



**United Nations
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ORIGINAL: ENGLISH

EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Eightieth Meeting
Montreal, 13-17 November 2017

PROJECT PROPOSAL: BANGLADESH

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

Phase-out

- HCFC phase-out management plan (stage I, third and fourth tranches) UNDP/UNEP

Refrigeration

- Conversion of domestic refrigerator manufacturing facility from HFC-134a to isobutane as a refrigerant and conversion of compressor manufacturing facility from HFC-134a-based compressors to isobutane-based compressors at Walton Hitech Industries Limited (“Walton”) UNDP

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS

Bangladesh

(I) PROJECT TITLE	AGENCY	MEETING APPROVED	CONTROL MEASURE
HCFC phase out plan (Stage I)	UNDP (lead), UNEP	65 th	30% by 2018

(II) LATEST ARTICLE 7 DATA (ANNEX C GROUP I)	YEAR: 2016	63.90 (ODP tonnes)
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(III) LATEST COUNTRY PROGRAMME SECTORAL DATA (ODP TONNES)								YEAR: 2016	
Chemical	Aerosol	Foam	Fire fighting	Refrigeration		Solvent	Process agent	Lab use	Total sector consumption
				Manufacturing	Servicing				
HCFC-123			0.03	0.04	0.08				0.15
HCFC-141b in imported pre-blended polyol		16.06							16.06
HCFC-142b					0.41				0.41
HCFC-22				25.85	37.18				63.03

(IV) CONSUMPTION DATA (ODP TONNES)			
2009 - 2010 Baseline:	72.6	Starting point for sustained aggregate reductions:	72.65
Consumption eligible for funding (ODP tonnes)			
Already approved:	24.53	Remaining:	48.13

(V) BUSINESS PLAN		2017	2018	TOTAL
UNEP	ODS PHASE-OUT (ODP TONNES)	0.2	0.2	0.4
	FUNDING (US \$)	20,340	19,210	39,550

(VI) PROJECT DATA		2010	2011	2012	2013	2014	2015-2016	2017*	2018	TOTAL	
Montreal protocol consumption limits		n/a	n/a	n/a	72.65	72.65	65.39	65.39	65.39		
Maximum allowable consumption (ODP tonnes)		n/a	n/a	n/a	72.65	72.65	65.39	65.39	50.86		
Agreed funding (US \$)	UNDP	Project costs	1,146,074	55,000	0	0	0	0	0	1,201,074	
		Support costs	85,956	4,125	0	0	0	0	0	0	90,081
	UNEP	Project costs	0	230,000	0	90,000	0	0	35,000	0	355,000
		Support costs	0	29,900	0	11,700	0	0	4,550	0	46,150
Funds approved by ExCom (US \$)	Project costs	1,146,074	285,000	0	90,000	0	0	35,000	0	1,539,074	
	Support costs	85,956	34,025	0	11,700	0	0	4,550	0	134,021	
Total funds requested for approval at this meeting (US \$)	Project costs							35,000		35,000	
	Support costs							4,550		4,550	

*The third tranche of US \$18,000 should have been submitted in 2015 and the fourth tranche of US \$17,000 should have been submitted in 2018.

SECRETARIAT'S RECOMMENDATION:	Individual consideration
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PROJECT DESCRIPTION

1. On behalf of the Government of Bangladesh, UNDP as the lead implementing agency, has submitted a request for funding for the third and fourth (final) tranches of stage I of the HCFC phase-out management plan (HPMP), at the amount of US \$35,000, plus agency support costs of US \$4,550 for UNEP only.¹ The submission includes a progress report on the implementation of the second tranche, the verification report on HCFC consumption and the tranche implementation plan for 2017 to 2018.

Report on HCFC consumption

HCFC consumption

2. The Government of Bangladesh reported a consumption of 63.9 ODP tonnes of HCFC in 2016, which was 2.3 per cent lower than the limits established in its Agreement with the Executive Committee and 12 per cent lower than the HCFC baseline for compliance. The consumption of HCFC-22 and HCFC-123 has increased in 2013-2016 due to continuing demand in refrigeration and air-conditioning (RAC) servicing and manufacturing sectors driven by economic growth; consumption of HCFC-141b is zero due to a ban in the import of bulk HCFC-141b; and HCFC-124 has not been imported since 2012. The 2012-2016 HCFC consumption is shown in Table 1.

