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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Ninety-third Meeting
Montreal, 15-19 December 2023
Item 9(d) of the provisional agenda¹

PROJECT PROPOSAL: JORDAN

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

Phase-down

- Kigali HFC implementation plan (stage I, first tranche)

UNIDO

¹ UNEP/OzL.Pro/ExCom/93/1

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS

Jordan

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

(II) LATEST ARTICLE 7 DATA (Annex F)	Year: 2022	844.52 mt	1,707,173 CO ₂ -eq tonnes
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(III) LATEST COUNTRY PROGRAMME SECTORAL DATA (CO₂-eq tonnes)								Year: 2022	
Chemical	Aerosol	Foam	Firefighting	AC and refrigeration			Solvent	Other	Total sector consumption
				Manufacturing		Servicing			
				AC	Other				
HFC-32				10,665		11,678			22,343
HFC-134a	3,518			57,701	27,999	345,803			435,020
HFC-227ea			94,990						94,990
R-404A				152,229		214,723			366,952
R-407C				16,252		67,864			84,116
R-410A				388,747		313,204			701,951
R-507A						1,801			1,801

(IV) AVERAGE 2020-2022 HFC CONSUMPTION IN SERVICING	466.70 mt	832,561 CO ₂ -eq tonnes
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(V) CONSUMPTION DATA (CO₂-eq tonnes)			
Baseline: average 2020-2022 HFC consumption plus 65% of HCFC baseline	2,808,101	Starting point for sustained aggregate reductions	TBD
CONSUMPTION ELIGIBLE FOR FUNDING			
Already approved	0	Remaining	TBD

(VI) ENDORSED BUSINESS PLAN		2023	2024	2025	Total
UNIDO	HFC phase-down (CO ₂ -eq tonnes)	0.0	0.0	0.0	0.0
	Funding (US \$)	266,860	0	0	266,860
UNDP	HFC phase-down (CO ₂ -eq tonnes)	0.0	0.0	0.0	0.0
	Funding (US \$)	0	444,870	0	444,870

(VII) PROJECT DATA		2023	2024	2025	2026	2027	2028	2029	2030	Total
Consumption (CO ₂ -eq tonnes)	Montreal Protocol limits	n/a	2,808,101	2,808,101	2,808,101	2,808,101	2,808,101	2,527,291	2,527,291	n/a
	Maximum allowable	n/a	1,809,703	1,707,013	1,596,587	1,492,613	1,393,191	1,367,791	1,278,531	n/a
Amounts requested in principle (US \$)	UNIDO Project costs	2,540,680	0	0	0	1,802,170	0	0	497,233	4,840,083
	UNIDO Support costs	177,848	0	0	0	126,152	0	0	34,806	338,806
Amounts recommended in principle (US \$)	Total project costs	2,540,680	0	0	0	1,802,170	0	0	497,233	4,840,083
	Total support costs	177,848	0	0	0	126,152	0	0	34,806	338,806
	Total funds	2,718,528	0	0	0	1,928,322	0	0	532,039	5,178,889

(VIII) Request for approval of funding for the first tranche (2023)		
Implementing agency	Funds recommended (US \$)	Support costs (US \$)
UNIDO	2,540,680	177,848
Total	2,540,680	177,848

Secretariat's recommendation:	Individual consideration
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PROJECT DESCRIPTION

1. On behalf of the Government of Jordan, UNIDO as the designated implementing agency has submitted a request for stage I of the Kigali HFC implementation plan (KIP), at the amount of US \$7,905,822, plus agency support costs of US \$553,408, as originally submitted.²
2. The implementation of stage I of the KIP will assist the Government of Jordan in meeting the target of 60.5 per cent reduction from its HFC baseline consumption by 1 January 2030.
3. The first tranche of stage I of the KIP being requested at this meeting amounts to US \$3,945,461, plus agency support costs of US \$276,182 for UNIDO, as originally submitted, for the period of January 2024 to December 2026.

Background

4. The Government of Jordan has ratified all amendments to the Montreal Protocol, including the Kigali Amendment on 16 October 2019. Jordan has an HCFC consumption baseline of 82.98 ODP tonnes or 1,247.0 metric tonnes (mt).

Status of implementation of the HCFC phase-out management plan

5. A demonstration project was approved for Jordan at the 60th meeting of the Executive Committee³ to phase out 8.06 ODP tonnes of HCFC-22 and HCFC-141b from the manufacturing of unitary air-conditioning (AC) equipment at Petra Engineering Industries Co.,⁴ at a total cost of US \$2,167,033, plus agency support costs.
6. Stage I of the HCFC phase-out management plan (HPMP) for Jordan was originally approved at the 65th meeting⁵ and revised at the 75th meeting⁶ to meet the 20 per cent reduction from the baseline by 2017, resulting in the phase-out of 17.44 ODP tonnes of HCFCs, at a total cost of US \$3,329,317,⁷ plus agency support costs. The demonstration project was also integrated into stage I of the HPMP.
7. Stage II of the HPMP for Jordan was approved at the 77th meeting⁸ to reduce HCFC consumption by 50 per cent from the baseline by 2022, at a total cost of US \$3,074,691, plus agency support costs. While stage II of the HPMP had been expected to be completed by December 2023, the Government of Jordan requested to extend the date of completion of the project to December 2024 to enable the completion of a train-the-trainers activity and the procurement of refrigerant identifiers.⁹
8. Stage III of the HPMP to completely phase out HCFC consumption by 1 January 2030 is planned for submission at the 94th meeting.

Status of implementation of HFC-related activities

9. At the 76th meeting, Jordan received funding to conduct a survey on the use of alternatives to ozone-depleting substances (ODSs) (US \$55,000), which was completed in November 2017. At the

² As per the letter of 24 August 2023 from the Ministry of the Environment of Jordan to UNIDO.

³ Decision 60/41

⁴ JOR/REF/60/INV/86

⁵ Decision 65/40

⁶ Decision 75/60

⁷ Funds associated with Middle East Complex for Engineering, Electronics and Heavy Industries PLC, which withdrew from stage I after original approval, were deducted from the total in the revised Agreement.

⁸ Decision 77/45

⁹ The extension has been requested in documents UNEP/OzL.Pro/ExCom/93/18 and UNEP/OzL.Pro/ExCom/93/19.

82nd meeting, the country received funding to implement the enabling activities for HFC phase-down (US \$150,000), which were completed in June 2022. Those activities assisted the country *inter alia* in ratifying the Kigali Amendment through capacity building and awareness raising; strengthening the HFC data collection and licensing system; developing technical support activities for the servicing sector including strengthening the recovery and reuse of HFCs, implementing a service technician certification system, and conducting awareness raising and information outreach on HFC-related provisions under the Kigali Amendment.

Stage I of the Kigali HFC implementation plan

Policy, regulatory and institutional frameworks

10. The national ozone unit (NOU) was established within the Ministry of Environment in 1993 as the national focal point for strategic, regulatory, and policy development related to the country's implementation of the Montreal Protocol. The NOU sets the policy agenda for the consumption of controlled substances and delineates feasible technologies and approaches, including providing advice to enterprises for controlling growth and for phase-out/phase-down as per agreed targets.

11. The Ministry of Environment controls imports of controlled substances under the Montreal Protocol through licensed importers; the project management unit (PMU) within the Ministry oversees project implementation.

