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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Ninety-fifth Meeting
Montreal, 4–8 December 2024
Item 9(d) of the provisional agenda[1]

PROJECT PROPOSAL: ARGENTINA

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

Air-conditioning (HFC)

• Phasing out R-410A in the residential air-conditioning manufacturing sector in Argentina	UNIDO	Individual consideration

[1] UNEP/OzL.Pro/ExCom/95/1

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

PROJECT EVALUATION SHEET – NON-MULTI-YEAR PROJECTS

Argentina

PROJECT TITLE	IMPLEMENTING AGENCY
Phasing out R-410A in the residential air-conditioning manufacturing sector in Argentina	UNIDO

NATIONAL COORDINATING AGENCY	National Ozone Unit (OPROZ), Ministry of the Environment

LATEST CONSUMPTION REPORTED FOR SUBSTANCES ADDRESSED BY THE PROJECT

A: ARTICLE-7 DATA (2023)

R-410A	841.88 mt	1,757,424 CO_2-eq tonnes

B: COUNTRY PROGRAMME SECTORAL DATA (2023)

R-410A	2,303.00 mt*	4,807,513 CO_2-eq tonnes

*Amount used, including 1,441 in manufacturing and 862 in servicing. Sourced from imports and locally manufactured.

HFC consumption remaining eligible for funding (mt)	TBD

CURRENT YEAR BUSINESS PLAN ALLOCATIONS	**Enterprise**	**Funding (US $)**	**Phase-out (mt)**
	Several	0	0

Particular	**Unit**	**R-410A**
HFC used at enterprises	mt	1,200.53
	CO_2-eq tonnes	2,506,112
HFC to be phased out through this project	mt	1,200.53
	CO_2-eq tonnes	2,506,112
HFC alternatives to be phased in	**Unit**	**HFC-32**
	mt	900.40
	CO_2-eq tonnes	607,770
Project duration (months)		36
Initial amount requested (US $)		7,709,518
Final project costs (US $)		
Incremental capital costs		5,907,050
Contingency (10 % of equipment)		577,505
Incremental operating costs*		*
Total project cost		6,484,555
Local ownership (%) (combined all enterprises)		87.9
Export component (%)		0
Requested grant (US $)		5,697,593
Cost-effectiveness	US $/kg	4.75
	US $/$CO_2$-eq tonne	2.27
Implementing agency support costs (US $)		398,832
Total cost of project to Multilateral Fund (US $)		6,096,425
Counterpart funding (Y/N)		Y
Project monitoring milestones included (Y/N)		Y

*Not requested

SECRETARIAT'S RECOMMENDATION	Individual consideration

PROJECT DESCRIPTION

1. On behalf of the Government of Argentina, UNIDO has submitted to the 95th meeting a project proposal to convert the manufacturing of residential air-conditioning (AC) units at six enterprises in Argentina from R-410A to HFC-32, at a total cost of US $7,709,518, plus support costs of US $539,666, as originally submitted.

Project objective

2. The project will eliminate 1,200.53 metric tonnes (mt) (2,506,112 CO_2-eq tonnes) of R-410A consumed annually by six residential AC manufacturers.

HFC consumption

3. In 2023, Argentina reported under Article 7 of the Montreal Protocol a total HFC consumption of 7,488 mt (15,743,179 CO_2-eq tonnes) of which the consumption of R-410A (i.e., imports) constitutes 11 per cent, both in metric tonnes and CO_2-eq tonnes. In addition to the reported imports of R-410A under Article 7, a large portion of the imports of HFC-125 and HFC-32 in Argentina have been used to manufacture R-410A since 2021.[2] When accounting for imports and locally manufactured R-410A, this substance represents 42 per cent in mt (43 per cent in CO_2-eq tonnes) of the 5,475 mt of HFCs reported as used in the different sectors in Argentina under the country programme implementation report (CP report).

4. Table 1 shows the level of R-410A used in residential AC manufacturing and in the servicing sector in Argentina, as reported in the CP report, the imports of R-410A reported under the Article 7 and an estimation of locally manufactured R-410A used in residential AC manufacturing and in the servicing sector.