Table 1. HCFC consumption in Bangladesh (2012-2016 Article 7 data)

HCFC	2012	2013	2014	2015	2016	Baseline
Metric tonnes						
HCFC-22	1,053.57	1,044.04	1,047.87	1156.76	1150.34	825.86
HCFC-123	7.05	6.80	3.00	7.00	11.00	10.33
HCFC-124	0	0	0	0	0	2.90
HCFC-141b	50.00	40.00	0	0	0	193.00
HCFC-142b	44.35	45.08	25.75	6.41	6.36	88.04
Total (mt)	1,154.97	1,135.92	1,076.62	1,170.17	1,167.70	1,120.11
ODP tonnes						
HCFC-22	57.95	57.42	57.63	63.62	63.27	45.42
HCFC-123	0.14	0.14	0.06	0.14	0.22	0.21
HCFC-124	0.00	0.00	0	0	0	0.07
HCFC-141b	5.50	4.40	0	0	0	21.23
HCFC-142b	2.88	2.93	1.67	0.42	0.41	5.72
Total (ODP tonnes)	66.47	64.89	59.36	64.18	63.90	72.65

Country programme (CP) implementation report

3. The Government of Bangladesh reported HCFC sector consumption data under the 2016 CP implementation report that is consistent with the data reported under Article 7. It has also reported use of HCFC-141b in imported pre-blended polyols mainly in manufacturing of sandwich panels, kitchenware insulation, thermal insulation for pipes and fittings, and wall insulation.

Verification report

4. The verification report confirmed that the Government is implementing a licensing and quota system for HCFC imports and exports and that the total consumption of HCFCs for 2015 and 2016 was 64.18 and 63.89 ODP tonnes, respectively. The verification concluded that Bangladesh has met the targets under its Agreement with the Executive Committee, and the country continues to fulfill its commitment to

¹ As per the letter of 5th September 2017 from the Department of Environment of Bangladesh to UNDP.

reduce consumption by 30 per cent of the baseline in 2018. The Government of Bangladesh will also include the recommendations from the verification report in the implementation plan for this requested tranche.

Progress report on the implementation of the second tranche of the HPMP

Legal framework

5. The Government of Bangladesh continued the enforcement of the Ozone Depleting Substance (ODS) regulation amended in 2014 particularly the ban on import and the manufacture of products using HCFC-141b in bulk. It is also currently preparing a proposal to ban HCFC-based equipment starting January 2018. A total of 189 customs and enforcement officers were trained through four training courses, and 300 sets of customs manual and other training material were distributed, including four sets of portable refrigerant identifiers.

6. The National Board of Revenues (NBR) who hosts the Customs Department has initiated the inclusion of the ODS enforcement module in the regular training of Bangladesh Customs Academy as part of a strategic direction to institutionalise sustainable customs capacity building on control of ODS. Actions concerning cross-border ODS control were initiated with the Customs authorities of Bhutan, India, and Nepal.

Manufacturing sector

7. An individual project that resulted in the phase-out of 20.20 ODP tonnes (183.70 mt) of HCFC-141b used in the manufacturing of insulation foam at Walton Hi-Tech Industries Limited² was completed prior to the implementation of the second tranche in May 2014.

Refrigeration servicing sector

8. A total of 21 training workshops on good servicing practices was conducted with cooperation from the Bangladesh Refrigeration and Air-conditioning Merchants Association (BRAMA), resulting in the training of 2,783 RAC technicians; commencement of the development of materials to integrate technical issues related to ODS phase-out in the national curricula of polytechnic and vocational institutions through the Directorate of Technical Education. Awareness raising activities including ozone day celebrations took place with 500 participants where awareness materials were distributed.

Project implementation and monitoring unit (PMU)

9. The National Ozone Unit (NOU), under the Department of Environment, is responsible for implementation and monitoring of stage I of the HPMP. This unit is supervised by the National Technical Committee on Ozone-depleting substances (NTCODS) comprised of department agencies and stakeholders who provide advice to the Ozone Cell on the implementation of the HPMP and projects related to the Montreal Protocol.

Level of fund disbursement

10. As of September 2017, of the US \$1,521,074 approved so far, US \$1,441,033 had been disbursed (US \$1,146,074 for UNDP and US \$294,959 for UNEP), as shown in Table 2. The balance of US \$80,041 will be disbursed in 2017 and 2018.

²Approved at the 62nd meeting (decision 62/31) and included in stage I of the HPMP.

Table 2. Financial report of stage I of the HPMP for Bangladesh (US \$)

Agency	First tranche		Second tranche		Total approved	
	Approved	Disbursed	Approved	Disbursed	Approved	Disbursed
UNDP	1,201,074*	1,146,074	0	0	1,201,074	1,146,074
UNEP	230,000	227,959	90,000	67,000	320,000	294,959
Total	1,431,074	1,374,033	90,000	67,000	1,521,074	1,441,033
Disbursement rate (%)	96.0		74.4		94.7	

*Includes US \$1,146,074 approved for individual conversion project at Walton Hi-Tech Industries Limited at the 62nd meeting

Implementation plan for the third and fourth (final) tranches of the HPMP

11. The following activities will be implemented between 2017 and 2018:
- Policy and regulation (UNDP) (funding from the previous tranches);
 - Training of 80 customs officers on enforcement of the import/licensing system, border dialogue with neighbouring countries, and training material development (UNEP) (US \$19,000);
 - Training for additional 750 RAC technicians in good service practice, including handling flammable refrigerants; curricula development and training material production (UNEP) (US \$11,000); and
 - Public awareness activities (UNEP) (US \$5,000).