12. Jordan's Customs Department is responsible for checking and monitoring imported chemicals according to the country's Harmonized System (HS) codes. It provides the NOU with records of annual imports and coordinates with the NOU on controlling and monitoring imports of controlled substances.

13. The National Ozone Committee, an advisory body to the NOU established within the Ministry of Environment, convenes annually to provide input on final import quotas. It consists of representatives from the Ministry of Trade and Industry, the Ministry of Planning and International Cooperation, the Customs Department in the Ministry of Finance, the Chamber of Industry, the Chamber of Commerce, the Ministry of Energy and Mineral Resources, the Ministry of Agriculture, Aqaba Special Economic Zone Area, and the Jordan Institute of Standard and Metrology. This inter-ministerial committee provides guidance to the NOU for preparing national ODS phase-out regulations and policies. Working groups are established as needed to evaluate proposed policies and make recommendations.

14. The Government considered measures for improving the monitoring and reporting of HCFCs following recommendations from a verification report conducted in 2019. The Government of Jordan reported that the country had been developing a system within the Customs Department allowing NOU approvals of HCFC imports to be obtained online, thereby improving monitoring and control of imports and reducing reporting discrepancies. The online reporting window was launched in January 2023 but has not yet been fully implemented.

15. The Government of Jordan has an HFC licensing system controlled and monitored by the NOU. HS codes for HFCs for 2022 were approved for use in January 2022; and the Government has a national database system for HFCs to meet all reporting requirements relating to the Kigali Amendment. The HFC quota system will be finalized and used for the allocation of quotas from 2024; the total HFC quotas will be estimated in CO₂-equivalent (CO₂-eq) tonnes and will be converted to metric tonnes for individual substances and allocated to different importers. The quota allocation and monitoring process for HFCs will ensure that the national targets for HFCs are not exceeded in any year.

16. The Government of Jordan has implemented minimum energy performance standards (MEPS) for AC appliances, refrigerators and freezers. The barriers to effective implementation of MEPS include the lack of market data to establish a baseline for energy consumption, lack of cost-benefit analysis for updating

MEPS, and resistance from local manufacturers to upgrade their manufacturing line to comply with MEPS. The Government has also enacted an energy-efficiency labelling system with ratings from class G to class A***; all AC appliances for sale in the domestic market must have energy-efficiency ratings of no less than level A effective 31 December 2016. Furthermore, there are tax exemptions for products with an energy-efficiency label of A and above, and other regulations relating to energy efficiency.

HFC consumption

17. Jordan only imports HFCs for use in the aerosol, firefighting, refrigeration manufacturing, AC manufacturing, and servicing sectors. In 2022, Jordan consumed R-410A (41.1 per cent of total HFC consumption in CO₂-eq tonnes), HFC-134a (25.5 per cent), R-404A (21.5 per cent), HFC-227ea (5.6 per cent), R-407C (4.9 per cent), HFC-32 (1.3 per cent), and R-507A (0.1 per cent). Table 1 presents the country's HFC consumption as reported to the Ozone Secretariat under Article 7 of the Montreal Protocol.

Table 1. HFC consumption in Jordan (2020–2022 Article 7 data)

Substance	GWP*	2020	2021	2022	Average	Share of HFC consumption in 2022 (%)
Mt						
HFC-32	675	2.61	1.60	33.10	12.44	3.9
HFC-134a	1,430	470.39	395.65	304.21	390.08	36.0
HFC-227ea	3,220	9.40	25.50	29.50	21.47	3.5
R-404A	3,922	77.13	80.90	93.57	83.87	11.1
R-407C	1,774	46.75	128.66	47.42	74.28	5.6
R-410A	2,088	110.40	156.67	336.26	201.11	39.8
R-507A	3,985	6.96	0.00	0.45	2.47	0.1
Total (mt)		723.64	788.98	844.52	785.72	100
CO₂-eq tonnes						
HFC-32	675	1,762	1,080	22,343	8,395	1.3
HFC-134a	1,430	672,658	565,780	435,020	557,819	25.5
HFC-227ea	3,220	30,268	82,110	94,990	69,123	5.6
R-404A	3,922	302,473	317,257	366,952	328,894	21.5
R-407C	1,774	82,927	228,224	84,116	131,756	4.9
R-410A	2,088	230,460	327,049	701,951	419,820	41.1
R-507A	3,985	27,736	0	1,801	9,846	0.1
Total (CO₂-eq tonnes)		1,348,284	1,521,499	1,707,173	1,525,652	100

*Global-warming potential

18. The consumption of HFC-134a is decreasing mainly due to the adoption of low-global-warming-potential (GWP) alternatives such as R-600a in domestic refrigerators and stand-alone commercial refrigeration equipment. In contrast, consumption of R-404A is increasing due to an increased demand for commercial refrigeration equipment, and consumption of HFC-32 and R-410A is increasing given increased manufacturing and sales of HFC-based air conditioners that are also replacing HCFC-22-based equipment. R-407C is used in air conditioner manufacturing by one enterprise. Consumption of R-407A, used in ice-cream making machines, is fluctuating based on market demand, and HFC-227ea is experiencing an increase due to post-COVID recovery in the installation of HFC-227ea-based firefighting systems.

Country programme implementation report

19. The sectoral HFC consumption data provided by the Government of Jordan in its country programme implementation report for 2022 is consistent with the data reported under Article 7 of the Montreal Protocol.

HFC distribution by sector

20. HFCs are consumed both in the manufacturing and servicing sectors. Analysis of average consumption of HFCs for the years 2020 to 2022 indicates that HFCs are consumed in the servicing (59.4 per cent in mt), refrigeration and air-conditioning (RAC) manufacturing (36.7 per cent), fire-fighting (2.7 per cent), and aerosol sectors (1.1 per cent), as shown in table 2. HFC-32, HFC-134a, R-404A, R-407C and R-410A are used to manufacture a range of RAC equipment.

Table 2. HFC consumption by sector and subsector (mt)

Sector	2020	2021	2022	Average
RAC manufacturing				
Domestic refrigeration	4.40	4.20	4.10	4.23
Commercial refrigeration	96.12	82.75	62.90	80.59
Transport refrigeration	5.54	10.08	12.17	9.26
Residential AC	65.22	118.53	169.27	117.67
Commercial AC (including chillers)	85.89	83.30	61.50	76.90
<i>Sub-total RAC manufacturing</i>	<i>257.17</i>	<i>298.86</i>	<i>309.94</i>	<i>288.66</i>
RAC servicing				
Mobile air-conditioning (MAC) service sector	116.60	121.09	125.30	121.00
RAC Service sector	329.27	330.50	377.32	345.70
<i>Sub-total RAC servicing</i>	<i>445.87</i>	<i>451.59</i>	<i>502.62</i>	<i>466.70</i>
Other sectors				
Aerosols	11.20	13.02	2.46	8.89
Firefighting	9.40	25.50	29.50	21.47
Total	723.64	788.97*	844.52	785.71

* Difference in total due to rounding.

21. In the case of the servicing sector, HFCs are mainly consumed in commercial refrigeration (32.4 per cent in mt and 38.2 per cent in CO₂-eq tonnes), followed by mobile AC (24.9 per cent in mt and 18.8 per cent in CO₂-eq tonnes), residential AC (24.1 per cent in mt and 23.8 per cent in CO₂-eq tonnes), commercial AC (16.8 per cent in mt and 17.4 per cent in CO₂-eq tonnes) and other subsectors, as shown in table 3.