Table 1. R-410A consumption and use in Argentina (2020–2023)

Year	2020	2021	2022	2023
Mt				
CP report				
Used in AC manufacturing	844	1,379	1,286	1,441
Used in servicing	896	735	860	862
Total use	**1,741**	**2,113**	**2,147**	**2,303**
Sourced by imports (Article 7)	1,712	661	665	842
Sourced by locally manufactured (estimated)	29	1,452	1,481	1,461
CO_2-eq tonnes				
CP report				
Used in AC manufacturing	1,762,101	2,877,954	2,685,214	3,007,921
Used in servicing	1,871,423	1,533,352	1,795,918	1,799,592
Total use	**3,633,523**	**4,411,307**	**4,481,132**	**4,807,513**
Sourced by imports (Article 7)	3,573,737	1,379,608	1,388,876	1,757,425
Sourced by locally manufactured (estimated)	59,786	3,031,699	3,092,256	3,050,088

5. In 2023, the refrigeration servicing sector was the largest user of HFCs (56 per cent in mt and 60 per cent in CO_2-eq tonnes of all sectoral uses reported under the CP report) followed by the residential AC manufacturing sector (26 per cent in mt and 27 per cent in CO_2-eq tonnes). Both sectors used imported and locally manufactured R-410A, as shown in table 1. There is no use of R-410A other than AC manufacturing and servicing.

[2] R-410A is constituted of 50 per cent HFC-125 and 50 per cent HFC-32.

Established HFC baseline

6. The HFC consumption baseline for Argentina was established at 19,219,484 CO_2-eq tonnes, as shown in table 2.

Table 2. HFC baseline calculation for Argentina (CO_2-eq tonnes)

Baseline calculation components	2020	2021	2022
HFC annual consumption	12,190,682	8,933,937	16,648,586
HFC average consumption in 2020–2022			12,591,068
HCFC baseline (65 per cent)			6,628,416
HFC baseline			**19,219,484**

Preparation of the Kigali HFC implementation plan

7. Argentina ratified the Kigali Amendment on 22 November 2019. The country received funds at the 74th meeting to conduct a survey on ODS alternatives; at the 81st meeting for enabling activities for HFC phase-down and for an investment project for the replacement of HFC-134a with R-600a/R-290-based refrigerant in the manufacture of domestic and commercial refrigeration equipment at three enterprises; and at the 87th meeting for a plan for the control and phase-out of HFC-23 emissions in production of HCFC-22. Project preparation for stage I of the Kigali HFC implementation plan (KIP) was approved at the 88th meeting and the KIP, which is currently under preparation, aims to freeze HFC consumption by 2024 and achieve a reduction of 10 per cent from the established baseline by 2029.

8. The current project proposal was prepared without preparatory funding and is submitted in line with decision 87/50(e) on assistance to Article 5 countries that choose to implement individual HFC investment projects in advance of submitting stage I of their KIP.

Sector and enterprise background

9. The residential AC manufacturing sector in Argentina is one of the largest consumers of HFCs in Argentina. The demand for residential AC is covered almost entirely by local manufacturers (94.3 per cent), while only 5.7 per cent of the units are imported. Enterprises in the sector are located in the south of the country where industry can benefit from tax incentives. Given the residential AC manufacturing sector's predominant role in HFC consumption patterns in Argentina, the Government considers the conversion of this sector critical to achieving compliance with the Montreal Protocol control target in 2029.

10. There are seven enterprises in the sector manufacturing residential AC units by assembling imported kits with components manufactured by them, charging, testing and packaging. All the enterprises use exclusively R-410A as refrigerant. All seven enterprises manufacture window and split units with different cooling capacities ranging from 2.5 kW to 6.9 kW. These products are exclusively sold in the domestic market, with none destined for export. All enterprises have demonstrated economic stability, viable technological process and equipment, and marketable products.

11. The enterprises also have networks of authorized independent servicing workshops to install and service their appliances. Because price is a critical variable in the local market, enterprises carefully evaluate any technical adjustment in manufacturing technology and equipment to ensure that competitive prices are maintained.

12. Five of the seven enterprises are entirely owned by Argentine entities, and from the remaining two, one has partial ownership by a non-Article 5 country and the other one is owned by another Article 5 country with partial ownership with a non-Article 5 country.

