



**United Nations
Environment
Programme**

Distr.
GENERAL

UNEP/OzL.Pro/ExCom/61/28
11 June 2010



ORIGINAL: ENGLISH

EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Sixty-first Meeting
Montreal, 5-9 July 2010

PROJECT PROPOSAL: ARGENTINA

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

Phase-out

- Phase-out of HCFC-22 in the room and unitary air-conditioning equipment manufacturing sector UNIDO and Italy

**PROJECT EVALUATION SHEET – NON-MULTI-YEAR PROJECTS
ARGENTINA**

PROJECT TITLE**BILATERAL/IMPLEMENTING
AGENCY**

(a)	Phase-out of HCFC-22 in the room and unitary air-conditioning equipment manufacturing sector	UNIDO and Italy
-----	--	-----------------

NATIONAL CO-ORDINATING AGENCY	National Ozone Unit (OPROZ), Ministry of Environment
--------------------------------------	---

LATEST REPORTED CONSUMPTION DATA FOR ODS ADDRESSED IN PROJECT**A: ARTICLE-7 DATA (ODP TONNES, 2008, AS OF JUNE 2010)**

Annex C, Group I	356.9
------------------	-------

B: COUNTRY PROGRAMME SECTORAL DATA (ODP TONNES, 2009, AS OF JUNE 2010)

Substance	Consumption by sector (ODP tonnes)						Total
	Aerosol	Foam	Ref. manu.	Ref. serv.	Solvent	Other	
HCFC-22	12.155	1.42	46.49	165.48	0	0.01	225.55
HCFC-141b	3.41	84.46	0	11.99	0	0	99.86
HCFC-142b	0.0013	0.78	0	10.56	0	0	11.34
Other	0	0	0	0.93	0	1.41	2.34

HCFC consumption remaining eligible for funding (ODP tonnes)	n/a
---	-----

CURRENT YEAR BUSINESS PLAN ALLOCATIONS		Funding US \$	Phase-out (ODP tonnes)
(a)		1,397,500	n/a

PROJECT TITLE:	(a)
ODS use at enterprises (ODP tonnes):	53.46
ODS to be phased out (ODP tonnes):	53.46
Project duration (months):	36
Project costs (US \$):	
Incremental Capital Cost:	3,336,864
Contingency (10 %):	333,686
Incremental Operating Cost:	6,123,600
Total Project Cost:	9,794,150
Local ownership (%): 7 enterprises have 100%, other two have 83% and 55%	Average ownership: 89.2%
Export component (%):	0
Requested grant (US \$):	8,735,542
Cost-effectiveness (US \$/kg):	8.99
Requested grant from UNIDO (US \$):	8,435,542
Requested grant from Italy (US \$):	300,000
Implementing agency support cost (US \$):	632,666
Bilateral agency support cost (US \$):	39,000
Total cost of project to Multilateral Fund (US \$):	9,407,207
Status of counterpart funding (Y/N):	Y
Project monitoring milestones included (Y/N):	Y

SECRETARIAT'S RECOMMENDATION:	For individual consideration
--------------------------------------	------------------------------

PROJECT DESCRIPTION

Introduction

1. UNIDO, on behalf of the Government of Argentina, has submitted to the 61st Meeting an investment project entitled “Phase-out of HCFC-22 in the room and unitary air-conditioning equipment manufacturing sector”. Project preparation funding for this project had been approved at the 57th Meeting. The project comprises nine manufacturers of air-conditioning equipment, consuming 972 metric tonnes (53.5 ODP tonnes) of HCFC-22. The funding requested for the implementation of the project is US \$8,435,542 plus support cost of US \$632,666 for UNIDO, and US \$300,000 plus support cost of US \$39,000 for the Government of Italy.

2. According to the 2008 country programme data, Argentina is consuming 360.4 ODP tonnes of HCFCs, consisting of 73 per cent of HCFC-22, 24 per cent of HCFC-141b and 3 per cent of HCFC-142b. Of the total HCFC-22 consumption of 261.35 ODP tonnes (4,752 metric tonnes), 1,789 metric tonnes are consumed in the refrigeration equipment manufacturing sector and 149.6 ODP tonnes (2,720 metric tonnes) in the refrigeration servicing sector, combined representing 94.9 per cent of the total HCFC-22 consumption. The project is to phase out 972 metric tonnes of HCFC-22 (53.5 ODP tonnes) used by the nine manufacturers by converting to HFC refrigeration technology. This is expected to comprise the major part of the country’s phase I reduction activity, thereby contributing to the country’s obligation to freeze HCFC consumption by 2013 and to reduce it by 10 per cent in 2015.

