumption in servicing	mt	188.13
	CO_2-eq tonnes	414,188
Reductions and 2030 target		
Established HFC consumption baseline	CO_2-eq tonnes	2,367,840
Reductions in remaining HFC consumption eligible for funding from manufacturing sector conversions	*CO_2-eq tonnes*	*-215,375*
Phase in of HFC-32 in the AC manufacturing sector	*CO_2-eq tonnes*	*65,417*
Reductions in remaining HFC consumption eligible for funding from the servicing sector	*CO_2-eq tonnes*	*-414,188*
2030 target	CO_2-eq tonnes	1,803,694

Project management unit

62. Funding for the PMU was agreed at US $197,926 (US $142,299 for consultants, US $40,518 for travel, and US $15,109 for operational costs) calculated at 10 per cent of the project costs, on the understanding that a lower percentage may be appropriate under stage III of the HPMP, noting that the final budget for the stage III PMU would be based on the activities included in that plan.

Coordination of activities in the servicing sector under HCFC phase-out and HFC phase-down plans

63. The final tranche of stage II of the HPMP is expected to be submitted in 2025, stage III of the HPMP in 2026, and the second tranche of stage I of the KIP in 2027. The Secretariat and UNIDO agreed to discuss possible opportunities to align subsequent tranches of the KIP and stage III of the HPMP once stage III was submitted, in order to minimize the reporting and administrative burden of submitting annual tranche requests under the HPMP and KIP, noting that tranche requests would inter alia require reporting and consumption verification.

Total project cost

64. At the total cost of US $2,177,181, stage I of the KIP for Tunisia will result in a reduction of 629,563 CO_2-eq tonnes from the country's HFC consumption eligible for funding, as summarized in table 17 below and described in paragraphs 50 to 62 above.

Table 17. Agreed cost of activities to be implemented during stage I of the KIP in Tunisia (US $)

Sector	**Substance**	**Phase-out (mt)**	**Ineligible (mt)**	**Phase-out (CO_2-eq tonne)**	**Ineligible (CO_2-eq tonne)**	**Cost (US $)**	**CE (US $/kg)**	**CE (US $/$CO_2$-eq tonne)**
Manufacturing sector	HFC-134a	4.03	0.00	5,759	0	1,019,779	9.76	4.73
	R-410A	96.91	3.50	202,309	7,306			
Servicing	n/a	188.13	0.00	414,188	0	959,476	5.10	2.32
PMU	n/a	0.00	0.00	0	0	197,926	n/a	n/a
Total	**n/a**	**292.57**		**629,563**		**2,177,181**	**7.44**	**3.46**

Implementation plan for the first tranche of the Kigali HFC implementation plan

65. In line with adjustments to project costs and activities the funding for the first tranche was adjusted to US $1,576,566 including the investment project in the RAC residential manufacturing sector amounting to US $1,019,779, activities in the servicing sector amounting to US $441,000 as detailed in table 15 above, and the revised PMU costs of US $115,787 (including consultants (US $82,149), travel (US $24,264) and operational costs (US $9,374)).

Co-financing

66. Manufacturing enterprises will co-finance any costs not covered by the approved KIP. The implementation of green public procurement as part of the legal and regulatory activities, will foster financial support from the Tunisian public administration toward the introduction of low-GWP alternatives to HFCs in the public sector.

2024-2026 business plan of the Multilateral Fund

67. UNIDO and UNEP are requesting US $2,177,181, plus agency support costs, for the implementation of stage I of the KIP for Tunisia. The total value of US $1,689,926, including agency support costs, requested for the period of 2024–2026, is US $1,574,366 above the amount in the business plan.