13. All these enterprises are committed to beginning the conversion in early 2025, aiming to achieve complete phase-out of R-410A by 2028. One of the enterprises (Carrier Fueguina) has already started manufacturing with HFC-32 in one of its lines and will finalize the conversion of the entire plant without requesting funding from the Multilateral Fund. An overview of the manufacturing capacity and R-410A consumption are listed in table 3.

Table 3. Overview of residential AC manufacturing enterprises in Argentina

Enterprise	Year of establishment	Article 5 ownership (%)	Number of lines	Production (units/year)	R-410A consumption (kg)
				average 2021–2023	
Enterprises participating in the project					
Aires de Sur	2006	100.00	2 outdoor/1 indoor	107,680	90,035
BGH	1988	61.94	2 outdoor/2 indoor	374,485	386,730
Electrofueguina	1988	100.00	1 outdoor/1 indoor	49,490	52,651
Newsan	1991	100.00	3 outdoor/3 indoor	493,369	440,331
Radio Victoria	1947	100.00	2 outdoor/2 indoor	186,424	151,860
Solnik	2012	100.00	1 outdoor/1 indoor	87,664	78,925
Total			**11 outdoor/10 indoor**	**1,299,112**	**1,200,533**
Self-funded conversion					
Carrier Fueguina		52.16		121,209	113,514
Grand total				**1,420,321**	**1,314,046**

Enterprise-level HFC consumption

14. The participating enterprises have different manufacturing lines, both indoor, and outdoor, where both refrigerant charging and testing are done. The enterprises assemble kits, mostly sourced from reputable and well-established manufacturers in China, comprising compressors, condensing units and evaporators, while cabinets and tubing can be manufactured or assembled in-house. The average annual sector's output for the last three years was 1,420,321 AC units, with a consumption of 1,314.05 mt of R-410A in a wide variety of products having an average refrigerant charge of around 900g as described in table 4.

Table 4. Residential AC units manufacturing and R-410A consumption levels per enterprise

Enterprise	Production (units/year) and consumption (kg)	2018	2019	2020	2021	2022	2023	Average 2021–2023
Aires de Sur	Units produced	85,375	21,969	85,033	128,582	71,324	123,133	107,680
	R-410A consumed	72,192	18,125	62,468	108,455	60,348	101,301	90,035
BGH	Units produced	230,950	217,587	218,592	389,576	311,469	422,410	374,485
	R-410A consumed	220,886	207,524	219,200	393,387	329,947	436,857	386,730
Electro-fueguina	Units produced	55,127	39,534	40,121	51,175	42,987	54,309	49,490
	R-410A consumed	61,273	42,364	41,365	55,142	45,820	56,992	52,651
Carrier Fueguina	Units produced	108,580	42,032	87,734	116,811	144,811	102,005	121,209
	R-410A consumed	100,461	45,469	87,626	113,406	132,746	94,389	113,514
Newsan	Units produced	470,139	291,376	317,425	449,336	497,011	533,759	493,369
	R-410A consumed	391,323	221,359	277,552	398,976	453,328	468,689	440,331
Radio Victoria	Units produced	146,810	112,172	119,818	182,947	173,997	202,329	186,424
	R-410A consumed	140,356	98,373	94,273	156,743	146,225	152,613	151,860
Solnik	Units produced	11,044	26,320	70,944	101,139	73,266	88,587	87,664
	R-410A consumed	7,199	23,492	58,545	89,420	63,411	83,944	78,925
TOTAL	**Units produced**	**1,108,025**	**750,990**	**939,667**	**1,419,566**	**1,314,865**	**1,526,532**	**1,420,321**
	R-410A consumed	**993,690**	**656,706**	**841,029**	**1,315,529**	**1,231,825**	**1,394,785**	**1,314,046**

15. The enterprises apply a similar manufacturing process with variations in quality control and manufacturing equipment. The manufacturing process consists of preparing copper tubes, capillary manufacturing, inspection of the kits received, welding of pipe assembly, printed circuit board (PCB)

manufacturing, electric box assembly, outdoor unit manufacturing (including inter alia assembly of components, charging of refrigerant, leak check, performance and others tests, and packing), and indoor unit manufacturing (including inter alia electric box assembly, evaporator assembly, indoor unit assembly, safety check, cleaning and packing).