Room air-conditioner manufacturing sector profile

3. The room air-conditioning (RAC) sector has been developing rapidly in Argentina. From 2003 to 2009, the number of manufacturers has increased from three to eleven, and the average HCFC consumption growth rate has been 40 per cent per year. The HPMP assumed that in 2010 the production of RAC would be of the same level as 2007, with an annual increase of 10 per cent in 2011 and 2012. The related figures are reproduced in Table 1.

Table 1- Actual use of HCFC-22 in the manufacture of RAC
for the years until 2009 and forecast to 2012

Year	HCFC consumption for RAC
2004	176
2005	420
2006	692
2007	991
2008	1,332
2009	652
2010	1,000
2011	1,100
2012	1,210

4. The major products in the RAC sector include window and split units with different cooling/heating capacities ranging from 2.48 kW to 18.5 kW manufactured by eleven companies. All companies are assembling pre-manufactured kits, charging, testing and packaging. An overview of the manufacturing capacity and HCFC-22 consumption are listed in Table 2.

Table 2 - Overview of Argentina RAC sector (2007-2009 average data)

No.	Firm	Production (units/year)	Local ownership	HCFC-22 consumption (MT/year)	Eligible HCFC-22 consumption (MT/year)
1	Aires del Sur	18,291	5%	-*	0
2	Audivic	69,027	100%	61	61
3	BGH	175,543	83%	162	134
4	Digital Fuegina	33,892	100%	33	33
5	Electrofuegina	113,286	100%	93	93
6	Foxman	10,674	100%	9	9
7	Interclima	237,810	100%	244	244
8	Newsan	2,872	55%	203	112
9	Radio Victoria	229,622	100%	154	154
10	Multicontrol	136,770	100%	13	13
11	Carrier S.A.	Started in 2009	Multinational	-*	0
	Total	1,027,787		972	853.11

*Data unknown

Technology selection

5. The project proposal has undertaken a detailed review of the technology options available at present, which included HFC-407C, HFC-410A, HC-290 and R-744. These technologies were assessed against their maturity, cost effectiveness, availability of pre-manufactured kits, compatibility, energy efficiency, environmental impact (including ozone depletion, and climate), safety, toxicity, market acceptability, and service requirements and conditions. In conclusion, HFC-410A was selected as refrigerant to replace HCFC-22 since it fulfils the requirements regarding high efficiency, technical maturity and reliability, and ease of servicing. In addition, the pre-fabricated kits that are the basis of this industry, are presently available only for HFC-410A technology, and not for any low-GWP technology.

Production facilities and conversion activities foreseen in the project proposal

6. The RAC production process in Argentina consists mainly in assembling components in the production line. Component kits including, *inter alia*, compressor and heat exchanger are imported, only the tubing is manufactured locally. The required changes in the production line are mainly due to the increased operating pressure of HFC-410A and the hygroscopic nature of new lubricant. Therefore components and their production facilities related to the refrigerant handling need to be replaced/converted, as shown in Table 3.

Table 3 - Production facilities and parts to be converted/replaced

Facility	Equipment to be replaced or converted	Cost for conversion or replacement (US \$)
Refrigerant storage and supply system	Storage tank: conversion and retrofitting	120,000
	Refrigerant pipeline: new pipe and installation	207,000
	Refrigerant transfer pump with accumulator: new purchase	26,500
Tube bending	Tools for cutting and bending of refrigerant pipe	320,000
Refrigeration circuit leak tightness control system	Nitrogen generator: new purchase	120,000
	Leak tightness test machine: new purchase as substance to be detected changed.	306,850
Evacuation line	Vacuum pump: new purchase due to new hygroscopic lubricant	444,000
Refrigerant charging	Charging machine: new purchase	450,600
Leakage detection and refrigerant recovery	Leak detector: new purchase, for R-410A	224,000
	Refrigerant recovery machine: new purchase due to pressure change	42,000
Function test	Dummies testing machine: conversion	580,000
Delivery and insurance		340,914
Total cost for conversion and replacement activities		3,181,864