Sustainability of the HFC phase-down and assessment of risks

68. The Secretariat considers the risks to the sustainability of the conversions of the eight enterprises manufacturing residential AC units to be low given the 1 January 2027 ban on the import and manufacture of residential AC units with a GWP greater than 700; the technical capacity of the enterprises to undertake the conversions; and the market acceptance in many regions of the world to HFC-32-based technology. The sustainability of the conversions will also be supported by the lower price of HFC-32 refrigerant relative to R-410A, and the ready availability of HFC-32-based compressors. Risks related to the financial viability of one enterprise with limited manufacturing in recent years have been mitigated through appropriate safeguards. The Secretariat similarly assesses the risks to the sustainability of the conversion of the cold-water dispenser manufacturer to R-600a to be low given the broad acceptance in the market of that technology and the 1 January 2027 ban on the import and manufacture of HFC-based cold-water dispensers.

69. Regulations to control and monitor HFCs through the HFC licensing and quota system are in place and funding for training customs officers, including provision of refrigerant identifiers, are included in stage I of the KIP. The 1 January 2027 ban on the import and manufacture of HFC-based domestic freezers, domestic refrigerators and stand-alone commercial refrigeration equipment will both help introduce low-GWP technologies in the country and ensure reduced HFC servicing demand. Improved servicing practices, including in the MAC sector, which had not been assisted since the CFC phase-out, awareness-raising, and policy and regulatory assistance are expected to facilitate the uptake of low-GWP technologies and enhance the sustainability of the HFC phase-down.

Impact on the climate

70. The activities proposed, including the phase out of HFC-134a and R-410A in the RAC manufacturing sector, the introduction of regulations such as the tax on HFCs and HFC-containing equipment, introducing labelling requirements for HFCs and the updating of codes and standards, the continued training of customs officers to ensure effective enforcement of the licensing and quota system, and the investment in training and equipment to improve servicing in the RAC and MAC sectors, indicate that the implementation of stage I of the KIP will reduce refrigerant emissions into the atmosphere, resulting in climate benefits. While the Secretariat is not able to provide an estimate of the avoided emissions from

the implementation of the KIP at the present meeting,[11] by 2030 Tunisia will have reduced its emissions by approximately 564,146 million CO_2-eq tonnes of HFCs, calculated as the difference between the HFC baseline for compliance and the 2030 target, assuming that all consumed HFCs would eventually have been emitted.

Draft Agreement

71. A draft Agreement between the Government of Tunisia and the Executive Committee for stage I of the KIP has not been prepared as the Agreement template is still under consideration by the Executive Committee.

72. If the Executive Committee so wishes, the funds for stage I of the KIP for Tunisia could be approved in principle, and funds for the first tranche could be approved on the understanding that the Agreement would be prepared and presented at a future meeting, before the submission of the second tranche, and once the Agreement template has been approved.

VI. Recommendation

73. The Executive Committee may wish to consider:

(a) Approving, in principle, stage I of the Kigali HFC implementation plan (KIP) for Tunisia for the period 2024-2030 to reduce HFC consumption by 23.8 per cent of the country's baseline by 2030, in the amount of US $2,336,184, consisting of US $2,067,181, plus agency support costs of US $144,703, for UNIDO and US $110,000, plus agency support costs of US $14,300, for UNEP, as reflected in the schedule contained in annex I to the present document;

(b) Noting:

(i) That the Government of Tunisia will establish its starting point for sustained aggregate reductions in HFC consumption based on guidance provided by the Executive Committee;

(ii) That, once the cost guidelines for HFC phase-down are agreed by the Executive Committee, reductions from the country's remaining HFC consumption eligible for funding will be determined in line with these guidelines;

(iii) That the reductions from the country's remaining HFC consumption eligible for funding referred to in subparagraph (b)(ii) above will be deducted from the starting point referred to in subparagraph (b)(i);

(c) Further noting:

(i) The strong commitment of the Government of Tunisia to support reductions in HFC consumption in advance of the Montreal Protocol targets;

(ii) The commitment of the Government to ban the import and manufacture of HFC-based cold-water dispensers, domestic freezers, domestic refrigerators and stand-alone commercial refrigeration equipment, and of residential