Project description

16. The proposal requests funds for the conversion of the manufacturing lines at the enterprises Aires de Sur, BGH, Electrofueguina, Newsan, Radio Victoria, and Solnik.

17. The alternative technology was selected based on a combination of criteria including availability, maturity, cost-effectiveness, technical and environmental properties, energy efficiency, safety, flammability, toxicity, market acceptance, and country-specific conditions. HFC-32 was selected as the alternative technology for the conversion as it offers a good balance of high efficiency and lower GWP than R-410A, combined with mild flammability. At present, local safety standards and regulations in Argentina restrict the use of R-290 and other hydrocarbon (HC) refrigerants, which constitutes an impediment to selecting HC-based alternatives.

18. Conversion from R-410A to HFC-32 in AC manufacturing requires several adaptations due to component compatibility, lower use of refrigerant and safety considerations related to flammability. This includes:

(a) Modifications in the refrigerant storage area with installation of A2L[3]-compliant tanks, isolation of the area, ensuring explosion-proof electric equipment, ventilation and leak detection, installation of welded refrigerant pipelines certified for flammables, and replacing refrigerant transfer pumps with explosion-proof models;

(b) Modifications in the manufacturing line with the provision of charging units designed and certified to operate with flammable refrigerants to replace current units, provision of ultrasonic welding machine, and adaptation of the production process to operate with flammable refrigerants, including installation of ventilation system, sensors to monitor airflow and leak detection (including industrial and hand-held units) in the refrigerant charging and performance test areas, and provision of refrigerant recovery and recycling unit for flammable refrigerants;

(c) Modifications to plants layout (baseline equipment and structures) including installation of grounding, antistatic floors, encapsulations, and safety walls around hazardous areas, installation of explosion-proof electrical switches, motors and connections, and training technical staff and operators; and

(d) Securing third party safety certification (TÜV in line with the applicable international safety standards, regulations and guidelines), obtaining relevant permits by local authorities (re-registration of the plant using technology with flammable refrigerants, and redesign, approval and certification of new appliances containing flammable refrigerant).

Project costs

19. The above required modifications are proposed to be applied to each of the plants and manufacturing lines included in the project, with differences based on the equipment existing in the baseline (e.g., several of the enterprises already have items that could be suitable for HFC-32), and manufacturing

[3] Under the ASHRAE (American Society of Heating, Refrigeration and Air-conditioning Engineers) safety standard, A2L refers to refrigerants that have lower toxicity, and lower flammability, based on lower flammability limit (LFL) testing, heat of combustion, and burning velocity measurement.

capacity. The project proposal included detailed information on all relevant baseline equipment for the storage area and manufacturing lines, including serial number, model and procurement dates.

20. Funds are requested for the adaptation of the storage areas and the manufacturing lines including inter alia storage tank area adaptations, refrigerant pipelines and pneumatic refrigerant pumps, provision of refrigerant charging stations, ultrasonic welding and leak detectors; layout and safety modifications including ventilation and sensors; training of the servicing team; a safety audit; and contingencies. The requested incremental capital costs (ICCs), shown in table 5 as originally submitted, stood at US $7,709,518.

Table 5. ICCs proposed for the conversion of six residential AC enterprises in Argentina