7. Since the production of RAC units will rely on the assembly of purchased kits with refrigerant tubing prepared locally, the cost requested for re-design was limited. UNIDO also requested training and incremental operating cost (IOC). UNIDO informed that there is no export to other countries and all the produced air-conditioners will be solely supplied to the domestic market. An overview of the costs is provided in below table:

Table 4 - Overview the costs as proposed by UNIDO

Item	Cost (US \$)
Total cost for conversion and replacement activities	3,181,864
Eligible incremental capital cost	2,929,708
Training	125,700
Contingency	305,541
Sub-total incremental capital cost	3,360,949
Incremental operational cost	5,374,593
Total project cost	8,735,542
Cost effectiveness, US\$/metric kg	8.99

Implementation arrangements

8. The National Ozone Unit (NOU) would be responsible for the overall project coordination and assessment. UNIDO will be responsible for the financial management of the grant. Specification for any procurement and contracts will be developed by UNIDO in consultation and agreement with the enterprise, and handled by the agency. Re-design, testing and training of personnel will be conducted by the enterprise management under a UNIDO contract. UNIDO is also to assist in equipment procurement, technical information update, monitoring the progress of implementation, and reporting to the Executive Committee. The project implementation time is 36 months, and it is expected to be completed by the end of 2013.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

Starting point

9. UNIDO informed the Secretariat that the starting point for aggregate reductions in HCFC consumption chosen by the Government of Argentina is the latest (2008) consumption reported to the Ozone Secretariat under Article 7, i.e. 356.9 ODP tonnes. This project will reduce the remaining eligible consumption by 53.5 ODP tonnes. The country intends to submit the HPMP to the 62nd Meeting of the Executive Committee.

Priority of a phase-out project for HCFC-22

10. In regard to the requirements of decision 59/11 on national circumstances which would require a submission of a HCFC-22 phase-out project instead of prioritizing HCFC-141b, UNIDO indicated that in 2008 the HCFC-141b consumption in the foam sector was 17.9 per cent of Argentina's total HCFC consumption measured in ODP tonnes. Approximately one quarter of the HCFC-141b consumption was in each of the sub-sectors domestic appliances, sandwich panels, and spray and pour-in-place, and the remaining quarter among five other sub-sectors. Argentina also indicated that 12 enterprises had a consumption above 20 metric tonnes (only five of which are eligible for funding), while 79 per cent of the enterprises had a consumption below 1 metric tonne. Some of the related information is provided in Table 5.

Table 5 - Information regarding the composition of the PUR foam sector in Argentina

HCFC-141b consumption (metric tonnes)	Number of enterprises
>20	12
10-20	3
5-10	12
3-5	18
1-3	75
0.5-1	70
<0.5	176
<0.1	193
Total	559

11. Furthermore, of the twelve enterprises in the foam sector with a consumption of more than 20 metric tonnes, only five appear to be eligible according to detailed information provided. Consequently, the Government of Argentina would not be able to achieve compliance with the 2013 and 2015 consumption targets predominantly through conversions of enterprises using HCFC-141b. Further, the Government points out that strong price-based competition between different manufacturers in the RAC sub-sector makes it necessary to work on the sector as a whole, to avoid companies that would be converted to decrease their market share due to cost disadvantages.

12. The argument of the Government of Argentina is based on the consumption figures for the year 2008. During the year 2009 the consumption of HCFC-22 dropped while the consumption of HCFC-141b increased; consequently, the ratio between the two HCFCs changed from 3:1 to 2:1 in 2009 (in ODP tonnes). Consumption data for 2008 and 2009, based on country programme data, is displayed in Table 6.