Table 3. HFC consumption by servicing subsector (2022)

Sector		HFC-134a	R-404A	R-407C	R-410A	R-507A	HFC-32	Total	Share of total (%)
Mt									
Refrigeration and AC servicing									
Refrigeration subsectors									
Domestic		0.48	0.00	0.00	0.00	0.00	0.00	0.48	0.1
Commercial	Stand-alone units	94.71	44.46	0.00	0.00	0.45	0.00	139.62	27.8
	Condenser units	9.83	5.24	0.00	0.00	0.00	0.00	15.07	3.0
	Centralized systems	5.57	2.62	0.00	0.00	0.00	0.00	8.19	1.6
	<i>Subtotal</i>	<i>110.11</i>	<i>52.32</i>	<i>0.00</i>	<i>0.00</i>	<i>0.45</i>	<i>0.00</i>	<i>162.88</i>	<i>32.4</i>

Sector	HFC-134a	R-404A	R-407C	R-410A	R-507A	HFC-32	Total	Share of total (%)	
Industrial*	5.93	2.43	0.00	0.00	0.00	0.00	8.36	1.7	
<i>Subtotal Refrigeration</i>	<i>116.52</i>	<i>54.75</i>	<i>0.00</i>	<i>0.00</i>	<i>0.45</i>	<i>0.00</i>	<i>171.72</i>	<i>34.2</i>	
Air-conditioning subsectors									
Residential	0.00	0.00	3.44	100.20	0.00	17.30	120.94	24.1	
Commercial	0.00	0.00	34.82	49.84	0.00	0.00	84.66	16.8	
Mobile	125.30	0.00	0.00	0.00	0.00	0.00	125.30	24.9	
<i>Subtotal Air-conditioning</i>	<i>125.3</i>	<i>0.00</i>	<i>38.26</i>	<i>150.04</i>	<i>0.00</i>	<i>17.3</i>	<i>330.90</i>	<i>65.8</i>	
Total**	241.82	54.75	38.26	150.04	0.45	17.30	502.62	100	
Local installation and assembly**	25.56	29.24	12.19	17.44	0.00	0.00	84.43		
CO₂-eq tonnes									
Refrigeration and AC servicing									
Refrigeration subsectors									
Domestic	686	0	0	0	0	0	686	0.1	
Commercial	Stand-alone units	135,435	174,354	0	0	1,793	0	311,583	32.6
	Condenser units	14,057	20,549	0	0	0	0	34,606	3.6
	Centralized systems	7,967	10,275	0	0	0	0	18,240	1.9
	<i>Subtotal</i>	<i>157,459</i>	<i>205,178</i>	<i>0</i>	<i>0</i>	<i>1,793</i>	<i>0</i>	<i>364,429</i>	<i>38.2</i>
Industrial*	8,480	9,529	0	0	0	0	18,009	1.9	
<i>Subtotal Refrigeration</i>	<i>166,624</i>	<i>214,708</i>	<i>0</i>	<i>0</i>	<i>1,793</i>	<i>0</i>	<i>383,124</i>	<i>40.1</i>	
Air-conditioning subsectors									
Residential	0	0	6,102	209,168	0	11,678	226,947	23.8	
Commercial	0	0	61,765	104,041	0	0	165,806	17.4	
Mobile	179,179	0	0	0	0	0	179,179	18.8	
<i>Subtotal Air-conditioning</i>	<i>179,179</i>	<i>0</i>	<i>67,868</i>	<i>313,209</i>	<i>0</i>	<i>11,678</i>	<i>571,933</i>	<i>59.9</i>	
Total**	345,803	214,708	67,868	313,209	1,793	11,678	955,057	100	
Local installation and assembly**	36,551	114,668	21,618	36,406	0	0	209,248		

* Also includes transport refrigeration service.

** Local installation and assembly is included in total.

Air-conditioning sector

22. The AC market includes single-split units, multi-split units including variable refrigerant flow systems, packaged rooftop units and chillers. There are five manufacturers of residential air conditioners and three manufacturers of commercial air conditioners, mainly large split units, packaged units, and chillers. Manufactured equipment is both sold domestically and exported, and uses HFC-32, HFC-134a, R-407C and R-410A. The estimated average 2020-2022 consumption of these substances is 5.27 mt, 41.86 mt, 34.14 mt and 113.28 mt, respectively.

23. AC demand is driven by installations in new buildings, new installations in existing buildings (to increase the share of air-conditioned rooms), and the replacement of AC systems at their end-of-life. On a technology level, the trend is to use a ductless split unit with inverter-based technology.

Refrigeration sector

24. This comprises manufacturers of domestic refrigerators and commercial refrigeration equipment. Commercial refrigeration equipment includes stand-alone refrigeration systems like chest freezers and reach-in refrigerators (capacity range 0.26 to 1.2 kW), condensing units (2 to 20 kW) and centralized plants

that are primarily used in cold storage (40 to 200 kW). Transport refrigeration, which is included under commercial refrigeration, primarily includes refrigerated vans, trucks, and trailers.

25. There are five domestic refrigeration equipment manufacturers in Jordan that use HFC-134a and R-600a. There are 22 commercial refrigeration manufacturers of whom UNIDO categorized 20 as small- and medium-sized enterprises (SMEs).¹⁰ These enterprises consume HFC-134a and R-404A in manufacturing, with an estimated consumption of 80.59 mt. Around 82 per cent of the commercial refrigeration condensing and centralized refrigeration systems are locally manufactured by SMEs based on customer-specific designs. The average consumption of HFC-134a and R-404A in manufacturing transport refrigeration is 5.59 mt and 3.67 mt, respectively.

26. Demand for new equipment depends on population and economic growth, including possible post COVID-19 recovery.

Mobile air-conditioning

27. The use of HFC-134a dominates the MAC sector as all operational units and most newly sold units are HFC-134a-based, with a few new vehicles with HFO-1234yf recently introduced into the country. The consumption of HFC-134a was estimated based on consultations with MAC technicians and assuming that 90 per cent of registered vehicles are equipped with AC and 10 per cent of those undergo AC maintenance. The estimated number of MAC maintenance workshops is around 650.

28. The dependence on HFC-134a in the MAC sector is expected to continue for some time, with negligible amounts of HFO-1234yf currently being imported. Good servicing practices, including recovery, recycling, and reuse of refrigerants, can help reduce consumption; however, most MAC workshops do not have recovery machines and do not charge the proper amounts as indicated by vehicle manufacturers. The MAC technicians have not received training in good servicing practices under the HPMP.

29. The average consumption of HFCs in MAC servicing for the years 2020 to 2022 is 121 mt, as shown in table 2 (15.4 per cent of total consumption of HFCs in the country).

Firefighting equipment

30. The installation and servicing of firefighting equipment represents a small share of the total use of HFCs, with an average 2020-2022 consumption of 21.47 mt of HFC-227ea. There are eight enterprises involved in installing systems based on HFC-227ea, as it is safe to use and has the advantage of being a low-pressure system. Currently, HFC-227ea is specifically requested by customers.