Item		Aires de Sur	BGH	Electro-fueguina	Newsan	Radio Victoria	Solnik	Total
Storage tank area upgrade		195,000	310,000	195,000	310,000	195,000	155,000	1,360,000
Refrigerant charging machine for flammable refrigerant		140,000	560,000	140,000	420,000	140,000	70,000	1,470,000
Refrigerant leak detectors		1,700	148,250	55,700	94,250	93,400	1,700	395,000
Ultrasonic welding machine		-	-	31,000	-	-	-	31,000
Ventilation system, safety monitoring and alarm for refrigerant storage, refrigerant charging, and performance test areas		178,000	670,000	208,000	502,000	335,000	-	1,893,000
Safe HFC-32 extraction and recycling for test areas		21,500	64,500	21,500	64,500	43,000	-	215,000
Modification to plants layouts (baseline equipment and structures)		110,000	330,000	82,500	330,000	220,000	110,000	1,182,500
Freight, installation, commissioning, spare parts and technical assistance		142,120	274,620	112,696	245,660	138,112	80,936	994,144
Safety certification (TÜV)		25,000	50,000	25,000	50,000	50,000	25,000	225,000
Subtotal equipment		*813,320*	*2,407,370*	*871,396*	*2,016,410*	*1,214,512*	*442,636*	*7,765,644*
Re-registration of plant and redesigned products with HFC-32		14,000	37,000	14,000	32,000	23,000	14,000	134,000
Project monitoring, expert on flammable refrigerant, staff training		7,000	7,000	7,000	7,000	7,000	7,000	42,000
Subtotal		**834,320**	**2,451,370**	**892,396**	**2,055,410**	**1,244,512**	**463,636**	**7,941,644**
Contingency (10%)		83,432	245,137	89,240	205,541	124,451	46,364	794,165
Total ICC		**917,752**	**2,696,507**	**981,636**	**2,260,951**	**1,368,963**	**510,000**	**8,735,809**
A5 ownership (%)		100	61.94	100	100	100	100	
Total Fund requested		**917,752**	**1,670,216**	**981,636**	**2,260,951**	**1,368,963**	**510,000**	**7,709,518**
Consumption	Mt	90.03	386.73	52.65	440.33	151.86	78.93	1,200.53
	CO_2-eq tonnes	187,947	807,300	109,910	919,191	317,008	164,756	2,506,112
Cost-effectiveness	(US $/kg)	10.19	4.32	18.64	5.13	9.01	6.46	6.42
	(US $/$CO_2$-eq t)	4.88	2.07	8.93	2.46	4.32	3.10	3.08

21. No funding for the incremental operating costs (IOCs) is being requested from the Multilateral Fund. Based on the price information received from the kit and refrigerant suppliers, the decreased cost of refrigerant charge is offset by the increased cost of the components and additional plant operating costs.

22. Based on the funding request, the overall cost-effectiveness of the conversion from the use of R-410A to HFC-32 in six residential AC manufacturing enterprises in Argentina, implemented over a period of 36 months, amounts to US $6.42/kg and is set to eliminate 1,200.53 mt (2,506,112 CO_2-eq tonnes) of R-410A. Table 6 presents a summary of project costs and expected outcomes, as submitted.

Table 6. Total costs requested for the conversion of six residential AC manufacturing enterprises in Argentina

Item		Cost in US $
ICCs		**7,709,518**
IOCs		0
Total requested		**7,709,518**
HFC phase-out from the six enterprises funded	Mt	1,200.53
	CO_2-eq tonnes	2,506,112
Cost-effectiveness	(US $/kg)	6.42
	(US $/$CO_2$-eq tonne)	3.08

Energy efficiency

23. The proposal does not include a component to enhance energy efficiency. The enterprises' kit suppliers have developed kits for HFC-32 and are able to supply the latest designs including energy-efficient products using inverter technology. The enterprises have shown interest in the prospect of introducing energy-efficient products in the market and all of them are manufacturing an increasing share of inverter-type split units.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

Relationship to stage I of the Kigali HFC implementation plan and the sustainability of HFC reductions

24. The Secretariat acknowledges that the project proposal for the phase-out of R-410A in the manufacturing of residential AC in Argentina, submitted in line with decision 87/50(e) in advance of stage I of the KIP, has been formulated without preparatory funding. UNIDO confirmed that the preparation of stage I of the KIP for Argentina is ongoing and scheduled to be submitted in 2025. The present project is one of the activities considered as part of the strategy for stage I of the KIP and it is submitted in advance to ensure that its implementation will begin in 2025 and contribute to achieving compliance with the 2029 reduction target.

25. The project will ensure the complete conversion of the sector in Argentina and enable the Government to establish, upon completion, a ban on the import and manufacturing of R-410A-based residential air conditioners, making the transition to HFC-32 sustainable.