[11] As noted in document UNEP/OzL.Pro/ExCom/94/14, Overview of issues identified during project review, the Secretariat is in the process of developing a methodology to estimate the avoided emissions from the implementation of HFC phase-down projects supported by the Multilateral Fund.

air-conditioning units based on HFCs with a global-warming potential greater than 700 by 1 January 2027;

(iii) That should the enterprise Star One not manufacture HFC-32-based residential air-conditioning units on a commercial scale upon completion of its conversion, and continue such manufacturing for at least three years, UNIDO would return the funding associated with the conversion, plus the associated funding with the project management unit, and agency support costs, to the Multilateral Fund;

(d) That a project to phase out HFCs contained in imported pre-blended polyols in the polyurethane foam sector in Tunisia would be subject to the Executive Committee consideration on whether it will fund the phase-out of HFCs contained in imported pre-blended polyols;

(e) Approving the first tranche of stage I of the KIP for Tunisia and the corresponding tranche implementation plan, in the amount of US $1,689,926, consisting of US $1,526,566, plus agency support costs of US $106,860, for UNIDO and US $50,000, plus agency support costs of US $6,500, for UNEP; and

(f) Requesting the Government of Tunisia, UNIDO, UNEP and the Secretariat to finalize the draft Agreement between the Government of Tunisia and the Executive Committee for the reduction in consumption of HFCs, including the information contained in the annex referred to in subparagraph (a) above, and to submit it to a future meeting once the KIP Agreement template has been approved by the Executive Committee.

PILOT PROJECT TO MAINTAIN AND/OR ENHANCE THE ENERGY EFFICIENCY OF REPLACEMENT TECHNOLOGIES AND EQUIPMENT IN THE CONTEXT OF HFC PHASE-DOWN (NON-INVESTMENT ACTIVITIES)

PROJECT DESCRIPTION

Background

74. On behalf of the Government of Tunisia, UNIDO has submitted, in line with decision 91/65, a request for a pilot project to maintain and/or enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down (non-investment activities), in the amount of US $220,000, plus agency support costs of US $19,800, as originally submitted.[12]

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

75. The project preparation for stage I of the Kigali HFC implementation plan (KIP) for Tunisia, approved at the 88th meeting for a total of $190,000, excluding agency support costs, included the development of a detailed report and energy efficiency strategy for the refrigeration and air-conditioning (RAC) sector.[13] The project preparation was completed 31 December 2023.

Energy efficiency pilot project

76. The report on energy efficiency in the RAC service sector included the results of a field survey of end users of domestic, commercial, industrial and mobile refrigeration, AC equipment and systems, installation and maintenance service companies, and manufacturers of this type of equipment and systems, as well as manufacturers of rigid polyurethane foams containing controlled substances. The energy consumed in Tunisia for RAC equipment and systems in 2022 was 5,431 GWh, which represents approximately 28 per cent of the total national electricity consumption (19,516 GWh). Currently, the domestic refrigeration and commercial air-conditioning (AC) subsectors have the largest consumption of electricity.

77. Information on HFC consumption and distribution by sector; the established HFC baseline; the country's ratification of the Kigali Amendment, and the policy and regulatory framework for its implementation; and proposed activities for stage I of the KIP and the first tranche submitted to the current meeting, is available in paragraphs 7 to 43 of the present document.

Policy, regulatory and institutional framework

78. There are currently no minimum energy performance standards (MEPS) related to the RAC appliances and systems in Tunisia. The implementation of the energy efficiency pilot for replacement RAC technology will be supported by different entities from the public sector, such as the ministries of environment, energy, finance, trade, education and professional training, and relevant agencies like the National Agency for the Protection of the Environment, the national ozone unit (NOU), the National Agency for Energy Management, the National Agency for Professional Training, and the National Institute for Standardization, among others. Stakeholders in the private sector include the Tunisian Association of Refrigeration and Air-Conditioning, the manufacturers and importers of RAC appliances for the domestic and small commercial sectors, the importers of controlled substances, and relevant end users in the commercial and industrial sectors.