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

Combined request for third and fourth tranches (final)

12. Delays in implementation of the activities associated with the first two tranches was due to delays in signing the agreement and financial transfers. UNDP emphasized that the reasons for the delays have been satisfactorily addressed. Noting the two remaining tranches of stage I of the HPMP (US \$18,000 due in 2015 and US \$17,000 due in 2018), the Government requested that the two tranches be approved jointly to ensure timely implementation of the remaining activities for the servicing sector, and complete stage I by December 2018, as per the Agreement. Stage II of the HPMP will be submitted to the 81st meeting.

13. In line with decision 74/19, UNDP and UNEP were requested, to submit annual tranche implementation reports until all approved activities had been completed, and submit annual verification reports to confirm whether HCFC consumption targets had been met, until approval of stage II of the HPMP, and the project completion report to the first meeting of the Executive Committee in 2019.

Revision to the HPMP Agreement

14. Based on the request for combining the funding for the third and fourth tranches, Appendix 2-A of the Agreement has been updated accordingly, and paragraph 16 has been added to indicate that the updated Agreement supersedes that reached at the 65th meeting, as shown in Annex I to the present document. The full revised Agreement will be appended to the final report of the 80th meeting.

Verification report

15. Upon request for clarification on minor data inconsistencies in the total imports and licenses issued in 2016, UNDP found some errors in the data provided and resubmitted the verification report with the correct figures. The Secretariat discussed with UNDP and UNEP the recommendations of the verification report, in particular training on flammable refrigerants requested by RAC technicians and the need for more ODS identifiers. As a result, training for technicians will be provided during implementation of stage II of the HPMP.

Report on HCFC consumption

16. In noting the consumption trend for Bangladesh where reductions from the target are at a minimum (i.e. consumption of 63.90 ODP tonnes against a target of 65.39 ODP tonnes), and the concerns that growth in consumption of HCFC-22 could put the country at risk of non-compliance, the Government assured that the strict enforcement of the licensing and quota system will ensure compliance with the Montreal Protocol.

17. UNDP noted the Secretariat's concerns on the increased consumption of HCFC-14b in imported pre-blended polyols and explained that the import of this substance is not yet controlled in the country. The Government, understanding the challenges facing this sector, has organised a meeting with the foam manufacturers to inform them of the possible ban of HCFC-141b in imported pre-blended polyol and encourage adoption of alternatives. Further actions on this sector will be explored during implementation of stage II, including potential limits on imports.

18. With regard to the nil consumption of HCFC-124, UNDP explained that the Government will continue monitoring if there would be any consumption during 2018 before declaring a ban on imports.

Progress report on the implementation of the second tranche of the HPMP

Legal framework

19. The Government of Bangladesh has already issued HCFC import quotas for 2017 in accordance with the Montreal Protocol control targets.

Refrigeration servicing sector

20. UNDP clarified that currently, the training curriculum for refrigeration technicians in the training institutes already includes a component on the safe use of flammable refrigerants as alternatives to ODS and the revision of this training programme will provide further information on relevant technologies as they become available.

21. Noting the relevant decisions of the Executive Committee on retrofits,³ the Secretariat enquired whether the equipment designed for non-flammable refrigerants is being retrofitted using flammable alternatives in the country. UNDP confirmed that the Government of Bangladesh is aware of the decisions and currently no retrofitting is taking place for air-conditioning equipment using flammable alternatives.

Conclusion

22. The country is in compliance with the Montreal Protocol targets in 2015 and 2016, and continued with progress its activities planned under stage I. After the issues of delays in implementation of activities have been resolved, activities in the servicing sector advanced well, including technicians training, customs officers training and border control strengthening, and update of curricula. The level of disbursement is

³ Decisions 72/17 and 73/34

94.7 per cent of the funds approved so far. The activities so far implemented and those planned under the final tranches will further strengthen the servicing sector, ensure the long-term sustainability of the activities, and continue to help the country to meet its compliance obligations under the Protocol and the Agreement. The Secretariat also noted that the Government would take further steps to control the increasing use of HCFC-141b contained in imported pre-blended polyols as part of stage II of the HPMP, whilst the current work plan will include continued consultation with the foam industry to explore alternatives.

RECOMMENDATION

23. The Executive Committee may wish to consider:

- (a) Noting:
 - (i) The progress report on the implementation of the second tranche of stage I of the HCFC phase-out management plan of (HPMP) for Bangladesh;
 - (ii) That the Fund Secretariat had updated Appendix 2-A of the Agreement between the Government of Bangladesh and the Executive Committee, based on the revised funding schedule (combining the third (US \$18,000 in 2015) and the fourth (US \$17,000 in 2018) tranches, and that paragraph 16 had been added to indicate that the updated Agreement supersedes that reached at the 65th meeting, as contained in Annex I to the present document; and,
- (b) Requesting the Government of Bangladesh, UNDP and UNEP to submit the 2017 verification report by the 82nd meeting; submit progress reports on a yearly basis on the implementation of the work programme associated with the final tranche until the completion of the project and project completion report to the first meeting of the Executive Committee in 2019; and
- (c) Approving the third and fourth (final) tranches of stage I of the HPMP for Bangladesh, and the corresponding 2017-2018 tranche implementation plan, at the amount of US \$35,000 plus agency support costs of US \$4,550 for UNEP.