26. Regarding the project implementation risks, UNIDO confirmed that each enterprise had provided a commitment letter to implement the project promptly upon approval. Drawing from past experience with these enterprises during the HCFC-22 to R-410A conversion project—whose production lines have operated successfully for over a decade since completion—as well as discussions with technical and managerial staff, UNIDO concluded that each enterprise has the necessary skills, personnel, and expertise to implement the project on time. No financial risks were identified. Additionally, ongoing activities in the servicing sector will support the proper adoption of the technology; OPROZ is implementing a national programme to train and certify technicians in handling flammable refrigerants. Currently, approximately 950 technicians have been trained, with 450 already certified.

Deduction of HFC reductions from the starting point

27. The phase-out of 2,506,112 CO_2-eq tonnes (1,200.53 mt) of R-410A resulting from the approval of the present project will count against the consumption eligible for funding identified in the KIP. As the project will ensure the complete phase-out of R-410A in the manufacturing of residential AC, the self-funded phase-out of 236,960 CO_2-eq tonnes (113.51 mt) of R-410A by Carrier Fueguina will also

count against the consumption eligible for funding identified in the KIP. Accordingly, once the starting point for sustained aggregate reduction in HFC consumption is established, the reductions proposed by this project will need to be deducted in accordance with the methodology agreed under the HFC cost guidelines (currently under discussion).

Cut-off date

28. The project proposal provided evidence that all manufacturing lines included for assistance had been installed and had initiated manufacturing before the cut-off date for eligible capacity of 1 January 2020 established in paragraph 17 of decision XXVIII/2 of the Parties and incorporated in the draft HFC cost guidelines. All relevant baseline equipment was provided including date of installation as well as six-year production figures.

Second-stage conversions

29. At its 61st meeting, the Executive Committee approved funding[4] to convert the manufacturing of residential AC at Aires del Sur, BGH, Electrofueguina, Newsan and Radio Victoria from HCFC-22 to R-410A, phasing out 972 mt (53.46 ODP tonnes) of HCFC-22. Solnik has not received Multilateral Fund assistance. In line with the principle relating to second and third conversions reflected in paragraph 18 of decision XXVIII/2 of the Parties and incorporated into the draft HFC cost guidelines, all the enterprises included in the project are eligible for funding.

Proposed and revised costs

30. The Secretariat noted that the proposal as submitted was cost-effective and had only included items that were incremental. For example, for the enterprise Solnik no funds had been requested for leak detectors, ventilation systems, sensors, alarm systems, and HFC-32 recovery units because these items were already in its baseline. It was also noted that an ultrasonic welding machine (agreed at US $30,000) had only been requested for one enterprise (Electrofueguina) as all the other enterprises already had this item in their baseline.

31. The Secretariat and UNIDO discussed in detail each of the items required for the conversion at the six manufacturing enterprises, including their unitary cost and the number of items required based on the number of manufacturing lines, equipment in the baseline and capacity. In reviewing the equipment and safety measures proposed, the Secretariat noted that even though the project had been designed to adopt A2L refrigerant (i.e., HFC-32), the equipment and safety measures proposed would also be suitable to manufacture AC units with R-290 (classified as A3[5] refrigerant). Upon discussion on this matter, UNIDO confirmed that on the basis of the equipment requested, if the beneficiary enterprises decide to transition to R-290 at a future date, they will not request funding to replace the equipment provided through this project. The Secretariat notes that the enterprises would still be eligible to receive IOCs, if required, as they are not being requested under the present project.

32. The main adjustments agreed to the costs were related to the modifications to the storage tank area, refrigerant pipeline and transfer pumps, with an overall reduction from US $1,360,000 to US $800,000 due to the possibility to procure tanks, pipes and pneumatic pumps at a lower price; a reduction in the unitary cost of the charging machines and the number of units needed (for the two largest enterprises from 8 to 6 and from 6 to 4) resulting in an overall reduction from US $1,470,000 to US $1,105,000; and a reduction from US $1,182,500 to 537,500 in the cost of the modifications to the plants to adopt flammable technology (changes of layout, grounding, antistatic floor in hazardous areas, new layout of equipment, installation of

[4] Projects ARG/REF/61/INV/163 and ARG/REF/61/INV/163; decision 61/34.