Table 6 - CP consumption data of HCFC in Argentina in 2008 and 2009

Year	2008 CP data			2009 CP data		
	Consumption		Share (ODP)	Consumption		Share (ODP)
	(metric tonnes)	(ODP tonnes)		(metric tonnes)	(ODP tonnes)	
HCFC-141b	777.1	85.5	24%	907.8	99.9	29.4%
HCFC-22	4,751.9	261.35	73%	4,100.9	225.6	66.5%
HCFC-142b	175.6	11.4	3%	174.5	11.3	3.3%
HCFC-123	73.4	1.5	0%	72.8	1.5	0.4%
HCFC-124	29.0	0.6	0%	40.6	0.9	0.3%
Total	5,807.0	360.4	100%	5,296.7	339.1	100%

13. The Government of Argentina pointed out that the average increase in HCFC consumption has been 18 per cent annually from 2002 to 2008; the year 2009 is considered atypical because of the economic crisis and other internal situations in the country which resulted in a 6 per cent reduction in the HCFC consumption. There is no indication that this represents a long-term trend. Further, the capacity in the air conditioning sector has increased in 2009, when a new manufacturer entered the market, suggesting a rebound and further increase in the HCFC-22 consumption in that sub-sector. In addition, despite increases in the consumption of HCFC-141b, the general structure of the foam sector remained as explained above. The Secretariat therefore believes that Argentina has presented a convincing case that national circumstances require implementation of this sector plan in order to comply with the 2013 and 2015 reduction steps in HCFC consumption.

Environmental issues

14. The project will convert the production in nine RAC manufacturing enterprises to HFC-410A. The current consumption of 972 metric tonnes HCFC-22 (53.5 ODP tonnes) will be replaced by 875 metric tonnes of HFC-410A, since the refrigerant filling in the equipment can be reduced by 10 per cent; this is possible without a conversion of a heat exchanger manufacturing since the enterprises purchase kits as the basis for their manufacturing.

15. The Secretariat questioned the choice of HFC-410A technology, considering potential significant negative impacts on the climate, in the order of 300,000 tonnes of CO₂ equivalent emission increase over the lifetime of the products manufactured in one year. In comparison, the selection of HC-290 technology (if it were to be available) would amount to approximately 2,000,000 tonnes of CO₂ equivalent emission reduction over the lifetime of the products manufactured in one year. These figures, as the term “indicator” shows, are indicative – but effects in this magnitude are realistic (Table 7). The Government of Argentina pointed to the urgency of the conversion due to the necessary compliance with the 2013 and 2015 reduction in consumption, noting that at this point in time there are no kits available for air conditioners using HC-290, while having demonstrated that relying on the foam sector alone might not be possible.

Table 7 - Results of calculations of the climate impact indicator

Input			
Generic			
Country	[-]	Argentina	
Company data (name, location)	[-]	9 enterprises	4 enterprises
Select system type	[list]	Air conditioning - split	Air conditioning - window
General refrigeration information			
HCFC to be replaced	[-]	HCFC-22	
Amount of refrigerant per unit	[kg]	0.97	0.61
No. of units	[-]	900,000	180,000
Refrigeration capacity	[kW]	4	3.5
Selection of alternative with minimum environmental impact			
Share of exports (all countries)	[%]	0	0
Calculation of the climate impact			
Alternative refrigerant (more than one possible)	[list]	HFC-410A, HC-290	HFC-410A, HC-290
If technical upgrade is desired:			
Present energy efficiency classification	[list]		
Increase in heat exchanger size/values	[%]		
Increase in compressor quality	[list - %]		

NOTE

All data displayed is specific to the case investigated and is not generic information about the performance of one alternative; performance can differ significantly depending on the case.

Output			
<i>Note: The output is calculated as the climate impact of the refrigerant systems in their life time as compared to HCFC-22, on the basis of the amount produced within one year. Additional/different outputs are possible</i>			
Country		Argentina	
Identification of the alternative technology with minimum climate impact			
List of alternatives for identification of the one with minimum climate impact	[Sorted list, best = top (% deviation from HCFC)]	HC-600a (-52%) HC-290 (-49%) HFC-134a (-11%) HCFC-22 HFC-407C (2%) HFC-410A (7%) HFC-404A (64%)	HC-600a (-44%) HC-290 (-41%) HFC-134a (-9%) HCFC-22 HFC-407C (2%) HFC-410A (8%) HFC-404A (58%)
Calculation of the climate impact of the conversion			
Alternative refrigerant 1		HFC-410A	HFC-410A
Total direct impact (post conversion – baseline)*	[t CO2 equiv]	80,640	10,483
Indirect impact (country)**	[t CO2 equiv]	182,766	33,649
Indirect impact (outside country)**	[t CO2 equiv]	0	0
Total indirect impact	[t CO2 equiv]	182,766	33,649
Total impact	[t CO2 equiv]	263,406	44,132
Alternative refrigerant 2		HC-290	HC-290
Total direct impact (post conversion – baseline)*	[t CO2 equiv]	-1,804,320	-234,562
Total indirect impact (country)**	[t CO2 equiv]	14,940	8671
Total indirect impact (outside country)**	[t CO2 equiv]	0	0
Total indirect impact**	[t CO2 equiv]	14,940	8671
Total impact	[t CO2 equiv]	-1,789,380	-225,890