Aerosol applications

31. Two enterprises, Middle East Pharmaceutical and Chemical Industries Co. and Imdad for Marketing and Distribution of Aesthetic Devices, use HFC-134a as a propellant in the manufacture of medical products. The average consumption of HFC-134a in manufacturing medical aerosol for 2020 to 2022 is 8.89 mt.

Servicing sector

32. The majority of workshops installing and servicing RAC in Jordan have an average of five employees that service a wide range of appliances; RAC equipment is typically only a small part of their business. Most service workshops are licensed and certified. In addition, there is a significant number of mobile maintenance workshops that operate out of vehicles to provide maintenance services. Major RAC

¹⁰ Designation by UNIDO to characterize enterprises that are smaller and have limited consumption. Jordan does not have a definition of SMEs that is specific to RAC manufacturing enterprises.

equipment brands have agents in all regions of the country; about 70 of these agents have their own service workshops while others outsource their servicing work.

33. There are about 1,556 workshops in the RAC sector, most of whom are in Amman, Zarqa, Irbid and Balqa. The total number of technicians in Jordan is estimated at 3,240. Approximately half of the technicians have gone through vocational schools and approximately 21 per cent through apprenticeship programmes, which indicates an established formal training system in the country.

34. Jordan has four types of training institutes as shown below.

- (a) *The Vocational Training Corporation (VTC)* is a government agency that provides vocational training for all occupational levels through proficiency programmes. VTC has 40 training institutes, 18 of which are for the RAC sector, and employ 40 trainers in the field of AC and refrigeration. These institutes are located in various regions of Jordan.
- (b) *The Ministry of Education* operates 15 industrial schools in the RAC sector and caters to both the manufacturing and servicing sectors. About 800 students graduate annually, and the RAC schools employ about 45 specialized teachers.
- (c) *Universities*: there are 32 public and private universities, out of which three offer RAC degrees (bachelor's and diploma). These universities have training workshops and coordinate with enterprises.
- (d) *Training centres in both the private and public sectors*: in addition to the above, there are several centres that provide training to RAC technicians; however, these centres are believed to have limited equipment and trainers.

35. Under stage II of the HPMP, a contract has been signed with the VTC for the training and certification programme for technicians. This activity was designed not only to enhance control measures for the handling of refrigerant gases but also to establish centres for the recovery, recycling, and reclaiming of refrigerants in order to reduce the demand for new refrigerant gases.

36. To ensure the effectiveness of the reclamation activities and to support the enforcement of relevant legislation, a comprehensive approach was adopted under the HPMP for the provision of recovery and recycling equipment to selected servicing workshops, along with training on the use of this equipment. Furthermore, comprehensive training on the proper handling and storage of refrigerant gases, including recovered and recycled gases, was provided. Monitoring of the reclamation centre ensures that used and reclaimed refrigerant gases are regularly transferred between the centre and the servicing workshops.

37. In collaboration with UNIDO and the NOU, three centres were identified in Amman, Irbid, and Aqaba. The necessary tools and equipment were delivered in September 2023 and are being distributed to the designated centres.

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

Overarching strategy

38. The Government of Jordan is submitting a request for funding of stage I of the KIP, which extends until 2030 to coincide with the last stage of the HPMP. Stage II of the KIP is expected to be submitted in 2028. Jordan is not presenting an overarching strategy for the whole KIP in the present document.

Established HFC baseline and proposed reductions

39. The Government of Jordan reported its Article 7 data for 2020-2022. By adding 65 per cent of the HCFC baseline in CO₂-eq tonnes to the average HFC consumption in 2020-2022, the established HFC baseline is 2,808,101 CO₂-eq tonnes, as shown in table 4.

Table 4. HFC baseline for Jordan (CO₂-eq tonnes)

Baseline calculation components	2020	2021	2022
HFC annual consumption	1,348,284	1,521,499	1,707,173
HFC average consumption in 2020-2022	1,525,652		
HCFC baseline (65%)	1,282,449		
HFC baseline	2,808,101		

40. Jordan's stage I strategy comprises a combination of conversion projects in RAC manufacturing, strengthening the RAC servicing sector through a combination of training and capacity building measures, and implementation of policies to control and monitor HFC consumption and implement a robust HFC licensing and quota system. Those activities would be implemented in parallel with the country's HPMP, which will be designed to minimise dependence on HFCs while phasing out HCFCs. Future stages of the KIP will address the firefighting and aerosol sectors.

41. The reduction in CO₂-eq tonnes is shown as a gradual decrease in table 5 below.

Table 5. HFC consumption limits proposed under stage I of the KIP for Jordan (CO₂-eq tonnes)

	2024	2025	2026	2027	2028	2029	2030
Montreal Protocol consumption limits	2,808,101	2,808,101	2,808,101	2,808,101	2,808,101	2,527,291	2,527,291
HFC control target under the KIP	1,604,898	1,522,929	1,433,226	1,349,974	1,271,273	1,195,785	1,109,544
Reduction from the baseline (%)	42.8	45.8	49.0	51.9	54.7	57.4	60.5

Proposed activities

42. The Government of Jordan proposes a strategy that focuses on sectors that were not supported under the HPMP, including MAC and domestic refrigeration, while building on synergies with the work under the HPMP.

RAC manufacturing sector

43. Stage I includes an investment project to eliminate the use of 158.74 mt (266,490 CO₂-eq tonnes) of HFC-134a, R-404A, and R-410A at six enterprises in the domestic refrigeration, commercial refrigeration, and residential AC subsectors. The enterprises manufacturing domestic refrigerators will convert to R-600a; enterprises manufacturing commercial refrigeration equipment will convert to R-290; and those manufacturing residential AC to HFC-32.

44. Jordan is also planning a technical assistance programme for SMEs in the commercial refrigeration manufacturing sector to upgrade their design and development capabilities and train their staff and installers on new low-GWP alternatives. The SME programme is not designed to eliminate consumption at those enterprises but to limit the growth of high-GWP refrigerants and prevent the phase-in of those refrigerants from the phase-out of HCFCs.

45. The proposed activities are as follows:

- (a) *Conversion project at six enterprises in the RAC manufacturing sector:* Conversion of four domestic refrigeration manufacturing lines, two commercial refrigeration manufacturing lines and four residential AC manufacturing lines to R-600a, R-290 and HFC-32, respectively (US \$5,310,122):

Table 6. Conversion in the RAC manufacturing sector, as submitted

Enterprise	Substance	Consumption (kg)	ICC [#] (US \$)	IOC [#] (US \$)	Total (US \$)
Domestic and commercial refrigeration					
Abu Haltam	HFC-134a	1,220	482,550	40,667	523,217
Exceed	HFC-134a	520	482,550	17,333	499,883
National Refrigeration Co. (NRC)	HFC-134a	5,500	482,550	98,083	580,633
Privatization Holding Co. (PHC)*	HFC-134a	200	0	0	0
Abdin	HFC-134a	1,600	482,550	66,000	548,550
	R-404A	7,200			
Sub-total (A)		16,240	1,930,200	222,083	2,152,283
Air-conditioning					
Abu Haltam	R-410A	30,300	490,650	151,500	642,150
Exceed	R-410A	77,600	490,650	388,000	878,650
PHC	R-410A	27,800	490,650	139,000	629,650
Yazan & Zahran	R-410A	6,800	490,650	34,000	524,650
Sub-total (B)		142,500	1,962,600	712,500	2,675,100
Sub-total (A+B) (US \$)					4,827,383
Contingency (US \$)					482,738
Total (US \$)**					5,310,122

* No funding was requested in the proposal as the enterprise was not ready to convert to HFC-32.