[12] As per the letter of 1 February 2024 from the Ministry of Environment of Tunisia to UNIDO.
[13] Document UNEP/OzL.Pro/ExCom/88/32

Project objective

79. The strategy to enhance the energy efficiency of replacement technologies and equipment in the context of the phase-down of HFCs in Tunisia involves the development of codes and standards, the promotion of energy-efficient devices and systems, the training of RAC servicing companies, including manufacturing, installation and maintenance services, and awareness raising among end users. The main sectors to be targeted by the strategy will be the domestic and commercial RAC sectors. The strategy aims to attain a 22 per cent reduction from the business-as-usual scenario of 9,967 GWh for energy consumption of RAC equipment and systems projected in the report by 2045.

Proposed activities

80. The proposed activities include four components presented below along with the associated costs:

(a) *Codes and standards*: Development of MEPS for small RAC devices and for large installations, including an inspection system; development of energy labelling for small RAC appliances, in line with the MEPS; training of 75 environmental inspectors (US $25,000);

(b) *Capacity building*: Updating of training modules in professional programmes and in the certification system to integrate the topic of energy efficiency into the corresponding activities of the HCFC phase-out management plan and stage I of the KIP; training sessions for 50 enterprises designing and installing large RAC systems on energy efficiency; upgrade two laboratories for testing of RAC appliances based on flammable alternatives[14] (US $105,000);

(c) *Awareness-raising*: Organizing three awareness workshops for 200 representatives from enterprises using large RAC systems and production and distribution of awareness materials for installers and owners of large installations; two awareness workshops for a total of 100 importers and the distributors of RAC devices used in the domestic and commercial sectors and production and distribution of awareness materials for manufacturers, importers and distributors of domestic and small commercial RAC appliances (US $40,000); and

(d) *Demonstration project*: The replacement of 50 split AC units based on HFCs with R-290-based units in a public sector building; monitoring of energy savings and dissemination of results among the general public and other stakeholders (US $50,000).

81. The project coordination and management will be undertaken by UNIDO in collaboration with the NOU. The NOU will ensure the complementarity between the activities on energy efficiency funded under the Multilateral Fund and those funded externally, avoiding overlaps.

Total cost of the pilot project

82. The total cost of the project to maintain and enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down amounts to US $220,000, plus agency support costs, and will be implemented between June 2024 and June 2027.

[14] Including items such as fire detectors, fire extinguishers, anti-spark switches, creation of a muster point, and other related equipment and measures to allow the laboratory to operate safely and meet the required new testing standards.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

83. The Secretariat has reviewed the project proposal in light of the activities described under decisions 89/6 and 91/65.

84. In line with decision 91/65, confirmation from the Government of Tunisia has been received: that the NOU will coordinate with relevant energy efficiency authorities and national standards bodies to facilitate consideration of refrigerant transition when developing energy efficiency standards in the relevant sectors/applications; that, if Tunisia has mobilized or is to mobilize funding from sources other than the Multilateral Fund for energy efficiency components when phasing down HFCs, the project will not result in the duplication of activities among those funded by the Multilateral Fund and those funded from other sources; that the information on project progress, results and key learning will be made available, as appropriate; and that the date of completion of the project will be set as no more than 36 months after the date of approval by the Executive Committee and a detailed project report will be submitted to the Executive Committee within six months of the date of completion of the project.

Technical and cost-related issues

85. Noting the openness expressed during the 93rd meeting for the submission of pilot projects under decision 91/65 in the manufacturing sector, the Secretariat invited the Government to consider including additional activities under the pilot project to enhance the energy efficiency of equipment manufactured by the local enterprises manufacturing residential AC units and cold-water dispensers participating in stage I of the KIP.