CONVERSION OF DOMESTIC REFRIGERATOR MANUFACTURING FACILITY FROM HFC-134A TO ISOBUTANE AS A REFRIGERANT AND CONVERSION OF COMPRESSOR MANUFACTURING FACILITY FROM HFC-134A-BASED COMPRESSORS TO ISOBUTANE-BASED COMPRESSORS AT WALTON HITECH INDUSTRIES LIMITED (“WALTON”)

Note from the Secretariat

Background

24. On behalf of the Government of Bangladesh, UNDP submitted to the 79th meeting a request for funding a demonstration project the conversion of domestic refrigerator manufacturing facility from HFC-134a to isobutane as a refrigerant and conversion of compressor manufacturing facility from HFC-134a-based compressors to isobutane-based compressors at Walton Hitech Industries Limited (“Walton”),⁴ pursuant to decision 78/3(g).⁵

25. At the same meeting, UNDP submitted an additional project proposal for the phase-out of HFC-134a used in the manufacturing of domestic refrigerators in Colombia.⁶

26. The two project proposals were included in the document on the Overview of issues identified during project review⁷ as they were submitted for individual consideration

Summary of the discussion at the 79th meeting⁸

27. During the discussion in plenary of the two HFC-related investment projects, Executive Committee members suggested that due consideration should be given to each project based on their individual merit, and should also take into account criteria that should be met before the project may be considered, including ratification of the Kigali Amendment; how the phase down related to national strategies and enabling activities, where resources for conversions would come from, and how these early projects would provide information that would assist in further development of the guidelines for the phase-down of HFC consumption and production.

28. The Committee also agreed to further consider the two project proposals in the contact group that it established under agenda item 11(c)(i), Matters related to the Kigali Amendment to the Montreal Protocol: draft criteria for funding. Discussions at the contact group focussed on additional criteria for the consideration of HFC-related investment project proposals submitted in line with decision 78/3(g), rather than on the actual proposals submitted to the meeting. Based on the report by the contact group, the Executive Committee decided *inter alia* that HFC-related investment projects would be considered on a case-by-case basis; should be in individual enterprises deciding to convert to mature technologies; should have broad replicability to the country or region or sector; and should take into account geographic distribution. Furthermore, projects must be fully implemented by no more than two years from the time of their approval; project completion reports should be comprehensive with detailed information on the

⁴ UNEP/OzL.Pro/ExCom/79/28

⁵ The Executive Committee decided *inter alia* to consider approving a limited number of HFC-related projects in the manufacturing sector only, to allow the Committee to gain experience in the incremental capital and operating costs that might be associated with phasing down HFCs, on the understanding: that any country that submitted a project should have ratified the Kigali Amendment or submitted a formal letter indicating the government’s intention to ratify the Amendment; that no further funding would be available until the instrument of ratification had been deposited at the United Nations in New York; and that any amount of HFC reduced as a result of the project would be deducted from the starting point.

⁶ UNEP/OzL.Pro/ExCom/79/31.

⁷ UNEP/OzL.Pro/ExCom/79/19.

⁸ The full text of the discussions is contained in paragraphs 87 to 89 and 143 of document UNEP/OzL.Pro/ExCom/79/51.

eligible incremental capital and operating costs (or savings), and on relevant factors that facilitated implementation; and that any remaining funds would be returned to the Fund no later than one year after the date of project completion (decision 79/45).

29. The Executive Committee also agreed to defer the consideration of the two HFC-related projects to the 80th meeting⁹.

Resubmission of the HFC-related investment project for Bangladesh

30. The Government of Bangladesh had requested UNDP to resubmit the project proposal submitted to the 79th meeting to the 80th meeting as an individual investment project. Accordingly, the project document submitted to the 79th meeting, including project description and Secretariat's comments and recommendation has been attached to the present Note from the Secretariat.

31. The Secretariat notes as follows:

- (a) The project that was submitted to the 79th meeting fulfilled the requirements under decision 78/3(g); and
- (b) The project re-submitted to the 80th meeting fulfills all the additional requirements under decision 79/45, i.e., the project is submitted by an individual domestic refrigerator enterprise to convert from HFC-134a to iso-butane, a mature technology that have been introduced in similar enterprises in other Article 5 countries when replacing CFC-12 as refrigerant. The results of the project could be replicated in other HFC-134a based domestic refrigerator manufacturing enterprises in Bangladesh, as well as in the region (and worldwide), and the sector. The project will be fully implemented in two years, a comprehensive report will be issued once it is completed with detailed information on the eligible incremental capital and operating costs, and any remaining funds would be returned to the Fund no later than one year after the date of project completion; and

32. The project proposal is presented for individual consideration in the document on Overview of issues identified during project review submitted to the 80th meeting.¹⁰

RECOMMENDATION

33. The Executive Committee may wish to consider the project for the conversion of domestic refrigerator manufacturing facility from HFC-134a to isobutane as a refrigerant and conversion of compressor manufacturing facility from HFC-134a-based compressors to isobutane-based compressors at Walton Hitech Industries Limited pursuant to decision 79/45 and discussions under Overview of issues identified during project review in document UNEP/OzL.Pro/ExCom/80/22.