** Rounded off.

ICC: incremental capital costs; IOC: incremental operating costs.

- (b) *Technical assistance (TA) to SMEs in the commercial refrigeration manufacturing sector:* TA on the design and assembly of low-GWP equipment for 10 SMEs, including safety consideration and energy efficiency, and development of awareness-raising products related to the benefits of low-GWP equipment (US \$200,000).

Servicing sector

46. Jordan is requesting US \$1,495,700 to reduce HFC consumption in the servicing sector, based on the following sectoral and cross-cutting activities to limit the growth in high-GWP HFCs and decrease the HFC phase-in from HCFC phase-out:

Regulatory framework

- (a) *Strengthening the HFC licensing and quota system:* Provide support for assessing the quota strategy, implementing the electronic system for the management of HFC quota issuance and data reporting, and strengthening the HFC quota system by including quotas and/or prohibitions on the import of HFC-based equipment, as needed (US \$36,000);
- (b) *Strengthening record-keeping by enterprises:* Workshops for refrigerant importers on data reporting obligations, use of correct customs codes, preventing illegal trade, and accurate data reporting of HFC imports and uses, with monitoring of results from the implementation of the electronic management system (US \$10,000);

- (c) *Provision of refrigerant identifiers to customs:* Provision of eight identifiers to compliment the identifiers provided under the HPMP. Two identifiers will be reserved for training purposes (US \$41,300);
- (d) *Training of customs officers:* Training of 280 officers, both theoretical and practical, including the identification of HFCs, with an emphasis on participation by women. Disaggregated data on gender will be collected (US \$112,000);
- (e) *Strengthening HFC import records by customs:* Training of customs officers on recording HFC imports in the customs' electronic system, including strengthening the exchange of information on the import control of HFCs at the entry ports in the country (US \$15,000);
- (f) *Improving market monitoring, including surveys:* Site visits and inspections for the monitoring of HFCs and the equipment containing them, and a detailed survey of MAC subsector workshops and their HFC consumption (US \$50,000);
- (g) *Categorizing servicing workshops and independent operators:* Development of a database categorizing servicing workshops and independent operators handling HFCs (e.g., number of trained technicians, types of equipment serviced, use of recovery and recycling procedures); sensitization programmes targeted at end users on the different categories of workshops and operators and the services performed by the workshops in terms of refrigerant management (US \$25,000);
- (h) *Supporting the technician certification system:* Support for linking the global "Refrigerant Driver's License", a programme coordinated by UNEP and international associations providing certification to technicians on a global basis, with the NOU activities on training, including record-keeping in the database on technician training (US \$40,000);
- (i) *Demand-side management:* Awareness raising on low-GWP refrigerant-based equipment that includes creation of web a platform for guidance to customers on low-GWP energy-efficient products, labelling programme for equipment, outreach to different target audiences including retailers and equipment distributors, and an incentive programme for commercial refrigeration for the adoption of low-GWP energy-efficient technologies to increase the adoption of equipment using alternative refrigerants (US \$200,000);
- (j) *Awareness raising:* Awareness raising on regulatory updates under the KIP; campaign on the categorization of servicing workshops and advantages to end users associated with their use; campaigns in RAC subsectors to inform end users about low-GWP alternative technologies and their advantages; campaigns in the MAC sector on maintaining the AC units in the vehicles and on leakage reduction; promoting green procurement and maintenance among RAC equipment sellers and servicing agencies; photo contests promoting low-GWP technologies (US \$40,000);

Support for the servicing sector including the provision of tools for good servicing practices

- (k) *Provision of tools and equipment for technicians:* Provide tools (e.g., vacuum pump, leak detectors, pressure gauge) for good servicing practices and the safe adoption of alternatives to technicians identified in consultation with national stakeholders (US \$260,000);
- (l) *Upgrading of training centres for low-GWP alternatives:* Provide support to three training centres under the VTC to promote sustainable practices and establish an area that allows for the implementation of robust safety measures, including fire-suppression systems, gas-detection systems, emergency exits, and proper signage. The activity also updates the

staff on training techniques and the dissemination of knowledge to stakeholders (US \$75,000);

- (m) *Technician training*: Conduct 28 training sessions for 700 technicians, prioritizing the refrigeration and MAC subsectors and emphasizing gender balance (US \$210,000);
- (n) *Development of codes of practice and training curricula*: Update existing code of practice to include new technologies and add focus to the domestic refrigeration and MAC subsectors; update training curricula for AC and refrigeration and develop a new training curriculum for MAC. The development update will be done by a national consultant (US \$15,000);
- (o) *Provision of recovery tools to the refrigeration and MAC sectors*: Provide 45 sets of tools to SMEs and technicians for the refrigeration sector and 43 sets of tools to the MAC workshops (US \$246,400);

Refrigerant management including recovery and reclamation

- (p) *Support for the operation of reclamation centres*: Provide continued support to reclamation centres for the safe handling of refrigerants, including training personnel, updating safety measures, and establishing an area that allows for the implementation of robust safety measures, including necessary equipment (US \$50,000); and
- (q) *Storage facility for waste refrigerants*: Establish a central storage facility that can safely and securely store unusable recovered refrigerants that cannot be reclaimed (US \$70,000).

Project implementation, coordination and monitoring

47. The PMU has the overall responsibility for the management of projects in the manufacturing and servicing sector, including reporting on operational progress and financial status during implementation. A total of US \$900,000 is being requested for a period of seven years and this includes international consultants (US \$250,000); national consultants (US \$300,000); travel (US \$95,000); meetings (US \$160,000); and operational and other costs (US \$95,000).

Gender policy implementation

48. In line with the Multilateral Fund's operational policy on gender mainstreaming, the NOU will endeavor to ensure the participation of women in customs trainings, technician trainings and SME programmes under stage I of the KIP. While the NOU staff and environmental officers include women, the exact number of women in RAC servicing is currently unknown. Sensitization activities will focus on the inclusion of women in activities undertaken by the NOU during KIP implementation. To further strengthen the participation of women, the NOU will also sensitize stakeholders participating in KIP implementation on the gender mainstreaming policy.

Total cost of stage I of the Kigali HFC implementation plan

49. The total cost for stage I, as submitted, is US \$7,905,822. The cost of activities in the refrigeration servicing sector has been established in line with decision 92/37. The proposed activities and costs for stage I of the KIP are summarized in table 7.

Table 7. Stage I of the KIP for Jordan, as submitted

Particulars	Cost (US \$)	Phase-out (mt)	CE (US \$/kg)
Conversion at six manufacturing enterprises (including technical assistance to SMEs)	5,510,122	158.74	34.71
Support for policies and regulations	569,300	111.63	5.10
Support for servicing sector	806,400	158.12	5.10
Support for refrigerant management	120,000	23.53	5.10
PMU	900,000	0	n/a
Total	7,905,822	452.02	17.49

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

50. Stages II and III of the HPMP will be implemented in a coordinated manner with stage I of the KIP, which focuses primarily on HFC-consuming applications in refrigeration and MAC. The impact of the HFC phase-down on residential AC servicing and the implementation of recovery and recycling would be taken into consideration to ensure that activities are complementary and duplication is avoided.