[5] Under the ASHRAE safety standard, A3 refers to refrigerants that have higher flammability, based on LFL testing, heat of combustion, and burning velocity measurement.

encapsulations, safety walls around the hazardous areas, explosion-proof electrical switches, motors and connections).

33. Additional smaller adjustments were agreed for the cost of leak detectors, the ultrasonic welding machine, the explosion-proof recovery and recycling units, installation costs, and obtention of safety audit and relevant certifications to operate with flammable refrigerants. No funds were recommended for storage tanks for two enterprises that currently rent them rather than owning them. The adjustments made to the equipment and adaptations related to safety were minor, noting that the infrastructure being installed in the plants will also be suitable for R-290 and the enterprises would not request these items in the event they convert to this technology in the future. The cost of US $42,000 requested for the monitoring of the project by an international expert and provision of training to the plants staff was maintained as submitted, given the level of work required to provide the expertise to six enterprises to handle flammable refrigerants and also noting that there is not project monitoring unit.

34. The revised costs of the conversion of the residential AC manufacturing at six enterprises in Argentina are shown in table 7.

Table 7. Agreed costs of the conversion to HFC-32 of six residential AC manufacturing enterprises

		Aires de Sur	BGH	Electro-fueguina	Newsan	Radio Victoria	Solnik	Total
Storage tank area upgrade		100,000	190,000	125,000	190,000	125,000	70,000	800,000
Refrigerant charging machine for flammable refrigerant		130,000	390,000	130,000	260,000	130,000	65,000	1,105,000
Refrigerant leak detectors		1,700	124,250	46,700	79,250	78,400	1,700	332,000
Ultrasonic welding machine		-	-	28,000	-	-	-	28,000
Ventilation system, safety monitoring and alarm for refrigerant storage, refrigerant charging, and performance test areas		178,000	670,000	149,000	502,000	299,000	-	1,798,000
Safe HFC-32 extraction and recycling for test areas		16,500	49,500	16,500	49,500	33,000	-	165,000
Modification to plants layouts (baseline equipment and structures)		50,000	150,000	37,500	150,000	100,000	50,000	537,500
Freight, installation, commissioning, spare parts and technical assistance		96,120	251,875	101,770	217,575	125,040	67,170	859,550
Safety certification (TÜV)		25,000	25,000	25,000	25,000	25,000	25,000	150,000
Subtotal equipment		*597,320*	*1,850,625*	*659,470*	*1,473,325*	*915,440*	*278,870*	*5,775,050*
Re-registration of plant and redesigned products with HFC-32		10,000	25,000	10,000	20,000	15,000	10,000	90,000
Project monitoring, expert on flammable refrigerant, staff training		7,000	7,000	7,000	7,000	7,000	7,000	42,000
Subtotal		**614,320**	**1,882,625**	**676,470**	**1,500,325**	**937,440**	**295,870**	**5,907,050**
Contingency (10 % of equipment)		59,732	185,063	65,947	147,333	91,544	27,887	577,505
Total ICC		**674,052**	**2,067,688**	**742,417**	**1,647,658**	**1,028,984**	**323,757**	**6,484,555**
A5 Ownership (%)		100	61.94	100	100	100	100	
Total Fund requested		**674,052**	**1,280,726**	**742,417**	**1,647,658**	**1,028,984**	**323,757**	**5,697,593**
Consumption	Mt	90.03	386.73	52.65	440.33	151.86	78.93	1,200.53
	(CO_2-eq tonnes)	187,947	807,300	109,910	919,191	317,008	164,756	2,506,112
Cost-effectiveness	(US $/kg)	7.49	3.31	14.10	3.74	6.78	4.10	4.75
	(US $/$CO_2$-eq t)	3.59	1.59	6.75	1.79	3.25	1.97	2.27

35. As the IOCs have not been requested, their calculation was not discussed in detail. The project estimates that by introducing HFC-32, the initial refrigerant charge would be reduced between 20 to 25 per cent of the R-410A unit. These savings in refrigerant are expected to be offset by the increased cost of the components.