⁹ Decision 79/39 for Bangladesh.

¹⁰ UNEP/OzL.Pro/ExCom/80/22.

Annex I

**TEXT TO BE INCLUDED IN THE UPDATED AGREEMENT BETWEEN THE GOVERNMENT OF BANGLADESH AND THE EXECUTIVE COMMITTEE OF THE MULTILATERAL FUND FOR THE REDUCTION IN CONSUMPTION OF HYDROCHLOROFLUOROCARBONS
(Relevant changes are in bold font for ease of reference)**

16. This updated Agreement supersedes the Agreement reached between the Government of Bangladesh and the Executive Committee at the 65th meeting of the Executive Committee.

APPENDIX 2-A: THE TARGETS, AND FUNDING

		2010	2011	2012	2013	2014	2015-2016	2017	2018	Total
1.1	Montreal Protocol reduction schedule of Annex C, Group I substances (ODP tonnes)	NA	NA	NA	72.65	72.65	65.39	65.39	65.39	
1.2	Maximum allowable total consumption of Annex C, Group I substances (ODP tonnes)	NA	NA	NA	72.65	72.65	65.39	65.39	50.86	
2.1	Lead IA (UNDP) agreed funding (US\$)	1,146,074	55,000	0	0	0	0	0	0	1,201,074
2.2	Support costs for Lead IA (US\$)	85,956	4,125	0	0	0	0	0	0	90,081
2.3	Cooperating IA (UNEP) agreed funding (US\$)	0	230,000	0	90,000	0	0	35,000	0	355,000
2.4	Support costs for cooperating IA (US\$)	0	29,900	0	11,700	0	0	4,550	0	46,150
3.1	Total agreed funding (US\$)	1,146,074	285,000	0	90,000	0	0	35,000	0	1,556,074
3.2	Total support costs (US\$)	85,956	34,025	0	11,700	0	0	4,550	0	136,231
3.3	Total agreed costs (US\$)	1,232,030*	319,025	0	101,700	0	0	39,550	0	1,692,305
4.1.1	Total phase-out of HCFC-22 agreed to be achieved under this Agreement (ODP tonnes)									3.48
4.1.2	Phase-out of HCFC-22 to be achieved through previously approved projects (ODP tonnes)									n/a
4.1.3	Remaining eligible consumption of HCFC-22 (ODP tonnes)									41.94
4.2.1	Total phase-out of HCFC-141b agreed to be achieved under this Agreement (ODP tonnes)									n/a
4.2.2	Phase-out of HCFC-141b to be achieved through previously approved projects (ODP tonnes)									20.20
4.2.3	Remaining eligible consumption of HCFC-141b (ODP tonnes)									1.03
4.3.1	Total phase-out of HCFC-142b agreed to be achieved under this Agreement (ODP tonnes)									0.57
4.3.2	Phase-out of HCFC-142b to be achieved through previously approved projects (ODP tonnes)									n/a
4.3.3	Remaining eligible consumption of HCFC-142b (ODP tonnes)									5.16
4.4.1	Total phase-out of HCFC-123 agreed to be achieved under this Agreement (ODP tonnes)									0.21
4.4.2	Phase-out of HCFC-123 to be achieved through previously approved projects (ODP tonnes)									n/a
4.4.3	Remaining eligible consumption of HCFC-123 (ODP tonnes)									n/a
4.5.1	Total phase-out of HCFC-124 agreed to be achieved under this Agreement (ODP tonnes)									0.07
4.5.2	Phase-out of HCFC-124 to be achieved through previously approved projects (ODP tonnes)									n/a
4.5.3	Remaining eligible consumption of HCFC-124 (ODP tonnes)									0

*Approved at the 62nd meeting for Walton Hi-Tech Industries and herewith subsumed into this Agreement.