51. Stage I of the KIP will be implemented in three tranches. The schedule of HFC phase-down, including the funding requested and targets, is presented in annex I to the present document. Annex I does not include the funding requests and targets for the HPMP for the country as stage II of the HPMP will be completed by 31 December 2024 and stage III will be submitted to the 94th meeting. Annex II provides a comparison of activities under the KIP and those expected to be submitted under stage III of the HPMP.

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

52. The first funding tranche of stage I of the KIP, in the amount of US \$3,945,461, will be implemented between January 2024 and December 2026 and will include the following activities:

RAC manufacturing sector

- (a) Conversion project at six enterprises in the RAC manufacturing sector (US \$2,675,061);
- (b) Technical assistance to SMEs in the commercial refrigeration manufacturing sector (US \$60,000);

Regulatory framework

- (c) Strengthening the HFC licensing and quota system including data reporting, record keeping, and a study on the implementation of bans in RAC manufacturing (US \$31,000);
- (d) Four training sessions for 120 customs officers on regulations relating to HFCs, monitoring and reporting of HFC imports and the HFC quota system, taking into consideration the gender mainstreaming policy (US \$48,000);
- (e) Improving market monitoring, including a survey in the MAC sector to collect initial data on HFC usage patterns, and updating the environment officers on monitoring HFCs (US \$20,000);
- (f) Developing a database categorizing servicing workshops using HFCs, and supporting the technician certification system by creating an e-based system that establishes an electronic link with the NOU database (US \$20,000);

- (g) Demand-side management that will cover preparing the strategy for customer and retailer programmes, planning and coordinating bans, and conducting the customer choice and retailer/installer sensitization programme (US \$90,000);
- (h) Awareness-raising on activities undertaken under the KIP (US \$15,000);

Support for the servicing sector including the provision of tools for good servicing practices

- (i) Provision of tools and equipment for technicians (US \$260,000);
- (j) Upgrading of training centres for low-GWP alternatives (US \$35,000);
- (k) Eight training sessions for 300 technicians while observing gender inclusion and provision of recovery tools to 88 refrigeration and MAC sector beneficiaries (US \$306,400);
- (l) Development of codes of practice and training curricula for the refrigeration sector (US \$15,000);

Refrigerant management including recovery and reclamation

- (m) Continued support to reclamation centres, including needs assessment, and rent and operation costs for a storage facility for waste refrigerants for three years (US \$50,000);

Project coordination and monitoring

- (n) Project coordination and monitoring (US \$320,000) with the following cost breakdown: international consultants (US \$100,000); national consultants (US \$100,000); travel (US \$35,000); meetings (US \$50,000); and operational and other costs (US \$35,000).

SECRETARIAT’S COMMENTS AND RECOMMENDATION

COMMENTS

53. The Secretariat reviewed stage I of the KIP for Jordan in light of the existing policies and guidelines of the Multilateral Fund, including decisions 91/38,¹¹ 92/37,¹² and 92/44,¹³ stage II of the HPMP, and the 2023-2025 business plan of the Multilateral Fund.

Overarching strategy

54. In line with decision 92/44, the Government of Jordan has submitted a letter confirming its commitment to support the HFC reductions under stage I of the KIP. The Government will achieve those reductions through a combination of investment and non-investment activities, including phasing out the consumption in RAC manufacturing at six enterprises, implementing a ban on the import and manufacture of HFC-based domestic refrigeration equipment, implementing the country’s HFC licensing and quota system, policy and regulatory support, and activities in the servicing sector. Jordan is included in the list of

¹¹ In the absence of the cost guidelines for HFC phase-down, to consider HFC individual investment projects and stage I of KIPs on a case-by-case basis, without setting a precedent for the cost guidelines or any future HFC individual investment projects and stage I of KIPs.

¹² Decision on the level and modalities of funding for HFC phase-down in the refrigeration servicing sector.

¹³ Proposals for projects that reduced HFC consumption in advance of Montreal Protocol targets could be considered on a case-by-case basis for countries that had a strong national level of commitment in place to support such reductions.

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.

Starting point for sustained reductions in HFC consumption

55. Jordan's HFC baseline for compliance is 2,808,101 CO₂-eq tonnes, as shown in table 4 above. The methodology for calculating the starting point for sustained reductions in HFC consumption is still under discussion. The Secretariat notes that the starting point will be established once the Executive Committee decides on the methodology for determining the starting point.

Addition of UNDP as a cooperating agency

56. On 22 October 2023, the Government of Jordan sent a letter to the Secretariat requesting inclusion of UNDP as a cooperating agency for stage I of the KIP. Given the progress in discussing the project proposal, as originally submitted, at the time the letter was received it was agreed to include UNDP as a cooperating agency when the second tranche was submitted.

Policy, regulatory and institutional frameworks

HFC licensing and quota system

57. Decision 87/50(g) requests the bilateral and implementing agencies, when submitting stage I of the KIPs, to include confirmation that the country has an established and enforceable national system of licensing and quotas for monitoring HFC imports/exports in place, consistent with decision 63/17. Accordingly, UNIDO confirmed that the Government of Jordan has an enforceable licensing system for HFCs and would implement a quota system for HFCs to ensure compliance with the targets from 2024 to 2030; the quotas will be determined in metric tonnes while maintaining compliance targets in CO₂-eq tonnes. Stage I of the KIP includes activities to strengthen and raise awareness on the HFC quota system.

58. The Government will implement a ban on the manufacture and import of HFC-based domestic refrigeration equipment upon completion of the conversion of the domestic refrigeration manufacturing lines. However, the Government was not in a position to implement a ban on residential AC manufacturing and commercial refrigeration manufacturing equipment as only some of the domestic manufacturing capacity in those subsectors was being converted under stage I of the KIP, and the country could meet its compliance targets without such bans.

Total project cost

59. UNIDO and the Secretariat had detailed discussions on the costs of the investment and non-investment components, keeping in view the limited manufacturing at some of the enterprises being converted under the project; the fact that only the larger enterprises manufacturing commercial refrigeration equipment would be converted under the project and that, therefore, there would be benefit to assisting SMEs also manufacturing such equipment to enhance the sustainability of the conversions and facilitate the uptake of low-GWP equipment in the market; and the need for additional TA, policy and regulatory support, and further strengthening of the servicing sector to ensure the Government was able to meet the ambitious targets proposed.

60. The following costs were agreed for the manufacturing conversions:

- (a) Noting that the domestic refrigeration manufacturers to be converted manufactured between 3,000 and 15,000 units per year, while manufacturers in other countries might manufacture 100,000s to 1,000,000s of units per year, technical assistance costs of US \$200,000 for the subsector;

- (b) For the conversion at the two enterprises manufacturing commercial refrigeration equipment, capital costs of US \$319,200 based on a R-290 charging unit, ultrasonic welding, leak detection, safety infrastructure, plant modifications, and contingencies for each enterprise. IOCs were agreed at US \$3.80/kg, resulting in agreed subsector costs of US \$365,180;
- (c) For the conversion at the four enterprises¹⁴ manufacturing residential air conditioners for which funding was requested, one enterprise had 98.2 per cent joint ownership with the United Arab Emirates; accordingly, it was agreed that the enterprise would convert using its own resources, in line with decision 23/14. Capital costs of US \$631,500 for the remaining three lines were based on an HFC-32 charging unit and supply system, leak detection, safety infrastructure, product testing, plant modifications, safety audit and contingencies for each enterprise. IOCs were agreed at US \$6.30/kg, resulting in agreed subsector costs of US \$1,040,370; and
- (d) Technical assistance to help ensure the uptake in the market of low-GWP refrigerant technologies in the converted subsectors (US \$200,000).