86. UNIDO and the Government required additional time to hold the necessary consultations to prepare a revised proposal that also included improved energy efficiency of the equipment manufactured at enterprises undergoing conversions as interventions may inter alia depend on the specific equipment manufactured, including the components used. Accordingly, it was agreed that the Secretariat would recommend the Executive Committee invite the Government, if it so wishes, to submit an additional pilot project to enhance the energy efficiency of the HFC-32-based split AC units and R-600a-based cold-water dispensers manufactured by the RAC manufacturing enterprises that were being converted in the KIP, on the understanding that the additional pilot project be submitted no later than the 96th meeting.

87. Noting that the KIP includes the establishment of a regulatory system for taxing the import of high-GWP HFCs and equipment containing them, according to the corresponding GWP, in order to make low-GWP options more competitive in the local market, the Secretariat enquired whether the Government had considered not only including the GWP of the HFC refrigerant but also the energy efficiency of the equipment as part of the criteria for determining the tax, while noting that including both the GWP of the HFC refrigerant and the energy efficiency of the equipment could be quite complex (e.g., determining the appropriate tax for equipment based on a high-GWP HFC that is more energy efficient than equipment based on a lower-GWP refrigerant that is already broadly available in the market). Given that complexity, it was agreed that the Government would proceed in a stepwise manner, first developing a tax based exclusively on the GWP of the refrigerant, and once the Government had gained experience in the application of the tax, considering the possible integration of energy efficiency in the tax.

88. In contrast, the equipment label being developing under the pilot project will be integrated with the label being developed under the KIP, resulting in a single label that both identifies the refrigerant in RAC equipment and provides information on the energy efficiency of the equipment. UNIDO confirmed that this label will be mandatory, and is expected to be applied as of 1 July 2026, in line with the timeline for the entry into force of the MEPS for small RAC devices and large RAC installations being developed under the pilot project.

89. Regarding the upgrade of two laboratories for testing of RAC appliances based on flammable alternatives, UNIDO clarified that there was only one laboratory operated by the Technical Centre of Mechanical and Electric Industries, a public entity integrated in the Ministry of Industry. The laboratory has three testing rooms: a small room for AC units (only one unit can be tested at a time), one large room for refrigeration units (seven units can be tested at the same time), and one intermediate room for refrigeration units (for four units at a time). Presently, all units are tested in the same manner, regardless of the refrigerant contained in the appliances. On that basis, it was agreed to adjust the cost of the capacity-building component of the project from US $105,000 to US $80,000.

90. Regarding the planned activity to raise awareness of owners and installers of large commercial and industrial RAC installations, the Secretariat noted that installers were likely keenly aware of the importance of energy efficiency to their or their clients' bottom line. Moreover, large commercial and industrial RAC installations (especially industrial refrigeration applications) may be quite specialized, which would diminish the utility of a general awareness workshops and materials given the application-specific information required. Accordingly, it was agreed to combine and rationalize the costs for the capacity-building and awareness-raising for the installers, resulting in agreed costs of US $40,000 for this combined activity.

91. The Secretariat and UNIDO had detailed discussions on the nexus of the demonstration project with the country's HFC phase-down, given that the Government had committed to issuing a ban on R-410-based split AC units and the AC manufacturers participating in the KIP decided to convert to HFC-32 rather than R-290. UNIDO clarified that although national and international conditions are not currently favourable for the introduction of R-290 technology in the Tunisian AC manufacturing sector, the Government wishes to start improving those market conditions to promote the import of R-290-based equipment and to prepare the local market for the future manufacturing with this technology. On that basis, and given the technology selected by the local manufacturers participating in the KIP, it was agreed that the project would replace 40 existing R-410A-based split AC units with 20 R-290 and 20 HFC-32-based units; monitor the energy use of the different technologies and disseminate the results. It was agreed to adjust the cost of this activity to US $35,000, resulting in agreed costs for the pilot project of US $170,000, as shown in table 18 below.