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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Seventy-ninth Meeting
Bangkok, 3-7 July 2017

PROJECT PROPOSAL: BANGLADESH

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

Refrigeration

- Demonstration for the conversion of domestic refrigerator manufacturing facility from HFC-134a to isobutane as a refrigerant and conversion of compressor manufacturing facility from HFC-134a-based compressors to isobutane-based compressors at Walton Hitech Industries Limited (“Walton”)

UNDP

BANGLADESH

PROJECT TITLE(S)
BILATERAL/IMPLEMENTING AGENCY

(a) Demonstration for the conversion of domestic refrigerator manufacturing facility from HFC-134a to isobutane as a refrigerant at Walton Hitech Industries Limited (“Walton”)	UNDP
(b) Demonstration for the conversion of compressor manufacturing facility from HFC-134a-based compressors to isobutane-based compressors at Walton Hitech Industries Limited (“Walton”)	UNDP

NATIONAL CO-ORDINATING AGENCY	N/A
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LATEST REPORTED CONSUMPTION DATA FOR HFC ADDRESSED IN PROJECT
A: ARTICLE-7 DATA (METRIC TONNES, 2016, AS OF JUNE 2017)

Annex F, Group I	N/A
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B: COUNTRY PROGRAMME SECTORAL DATA (METRIC TONNES (MT), 2016, AS OF JUNE 2017)

HFC-134a	N/A
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HFC consumption remaining eligible for funding (CO₂-equivalent tonnes)	N/A
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CURRENT YEAR BUSINESS PLAN ALLOCATIONS		Funding US \$ million	Phase-out (mt)
	(a)	N/A	N/A

PROJECT TITLE:	Walton	
Project component	Refrigerator manufacturing conversion	Compressor manufacturing conversion
HFC used by the enterprise:	HFC-134a	HFC-134a (indirect)
HFC to be phased-out (mt):	197.3	197.3
Project duration (months):	24	24
Initial amount requested (US \$):	2,362,058	2,574,450
Final project costs (US \$):		
Incremental capital cost:	1,382,618	2,078,120
Contingency (10 %):	138,262	207,812
Incremental operating cost:	1,160,678	N/A
Servicing sector	160,000	N/A
Total project cost:	1,320,678	2,285,932
Local ownership (%):	100	100
Export component (%):	0	0
Requested grant (US \$):	1,320,678	1,810,932
Cost-effectiveness (US \$/kg):	Manufacturing	5.88
	Servicing	4.8
Implementing agency support cost (US \$):	92,447	126,765
Total cost of project to Multilateral Fund (US \$):	1,413,125	1,937,697
Status of counterpart funding (Y/N):	N/A	Confirmed by UNDP
Project monitoring milestones included (Y/N):	Y	Y

SECRETARIAT’S RECOMMENDATION	For individual consideration
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PROJECT DESCRIPTION

1. On behalf of the Government of Bangladesh, UNDP has submitted to the 79th meeting a request for funding the conversion of three domestic refrigerator manufacturing lines from HFC-134a to isobutane as a refrigerant, at a total cost of US \$2,362,058, plus agency support costs of US \$165,344, and the conversion of a compressor manufacturing facility from HFC-134a-based compressors to isobutane-based compressors at Walton Hi-tech Industries Limited (“Walton”), at a total cost of US \$2,574,450, plus agency support costs of US \$180,212.

2. The submission was accompanied by a letter dated 14 May 2017 from the Government of Bangladesh committing to the ratification of the Kigali Amendment and agreeing that no further funding would be available from the Fund until the instrument of ratification had been received by the depositary at the Headquarters of the United Nations in New York; and that any amount of HFC reduced as a result of the project would be deducted from the starting point, in line with decision 78/3(g). The Secretariat also notes with appreciation that this proposal was submitted without preparation funding.

HFC consumption in Bangladesh

3. Table 1 presents a summary of HFC consumption in Bangladesh as provided in the project proposal. The country also received funds to conduct a survey on ODS alternatives, the report of which has been submitted to the 79th meeting.

Table 1. HFC consumption in Bangladesh in 2015 (metric tonnes (mt))

Sectors	HFC-134a	R-404A	R-410A	R-407C	HFC-227ea	HFC-32	Total
Domestic refrigerator manufacturing	205.80						205.80
Commercial refrigerator manufacturing	119.70	3.50					123.20
Industrial refrigerator manufacturing			0.50				0.50
Transportation refrigeration	3.18		0.50				3.68
Residential air-conditioner (AC) manufacturing	2.00		2.00			0.90	4.90
Commercial AC manufacturing	3.00		1.43				4.43
Industrial AC manufacturing		0.50	4.00	1.10			5.60
Mobile AC	7.79	0.35					8.14
Aerosol	140.10						140.10
Fire Extinguishers					1.00		1.00
Service sector (for all applications)	284.91	11.15	12.83	1.95	1.50	1.00	313.34
Total	766.48	15.50	21.26	3.05	2.50	1.90	810.68
% in mt	94.5%	1.9%	2.7%	0.4%	0.3%	0.2%	100.0%
Total CO ₂ -eq tonnes	1,096,059	60,785	44,255	5,401	8,050	1,282	1,215,833
% in CO ₂ -eq tonnes	90.1%	5.0%	3.6%	0.4%	0.7%	0.1%	100.0%

4. The consumption of HFC-134a constitutes 94.5 per cent of the total consumption of HFCs in metric tonnes, and 90.1 per cent in CO₂-equivalent tonnes in 2015. HFC-134a in domestic refrigerator manufacturing constitutes about 26.9 per cent of the total HFC-134a consumption in the country.