36. The revised incremental costs requested for the conversion of six enterprises in Argentina to phase out 1,200.53 mt (2,506,112 CO_2-eq tonnes) of R-410A amount to US $5,697,593, with a cost-effectiveness

of US $4.75/kg (US $2.27/$CO_2$-eq tonne).

37. The Secretariat notes that in the absence of the cost guidelines for HFC phase-out, this project has 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 estimate of the overall incremental 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.

Energy-efficiency considerations

38. Even though a component to enhance energy-efficiency was not included as part of the project proposal, the Secretariat notes that the enterprises included in the project could be potentially eligible under the operational framework on energy efficiency (decision 94/60). UNIDO informed that enhancing energy efficiency is considered a key strategy for Argentina, which has been discussed with each of the enterprises participating in the project. The enterprises have been working to increase the energy-efficiency standards of residential AC and the share of the inverter-type AC units in their product mix. The Government is planning to prepare a project along the lines of decision 94/60, which most probably will involve residential AC, among other applications. Accordingly, it was agreed that the Secretariat would recommend to the Executive Committee to invite the Government of Argentina, if it so wishes, to submit a project to enhance the energy efficiency of the HFC-32-based split AC units manufactured by the enterprises assisted by this project, on the understanding that the project be submitted no later than the 97th meeting to take advantage of the ongoing plants conversion.

Project climate impact

39. While the Secretariat is not able to provide an estimate of the avoided emissions from the implementation of the project at the present meeting, the Secretariat has used the Multilateral Fund Climate Impact Indicator (MCII) to estimate the climate benefit accrued from the manufacture of the converted enterprise for one year, calculated at 2,686,113 CO_2-eq tonnes. This includes 1,775,271 CO_2-eq tonnes of direct impact and 910,841 CO_2-eq tonnes of indirect impact. The direct impact reflects the climate benefit of residential AC units manufactured in one year, while the indirect impact reflects the energy efficiency improvements achieved by converting from R-410A to HFC-32 (estimated at 15 years) without any additional upgrade to enhance efficiency.

Gender mainstreaming

40. In line with the Multilateral Fund policy on gender mainstreaming, during the site visits and meetings with the senior management of each enterprise gender mainstreaming issues were discussed. The Coordinator of OPROZ verified relevant gender information at each enterprise and checked whether they had gender policies in place, and how those policies are or will be implemented. The number of female employees at each enterprise was indicated in the project submission.

2024–2026 business plan

41. This project is not included in the 2024–2026 business plan of the Multilateral Fund. However, this project will be integrated into stage I of the KIP for Argentina currently under preparation. The business plan allocation for the KIP in 2024 is US $511,419, including support costs.

RECOMMENDATION

42. The Executive Committee may wish to consider:

(a) Approving the project proposal for phasing out R-410A in the residential air-conditioning (AC) manufacturing sector in Argentina in the amount of US $5,697,593, plus agency support costs of US $398,832 for UNIDO, on the understanding:

(i) That 2,743,072 CO_2-eq tonnes (1,314.04 mt) of R-410A would be deducted from the starting point for sustained aggregate reductions in HFC consumption once it had been established, and that this deduction would be undertaken in accordance with the methodology agreed under the HFC cost guidelines currently under discussion;

(ii) That the present project would be integrated into stage I of the Kigali HFC implementation plan (KIP) for Argentina, once the plan had been fully formulated for submission for consideration by the Executive Committee;

(iii) That the level of costs approved would not constitute a precedent for future HFC individual investment project proposals;

(b) Noting:

(i) The commitment of the Government of Argentina to issue upon completion of the project referred to in sub-paragraph (a), a ban on the manufacturing and imports of small self-contained residential AC units with R-410A in Argentina; and

(ii) That if the enterprises Aires del Sur, BGH, Electrofueguina, Newsan, Radio Victoria and Solnik decide to convert their manufacturing of residential AC from HFC-32 to R-290 at a future date, they will not request funding to replace the equipment provided through this project; and

(c) Inviting the Government of Argentina, if it so wishes, to submit a project under decision 94/60 to enhance the energy efficiency of the HFC-32-based split AC units manufactured by the enterprises assisted by this project, on the understanding that the project be submitted no later than the 97th meeting.