Table 18. Total cost of the energy efficiency pilot project for Tunisia as agreed

Area of activity	Activity	Cost (US $)
Codes and standards	Development of MEPS for small RAC devices and for large installations, including inspection system	20,000
	Development of energy labelling for small RAC appliances, in line with the MEPS.	5,000
Capacity building	Updating training programmes in professional training and in the certification system, to integrate the topic of energy efficiency.	15,000
	Training sessions for designers and installers of large RAC systems (and awareness workshops and materials)	40,000
	Support to laboratories for correct testing of RAC appliances, including safety training and development of specifications.	35,000
Awareness raising	Awareness workshops and production and distribution of awareness materials for installers and owners of large installations (included above).	Included above
	Awareness workshops and production and distribution of awareness materials for manufacturers, importers and distributors of domestic and small commercial RAC appliances.	20,000
Demonstration project	Replacement of R-410A AC split units with HFC-32 and R-290-based units in a public sector building.	35,000
Total		**170,000**

Agreed cost of the pilot project

92. The cost of the project was agreed at US $170,000, plus agency support costs of US $15,300 for UNIDO.

Sustainability of the pilot project and assessment of risks

93. The development of MEPS for small RAC devices and for large installations, which will enter into force by 1 July 2026, will ensure the sustained introduction of energy-efficient equipment into the country. Activities under the pilot project to ensure that RAC technicians are trained on issues related to energy efficiency and building the capacity of designers and installers of large RAC systems will help ensure that the demand for energy-efficient equipment, which will be raised through awareness activities, can be met. Strengthening the national laboratory infrastructure on implementation of MEPS for RAC equipment, including testing capacity for handling flammable refrigerants, strengthening technical skills of personnel, would facilitate adoption of energy-efficient equipment in different applications RAC applications.

94. Tunisia both manufactures and imports RAC equipment. Given the size of the Tunisian market, it is unlikely energy efficiency standards in the country will significantly influence the energy efficiency standards in other manufacturing countries that export equipment to Tunisia. An additional pilot project to enhance the energy efficiency of equipment manufactured by the enterprises that will be converted in the stage I of the country's KIP has the potential of allowing the country to develop best-in-class MEPS for such equipment.

RECOMMENDATION

95. The Executive Committee may wish to consider:

(a) Approving the pilot project to maintain and/or enhance the energy efficiency of replacement technologies and equipment in the context of HFC phase-down (non-investment activities) for Tunisia, in the amount of US $170,000, plus agency support costs of US $15,300 for UNIDO, noting:

(i) That the Government of the Tunisia has committed to the conditions referred to in decision 91/65(b)(iv)b. to (b)(iv)d.;

(ii) That the project would be operationally completed no later than 31 December 2027, and a detailed project report would be submitted to the Executive Committee within six months of the date of completion of the project; and

(b) Inviting the Government of Tunisia, if it so wishes, to submit an additional pilot project to enhance the energy efficiency of the HFC-32-based split air-conditioning units and R-600a-based cold-water dispensers manufactured by the manufacturing enterprises that were being converted in stage I of the country's Kigali HFC implementation plan, on the understanding that the additional pilot project be submitted no later than the 96th meeting.

Annex I

SCHEDULE OF HFC PHASE-DOWN AND HCFC PHASE-OUT COMMITMENTS AND FUNDING TRANCHES UNDER THE KIGALI HFC IMPLEMENTATION PLAN AND THE HCFC PHASE-OUT MANAGEMENT PLAN FOR TUNISIA

Kigali HFC implementation plan (stage I)