Domestic refrigerator manufacturing sector

5. In Bangladesh, domestic refrigerators are both locally produced and imported. Local production is done by four domestic refrigerator manufacturers using mainly HFC-134a as a refrigerant, with a total production of about 2.5 million units in 2016. In the same period, approximately 200,000 units were imported from China, India, Indonesia and Thailand. Demand for refrigeration and air-conditioning (RAC) products is increasing due to growth in the economy of the country.

Company profile

6. Walton is the largest manufacturer of domestic refrigerators in Bangladesh with a total production of 2.2 million units in 2016, representing 88 per cent of the total market, and mainly uses HFC-134a as a refrigerant. Approximately 150,000 units of refrigerators were exported (Bhutan, Myanmar, Nepal and countries in Africa and the Middle East). The company's HFC-134a consumption in 2016 was 197.30 mt. The company also has a production line of compressors with a cooling capacity range of 85 to 205 watts used in the domestic refrigerator industry, with a total production of 2.25 million compressors in 2016, representing 70 per cent of the total market. It is estimated that the company would be producing 4.5 million compressors by 2021-2022 annually for both the domestic market and for exports.

7. In 2015, Walton completed the conversion of one production line from HFC-134a to isobutane as a demonstration project with funding support from the United States of America (US \$550,000), plus US \$790,000 provided by the enterprise. The project included conversion of assembly line comprising of investments in refrigerant storage, charging and supply system, gas charging and ultrasonic welding units, replacement of vacuum pumps with explosion-proof units and helium detection system, safety system including exhaust blower, gas detection and alarm system and explosion proof motors, modification of testing equipment and explosion proof research and development testing rooms, and training. All compressors used in the conversion were imported as the project did not include compressor manufacturing conversion. In 2016, Walton produced 650,000 refrigerators on this converted line with refrigerant charge ranging from 39 grams to 60 grams per unit reducing HFC-134a consumption by 65 mt. Lessons learned from this conversion to isobutane technology encouraged Walton to move forward to convert the entire manufacturing facility to hydrocarbons.

8. At the 62nd meeting, the Executive Committee approved US \$1,146,074 for the conversion of the insulation foam component to replace 183.6 mt (20.2 ODP tonnes) of HCFC-141b to cyclopentane for domestic refrigeration manufacturing at Walton. The project was successfully completed by 2014. At the time of the approval of the project, the capacity of the enterprise was about 283,000 units/year.

Project overview and funding request

Technology selection

9. The project proposal provides a review of the technology options available in terms of their technical and economic feasibility, and environmental performance. The enterprise evaluated propane-butane mixture and pure isobutane and concluded that isobutane alone is the better option. Furthermore, it is readily available and cost-effective and has been used in the production line that was converted with funding assistance from the United States of America.

Production conversion activities foreseen

10. The conversion of the production lines from HFC-134a to isobutane as a refrigerant for manufacturing domestic refrigerators includes: modification or replacement of the equipment in the production process for refrigerators, installation of safety devices in areas where refrigerant is handled and product re-design including introduction of safety feature to handle flammable refrigerants changes in

product components including heat exchanger and compressor; and support for the service infrastructure for handling installation and maintenance. The new product will have an average refrigerant charge of 40 to 90 grams of isobutane per unit instead of an average of 126 grams of HFC-134a. Financial assistance for the conversion of the lines are requested for refrigerant supply and storage, vacuum pumps, refrigerant charging equipment, leak detection equipment, safety infrastructure and assembly line testing equipment, vacuum pumps, charging machines, manifold for service centre for equipping service infrastructure for handling hydrocarbon refrigerants, modification of drier filter production line for use with isobutane, changing fin press die for frost free refrigerator production and technical assistance/consultancy for product redesign, training costs and civil works necessary for conversion. The incremental operating costs (IOC) for the production of 1.62 million refrigerators is estimated at US \$3,018,600 (i.e., US \$1.83 per unit). These costs have not been requested. Table 2 summarises the investment costs requested for the project.

Table 2: Estimated costs for conversion of three domestic refrigerator manufacturing lines at Walton

Description	Cost (US \$)
Product design, testing and certification	240,000
Refrigerant charging and supply system	130,000
Assembly line modifications	1,068,000
Safety systems	203,000
Service centers equipment support	150,000
Technical assistance and training	160,000
Shipping and insurance	116,325
Civil construction	80,000
Contingencies	214,733
Total	2,362,058
Operating costs	-
Total fund requested	2,362,058

11. The conversion of the compressor line to manufacture fixed speed compressors for refrigerators using isobutane as the refrigerant includes: product redesign, modifications in tool, die, moulds and machining operations for design changes in parts and components to ensure energy efficient performance of the compressors; safety systems and training and testing needed for assessing its reliable performance. The total estimated cost of the project is US \$3,574,450; of this amount, US \$1,000,000 is co-financed by Walton. Table 3 presents the summary of the costs requested by the company.