61. UNIDO had proposed technical assistance to 10 SMEs that manufactured and assembled commercial refrigeration equipment. Given that there were 23 SMEs manufacturing commercial RAC equipment in the country, and in order to ensure that all such enterprises could be assisted in a coordinated manner and thus help ensure both the uptake of low-GWP technologies and the sustainability of the manufacturing conversions, it was agreed to provide assistance to all the SMEs, resulting in agreed costs of US \$437,000. In addition, the Secretariat proposed US \$150,000 for regulatory and policy assistance to support the ban in the import and manufacture of HFC-based domestic refrigerators, and other policy development to facilitate the uptake of low-GWP, energy efficient alternatives and equipment.

62. Costs for the servicing sector were agreed at US \$2,007,525 based on an increase in the number of technicians (from 700 to 1,155) and customs and enforcement officers (from 280 to 462) to be trained, increase in tool kits (from 248 to 396) for good servicing practices and recovery and reuse to service technicians in the refrigeration and MAC sectors, and increase in the number of refrigerant identifiers for customs and enforcement from eight to 10.

63. The average HFC consumption in Jordan's servicing sector during the baseline years was 466.70 mt or 832,561 CO₂-eq tonnes. At the 92nd meeting, the Executive Committee agreed on funding at a level of up to US \$5.10/kg for countries with consumption above 360 mt in servicing (decision 92/37(b)(iii)). The Secretariat calculated the reductions associated with the servicing sector, regulatory and policy assistance, and TA using the methodology for converting US \$/kg to US \$/CO₂-eq tonnes in the servicing sector described in annex I of document 92/46,¹⁵ resulting in a cost-effectiveness in the servicing sector for Jordan of US \$2.86/CO₂-eq tonnes.

64. In line with other projects, the PMU costs were agreed at US \$440,008. Table 8 summarizes the agreed costs and associated reductions.

¹⁴ One enterprise did not request funding as it was not ready to convert to HFC-32.

¹⁵ Paper on the starting point for sustained aggregate reductions based on discussions at the 91st meeting in the contact group on the cost guidelines for the phase-down of HFCs (decision 91/64(a)).

Table 8. Agreed cost of activities to be implemented in stage I of the KIP for Jordan (US \$)

Particulars	Cost (US \$)	Phase-out (mt)	Phase-out (CO ₂ -eq tonnes)	CE (US \$/kg)
Manufacturing sector				
Domestic refrigeration	200,000	4.14	5,920	48.31
Commercial refrigeration	365,180	12.10	35,243	30.18
Residential air-conditioning	1,040,370	64.90	135,479	16.03
TA for adoption of low-GWP technology	200,000	39.22	69,959	5.10
Servicing sector and technical assistance				
Servicing sector	2,007,525	393.63	702,219	5.10
Regulatory and policy assistance	150,000	29.41	52,469	5.10
TA to 23 SMEs in commercial refrigeration	437,000	85.69	152,860	5.10
PMU	440,008	43.14	76,956	10.20
Total	4,840,083	672.22	1,231,104	7.20

65. The Secretariat notes that in the absence of cost guidelines for HFC phase-out, the manufacturing conversions included in the project have been reviewed on a case-by-case basis. Based on the information available at the time of review, the Secretariat considers that the agreed costs are the best estimates of the overall costs of the conversion; however, these estimates might change, according to the specific characteristics of participating enterprises, as more information becomes available. The Secretariat considers that approval of the project at the levels proposed above would not constitute a precedent.

66. In line with decision 92/44, the agreed costs and reductions to be achieved, the Government of Jordan proposes to achieve a 2030 consumption target of 1,278,531 CO₂-eq tonnes, representing a 54 per cent reduction from the country's HFC baseline for compliance.

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

67. Based on the agreed funding and associated activities for stage I, the implementation of the first tranche was adjusted to US \$2,540,680 based on the following activities: implementation of the manufacturing conversions at the domestic and commercial refrigeration enterprises and initiation of the conversion at the residential AC manufacturing enterprises (US \$1,163,680), and technical assistance for the adoption of low-GWP alternative technology (US \$80,000); initiating TA for 23 SMEs in commercial refrigeration (US \$200,000) and regulatory and policy assistance (US \$65,000); and activities in the servicing sector, including training of 120 customs and enforcement officers (US \$48,000); strengthening HFC controls and monitoring system, including the licensing system and market monitoring (US \$51,000); provision of tool kits to 114 service technicians (US \$250,000); training of about 150 technicians and upgrading the training curriculum (US \$105,000); provision of training equipment to one training centre on the safe use of HFC alternatives (US \$50,000); provision of recovery tools to 56 refrigeration and MAC service technicians (US \$155,000); technical support for reclamation centres and storage facility charges (US \$50,000); development of the servicing workshop database and support for technician certification (US \$20,000); promoting adoption of HFC alternatives and awareness-raising (US \$105,000); and project management and monitoring (US \$198,000). These activities will be implemented from January 2024 to September 2027.

Impact on the climate

68. The Secretariat was in the process of updating the Multilateral Fund Climate Impact Indicator (MCII). As that revision is not yet complete, the Secretariat is presenting the annual reductions in CO₂-eq tonnes associated with the conversions in the RAC manufacturing sector in table 9. The Secretariat has not estimated the climate benefits associated with any energy efficiency benefits in this calculation.

Table 9. Annual reduction in CO₂-eq tonnes in RAC manufacturing activities

Subsector	HFC consumption		Consumption of alternatives		Reduction (CO ₂ -eq tonnes)
	mt	CO ₂ -eq tonnes	mt	CO ₂ -eq tonnes	
Refrigeration*	16.24	34,338	8.12	24	34,313
Air-conditioning	64.90	135,479	48.68	32,856	102,623
Total	81.14	169,816	56.80	32,880	136,936

*Includes both domestic and commercial refrigeration equipment.

69. In addition to the benefits from the manufacturing conversions, the activities in the servicing sector, regulatory and policy assistance, and TA are expected to also reduce refrigerant emissions into the atmosphere, resulting in climate benefits. A calculation of the impact on the climate of the activities in the KIP indicates that by 2030, Jordan will have reduced its emissions by approximately 1,529,570 CO₂-eq tonnes of HFCs, calculated as the difference between baseline HFC consumption and the target proposed to be achieved by 2030.