Row	Particulars	2024	2025	2026	2027	2028	2029	2030	Total
1.1	Montreal Protocol reduction schedule of Annex F substances (CO_2-eq tonnes)	2,367,840	2,367,840	2,367,840	2,367,840	2,367,840	2,131,056	2,131,056	n/a
1.2	Maximum allowable total consumption of Annex F substances (CO_2-eq tonnes)	2,367,840	2,367,840	2,367,840	2,367,840	2,367,840	2,131,056	1,803,694	n/a
2.1	Lead IA (UNIDO) agreed funding (US $)	1,526,566	0	0	435,875	0	0	104,740	2,067,181
2.2	Support costs for Lead IA (US $)	106,860	0	0	30,511	0	0	7,332	144,703
2.3	Cooperating IA (UNEP) agreed funding (US $)	50,000	0	0	45,000	0	0	15,000	110,000
2.4	Support costs for Cooperating IA (US $)	6,500	0	0	5,850	0	0	1,950	14,300
3.1	Total agreed funding (US $)	1,576,566	0	0	480,875	0	0	119,740	2,177,181
3.2	Total support costs (US $)	113,360	0	0	36,361	0	0	9,282	159,003
3.3	Total agreed costs (US $)	1,689,926	0	0	517,236	0	0	129,022	2,336,184

HCFC phase-out management plan (stage II)

Row	Particulars	2019	2020	2021	2022	2023	2024	2025	Total
1.1	Montreal Protocol reduction schedule of Annex C, Group I substances (ODP tonnes)	36.63	26.46	26.46	26.46	26.46	26.46	13.19	n/a
1.2	Maximum allowable total consumption of Annex C, Group I substances (ODP tonnes)	34.60	25.91	25.91	25.91	25.91	25.91	12.88	n/a
2.1	Lead IA (UNIDO) agreed funding (US $)	858,306	0	0	386,640	0	0	120,000	1,364,946
2.2	Support costs for Lead IA (US $)	60,081	0	0	27,065	0	0	8,400	95,546
2.3	Cooperating IA (UNEP) agreed funding (US $)	76,000	0	0	100,000	0	0	24,000	200,000
2.4	Support costs for Cooperating IA (US $)	9,880	0	0	13,000	0	0	3,120	26,000
3.1	Total agreed funding (US $)	934,306	0	0	486,640	0	0	144,000	1,564,946
3.2	Total support costs (US $)	69,961	0	0	40,065	0	0	11,520	121,546
3.3	Total agreed costs (US $)	1,004,267	0	0	526,705	0	0	155,520	1,686,492

Annex II

SIMULTANEOUS IMPLEMENTATION OF THE HCFC PHASE-OUT MANAGEMENT PLAN AND THE KIGALI HFC IMPLEMENTATION PLAN IN TUNISIA

Category of activity	HPMP stage II		KIP – stage I		HPMP+KIP combined cost (US $)
	Activity	Cost (US $)	Activity	Cost (US $)	
Investment components	Conversion project for two foam enterprises to phase out HCFC-141b contained in imported pre-blended	458,306			458,306
			Residential RAC manufacturing sector conversion project for seven enterprises	1,019,779	1,019,779
Policy and regulation	Ban on imports of HCFC-141b contained in pre-blended polyols; development of regulations related to the management of HCFCs and HFCs including stipulations related to recycling and reclamation, operating equipment based on these substances and end-of-life management, strengthening the quota system and banning the importation, manufacture or assembly of HCFC-based equipment	35,000	Regulation for the introduction of mandatory reporting through logbooks; regulation for taxing the imported HFCs and equipment containing them; regulation for taxing the imported HFCs and equipment containing them, based on the GWP plus green public procurement	45,000	80,000
			Regulation for equipment labelling (including domestic equipment; including information on HFCs; to be integrated in the license system in the future)	15,000	15,000
	Introduction and implementation of a technician certification scheme, training and testing materials, and supporting regulations	195,000			195,000
			Updating codes and standards for low-GWP alternatives and training of 100 environmental inspectors.	45,000	45,000
Customs and enforcement	Capacity building for customs: provision of 20 refrigerant identifiers and training for a total of 60 trainers and 125 customs officers on control of HCFC	200,000	Training of 200 customs officers on the control of HFCs; provision of 10 identifiers	100,000	300,000
Refrigeration and air-conditioning servicing sector	Train-the-trainer courses and training for technicians on good refrigeration practices, use of low GWP alternative refrigerants, recovery and recycling of refrigerants, support to the certification programme; update training materials	197,651	Update training curricula to include MAC systems; training and certification of 1000 technician s under updated system including 45 instructors on MAC systems	295,000	492,651