*Direct impact: Different impact between alternative technology and HCFC technology for the substance-related emissions.

**Indirect impact: Difference in impact between alternative technology and HCFC technology for the energy-consumption-related emissions of CO2 when generating electricity.

Eligibility issue

16. The project involved only nine of the eleven enterprises in the RAC sector in Argentina, as two enterprises are not eligible for funding (Carrier S.A, started operation only in 2009, and Aires del Sur has 95 per cent foreign ownership). Two more of the enterprises are partially owned by non-Article 5 countries. The funding for these two enterprises has been proportionally reduced.

Agreed costs

17. UNIDO and the Secretariat agreed on a funding level of US \$8,735,542 plus support cost US \$632,666 for UNIDO and 39,000 for Italy. A detailed breakdown is shown in the following Tables 8 and 9:

Table 8 – Cost breakdown by item

Eligible equipment cost		2,909,708
Training	Up to US \$15,000 per enterprise, proportional to eligibility	125,700
Design	US \$ 20,000 cost for minor redesign	20,000
ICC		3,055,408
Contingency	10%	305,541
Subtotal ICC		3,360,949
Eligible IOC		5,374,593*
Total		8,735,542
C/E	US \$/metric kg	8.99
Support cost	Italy (base: US \$300,000)	39,000
	UNIDO	632,666
	Total	671,666
Cost to the Fund (US \$)		9,407,207

*According to decision 60/44, at US \$6.30/metric kg of eligible HCFC consumption. UNIDO had submitted a calculation of IOC based on actual costs of US \$6,396,413

Table 9 - Cost breakdown by enterprise

Firm	Total ICC	IOC	Total Incremental cost	Ownership share	Total eligible incremental cost
	Before converting for foreign ownership				
Audivic	291,359	384,300	675,659	100%	675,659
BGH	517,554	1,020,600	1,538,154	83%	1,276,668
Digital Fuegina	331,276	207,900	539,176	100%	539,176
Electrofuegina	546,260	585,900	1,132,160	100%	1,132,160
Foxman	158,796	56,700	215,496	100%	215,496
Interclima	654,614	1,537,200	2,191,814	100%	2,191,814
Multicontrol	191,268	81,900	273,168	100%	273,168
Newsan	492,483	1,278,900	1,771,383	55%	974,261
Radio Victoria	486,939	970,200	1,457,139	100%	1,457,139
Total (US \$)	3,670,550	6,123,600	9,794,150		8,735,542

RECOMMENDATION

18. The Executive Committee may wish to:

- (a) Note that the Government of Argentina agreed to establish as its starting point for sustained aggregate reductions in HCFC consumption, the consumption level reported under Article 7 for 2008, i.e. 356.9 ODP tonnes;
- (b) Approve the investment project for the phase-out of HCFC-22 in the room and unitary air conditioning equipment manufacturing sector at a level of US \$8,435,542 plus agency support cost of US \$632,666 for UNIDO and US \$300,000 plus agency support cost of US \$39,000 for the Government of Italy;
- (c) Request UNIDO and the Government of Argentina to deduct 53.5 ODP tonnes of HCFCs (972 metric tonnes of HCFC-22) from the starting point for sustained aggregate reductions HCFC consumption, as established under paragraph (a) above; and
- (d) Request UNIDO to provide to the Secretariat at the end of each year of the project's implementation period, or part thereof, progress reports that address the issues pertaining to the collection of accurate data in line with the objectives of decision 55/43(b).