Sustainability of the HFC phase-down and assessment of risks

70. The Secretariat considers the risks to the sustainability of the conversion in domestic refrigeration manufacturing to be low given the widespread adoption of R-600a technology in the country, in the region, and internationally; UNIDO had confirmed the financial viability of the manufacturing enterprises in the sector, noting that the enterprises also manufactured equipment other than domestic refrigerators. The risks to the sustainable conversion in residential AC manufacturing are more significant given the continued manufacturing in the country of R-410A-based equipment. In particular, the largest RAC manufacturing enterprise in the country, Petra Engineering, as well as NRC were not ready to convert their residential AC manufacturing to HFC-32 and therefore decided not to participate in the project; Exceed, while willing to convert to HFC-32, would not be obliged to convert to that technology as the enterprise is ineligible for funding and therefore would phase out its consumption with its own resources. In addition, while a number of Article 5 countries have successfully converted their residential AC manufacturing to HFC-32 technology, and there is widespread adoption of the technology in those regions, the uptake of HFC-32-based technology in Jordan and in the region appears to be more limited. The close monitoring of the conversion projects, and the TA, and regulatory and policy assistance proposed by the Secretariat are designed to mitigate that risk. Similarly, the conversion in the commercial refrigeration manufacturing sector entails risks given the continued manufacturing of equipment based on R-134a and R-404A in the country by SMEs. This risk is mitigated as the enterprises converted under the project are the largest manufacturers in the region, and thus are more likely to be able to both adopt the technology and help ensure its market uptake; in addition, close monitoring of the conversion projects, TA that specifically targets the SMEs, and regulatory and policy assistance will mitigate the risks to the sustainability of the conversions.

71. Regulations to control and monitor HFCs through the HFC licensing system are in place and funding for training customs and enforcement officers, including better HFC data management and reporting system, are included in stage I of the KIP. Improved servicing practices, including in the MAC sector, which had not been assisted since the CFC phase-out, awareness-raising, and technical, policy and regulatory assistance are expected to facilitate the uptake of low-GWP technologies and enhance the sustainability of the HFC phase-down.

72. Sustainability of the phase-down will be monitored through the periodic review and monitoring of implementation of activities under stage I of the KIP. In addition, market monitoring and surveys will be used to assess market adoption of low-GWP technologies and can help inform whether additional steps are necessary to achieve the specified targets and sustaining the HFC phase-down.

Co-financing

73. Owners in the manufacturing conversion project are expected to co-finance the portions of the project that will not be covered by the KIP project funding. The project does not include other co-financing.

2023-2025 business plan of the Multilateral Fund

74. UNIDO is requesting US \$4,840,083, plus agency support costs, for the implementation of stage I of the KIP for Jordan. The total value of US \$2,718,528, including agency support costs, requested for the period of 2023–2025, is US \$2,006,798 above the amount in the business plan.

Draft Agreement

75. A draft Agreement between the Government of Jordan 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.

76. If the Executive Committee so wishes, the funds for stage I of the KIP for Jordan 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.

RECOMMENDATION

77. The Executive Committee may wish to consider:

- (a) Approving, in principle, stage I of the Kigali HFC implementation plan (KIP) for Jordan for the period 2023-2030 to reduce HFC consumption by 54 per cent of the country's baseline by 2030, in the amount of US \$4,840,083, plus agency support costs of US \$338,806, for UNIDO, as reflected in the schedule contained in annex I of the present document;
- (b) Noting:
 - (i) That the Government of Jordan 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, the 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);
 - (iv) The commitment of the Government of Jordan to ban the import and manufacture of HFC-based domestic refrigeration equipment upon completion of the conversion projects in the subsector;
- (c) Also noting that, in line with the request from the Government of Jordan, UNDP would be added to stage I of the KIP as a cooperating agency when the second tranche was submitted;

- (d) Approving the first tranche of stage I of the KIP for Jordan, and the corresponding tranche implementation plan, in the amount of US \$2,540,680, plus agency support costs of US \$177,848, for UNIDO; and
- (e) Requesting the Government of Jordan, UNIDO and the Secretariat to finalize the draft Agreement between the Government of Jordan 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.

Annex I

**SCHEDULE OF HFC PHASE-DOWN AND FUNDING TRANCHES
UNDER THE KIGALI HFC IMPLEMENTATION PLAN FOR JORDAN**

Kigali HFC implementation plan (stage I)

Row	Particulars	2023	2024	2025	2026	2027	2028	2029	2030	Total
1.1	Montreal Protocol reduction schedule of Annex F substances (CO ₂ -eq tonnes)	n/a	2,808,101	2,808,101	2,808,101	2,808,101	2,808,101	2,527,291	2,527,291	n/a
1.2	Maximum allowable total consumption of Annex F substances (CO ₂ -eq tonnes)	n/a	1,809,703	1,707,013	1,596,587	1,492,613	1,393,191	1,367,791	1,278,531	n/a
2.1	Lead IA (UNIDO) agreed funding (US \$)	2,540,680	0	0	0	1,802,170	0	0	497,233	4,840,083
2.2	Support costs for Lead IA (US \$)	177,848	0	0	0	126,152	0	0	34,806	338,806
3.1	Total agreed funding (US \$)	2,540,680	0	0	0	1,802,170	0	0	497,233	4,840,083
3.2	Total support costs (US \$)	177,848	0	0	0	126,152	0	0	34,806	338,806
3.3	Total agreed costs (US \$)	2,718,528	0	0	0	1,928,322	0	0	532,039	5,178,889

Annex II

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

Category of activity	HPMP – stage III (indicative)*		KIP – stage I		Combined cost for HPMP+KIP (US \$)
	Activity	Cost (US \$)	Activity	Cost (US \$)	
RAC manufacturing sector			Conversion at six enterprises	1,605,550	1,605,550
RAC manufacturing sector			Technical assistance to SMEs, support for adoption of low-GWP alternatives and support for policies/regulations to reduce demand for HFC-based equipment	787,000	787,000
Provision of tools	Tools for service technicians in HCFC-based RAC applications	143,800	Provision of tools for all subsectors	576,825	720,625
Training of technicians cross-sectoral		112,500	Training of service technicians	210,000	322,500
Upgrading training centres			Additional equipment support to training centres	150,000	150,000
Development of code of practice			Updating codes for training curricula	15,000	15,000
Provision of recovery tools	Provision of recovery tools	980,000	Additional tools for recovery of refrigerants for MAC and refrigeration servicing	366,400	1,346,400
Continued support to reclamation centres			Technical support and tools to reclamation centres	50,000	50,000
Storage facilities for waste refrigerants			Support for storage facility for waste refrigerants	70,000	70,000
Strengthening of HFC licensing and quota system			Strengthening HFC licensing and quota system	36,000	36,000
Strengthening of record keeping by enterprises			Support for HFC data recording and reporting for importers	10,000	10,000
Provision of tools to customs	Provision of identifiers for customs	50,500	Procurement for additional identifiers for customs	41,300	91,800
Training of customs officers	Training of customs officers	112,500	Training of customs officers	112,000	224,500
Strengthening of customs records			Electronic data management for HFC imports	15,000	15,000
Improving market monitoring and surveys			Monitoring and conducting surveys for HFC control	50,000	50,000

	HPMP – stage III (indicative)*		KIP – stage I		Combined cost for HPMP+KIP (US \$)
Category of activity	Activity	Cost (US \$)	Activity	Cost (US \$)	
Categorizing service workshops			Categorizing service sector workshops and online data management of certified technicians	65,000	65,000
Demand side management			Demand side management to reduce adoption of high-GWP refrigerants	200,000	200,000
Awareness raising	Awareness raising	38,700	Awareness and outreach on adoption of HFC-free low-GWP alternatives	40,000	78,700
Coordination and monitoring	Coordination and monitoring	143,800	Coordination and monitoring	440,008	583,808
Total		1,581,800		4,840,083	6,421,883
Percentage of total (%)		24.6		75.4	100

*Activities will be designed to avoid duplication and maximise synergies with KIP implementation.