Category of activity	HPMP stage II		KIP – stage I		HPMP+KIP combined cost (US $)
	Activity	Cost (US $)	Activity	Cost (US $)	
	Provision of basic servicing toolkits and materials (i.e., tube cutters, wrench sets, flaring tools, safety gloves and goggles, basic leak detector) to 125 technicians	125,000			125,000
			Provision of tools and equipment for ten relevant RAC servicing workshops and end users having their own servicing personnel (big commercial surfaces, big industrial facilities, professional associations)	95,400	95,400
			MAC servicing: six training workshops for a total of 300 technicians of the MAC sector on good practices; provision of tools and equipment to seven relevant workshops of the MAC sector	95,300	95,300
Support training centres and Recovery, recycling and reclamation (RRR) system	Support for training centres including a maritime training centre with training tools and equipment Upgrade two refrigeration reclaim/recycling centres through provision of equipment (e.g., recovery and recycling units and different size-cylinders, vacuum pumps, scales, multimeters, basic tools)	268,989	Provision of tools and equipment to five training centers for correct handling of HFCs and alternatives (including recovery tools and training units) Provision of 200 recovery cylinders for the RRR centers	143,700	412,689
Awareness raising			Fourteen information and awareness raising events oriented to relevant end-users of relevant private and the public sectors on the alternatives to HFCs (supermarkets, agroindustry, fisheries, hotel associations, public administration, retailers of domestic devices)	68,600	68,600
			Women in the RAC sector: Five information and awareness raising events on the topic of women in the RAC servicing sector oriented to educational entities and the entrepreneurial sector	24,500	24,500
Technical assistance commercial refrigeration manufacturer			Technical assistance and tools for four commercial refrigeration manufacturers	31,976	31,976
Coordination and monitoring	Continuously monitoring the progress of the implementation of the HPMP	85,000	Project coordination, implementation, and monitoring	197,926	282,926
Total		**1,564,946**		**2,177,181**	**3,742,127**

Annex III

RESIDENTIAL RAC MANUFACTURERS PRODUCTS, CONSUMPTION, AND PHASE OUT

Enterprise	Product manufactured	Average consumption 2021-2023			
		R-410A (mt)	HFC-134a (mt)	R-410A CO_2-eq tonne	HFC-134a CO_2-eq tonne
Sicad Coala	Residential AC units	24.67	0.00	51,492	0
	Cold-water dispensers	0.00	4.00	0	5,720
Société New Star	Residential AC units	4.17	0.03[b]	8,698	38[b]
El Athir	Residential AC units	21.57	0.00	45,020	0
Société Industrielle Méga	Residential AC units	37.16	0.00	77,572	0
3 Stars Electronics	Residential AC units	7.70	0.00	16,077	0
Novatech West Point	Residential AC units	1.02	0.00	2,129	0
	Domestic freezers	0.00	0.00[c]	0	1.24[c]
Star One	Residential AC units	0.63[d]	0.00	1,322[d]	0
Subtotal eligible enterprises		*96.91*	*4.03*	*202,309*	*5,759*
Condor Tunisie[a]	Residential AC units	3.5	0.00	7,306	0
Total phase out		**100.41**	**4.03**	**209,616**	**5,759**

[a] Ineligible enterprise established after the cut-off date for eligible capacity.

[b] Consumption to be phased out but not proposed for inclusion in the conversion project.

[c] Small manufacturing of 88 units and very small consumption to be phased out not proposed for inclusion in the conversion project.

[d] Star One had not manufactured AC units in 2022 and 2023 due to particular market conditions, but the company is active and operational, and has launched a new manufacturing programme in 2024.