Table 3: Estimated project costs for conversion of compressor manufacturing facility at Walton

Description	Cost (US \$)
Costs of plant equipment modification	2,260,000
Product redesign, prototype development and testing	500,000
Safety system for testing and verification	250,000
Training	20,000
Installation and commissioning	169,500
Civil construction and other miscellaneous	50,000
Contingency	324,950
Total	3,574,450
Co-financing	1,000,000
Total fund requested	2,574,450

12. The total costs for refrigerator manufacturing conversion and compressor conversion as submitted is summarized in Table 4.

Table 4. Estimated costs for conversion of three domestic refrigerator manufacturing lines and one compressor line at Walton

Particulars	US \$	HFC-134a phase-out (mt)	Cost – effectiveness (US \$/kg)
Refrigerator manufacturing	2,362,058	197.30	11.97
Compressor manufacturing	2,574,450		NA
Total	4,936,508	197.30	NA

13. The project is expected to result in direct emissions reduction of about 282,000 tonnes of CO₂- equivalent tonnes with the reduction of 197.3 mt of HFC-134a. No estimates of indirect emission savings associated with energy efficiency were provided.

14. The project will be implemented over a period of 24 months.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

Eligibility

15. This project has been submitted in line with decision 78/3(g). It included an official letter from the Government with the commitment required in the decision as mentioned in paragraph 2.

16. The Secretariat reviewed the project proposal based on the current policies and decisions of the Multilateral Fund and the review of similar conversion projects for CFC phase-out so far approved (i.e., conversion of refrigerant component from CFC-12 to isobutane, and conversion of compressors from HCFC-22 to propane involving product and manufacturing process redesign). The Secretariat's comments on the project proposals are presented below.

Conversion of refrigerator assembly line to isobutane

17. Noting that one production line had already converted to isobutane technology, the Secretariat requested clarification on the need for product redesign, prototype development and certification; the requests for components for assembly line modification; the need for additional safety infrastructure; the need for modification of the filter drier manufacturing process and fin press die for producing evaporators; and the need for technical assistance and training component.

18. Following a discussion on the above, UNDP explained that the requested modifications were necessary to implement the conversion projects, and agreed to adjust costs of equipment required for ultrasonic welding machines in the production lines, rationalised the number of vacuum pumps and their unit costs, and adjusted the costs required for safety systems. UNDP also agreed to remove the component relating to filter drier manufacturing based on consultation with the company, and reduce the costs for technical assistance, product redesign, testing and certification.

19. The incremental operating cost had been estimated at US \$1.863/unit on an average, including US \$2.00/compressor. However, financial assistance is requested for converting the compressor manufacturing line to isobutane. This would result in incremental savings of US \$0.137/unit, or US \$221,940 for a total production of 1,620,000 units in 2016.

20. The funding component also included assistance to service centres equipment infrastructure. As this activity is related to servicing, UNDP agreed to consider deducting an additional 33.33 mt of HFC-134a (47,662 CO₂-equivalent tonnes) calculated at US \$4.8/kg in line with 74/50(c). The agreed costs of the conversion of the domestic refrigerator manufacturing lines are shown in Table 5.

Table 5. Agreed costs for conversion of domestic refrigerator manufacturing lines at Walton

Particulars	Proposed cost (US \$)	Agreed cost (US \$)
Refrigerator manufacturing		
Product design, testing and certification	240,000	96,000
Refrigerant charging and supply system	130,000	130,000
Assembly line modifications	1,068,000	671,000
Safety systems	203,000	158,000
Technical assistance	160,000	70,000
Shipping and insurance	116,325	71,925
Civil construction	80,000	60,000
Service sector equipment support	150,000	0
Total funding request (excluding contingency)	2,147,325	1,256,925
Contingency	214,733	125,693
Total incremental capital cost	2,362,058	1,382,618
Incremental operating savings	*	(221,940)
Total incremental cost	2,362,058	1,160,678
HFC-134a consumption (mt)	197.3	197.3
CE (US \$/kg)	11.97	5.88
Servicing sector		
Technical assistance		150,000
Training of technicians		10,000
Total		160,000
HFC-134a consumption (US \$4.8/kg) (mt)		33.33
Total HFC-134a phased-out (mt)		230.63
CO₂-eq tonnes of HFC-134a phased-out		329,801
Total cost of the project		1,320,678

*Incremental operating costs were not requested in the original project proposal.

Conversion project for compressors

21. The Secretariat has limited experience in projects related to the conversion of compressor manufacturing from HFC-134a to isobutane for domestic refrigerators; however, it reviewed this project in light of the demonstration projects approved for compressor conversion to hydrocarbon refrigerant in air-conditioning, noting similarities between these projects.

22. The proposed conversion is for producing fixed-speed isobutane-based compressors while the compressors currently used for the isobutane-based refrigerators produced by the enterprise are inverter-based models which are imported. UNDP explained that the choice of fixed-speed compressor model was to provide a cost advantage while introducing the new refrigerators using isobutane in the market, noting that inverter-type refrigerators cost more. The enterprise is committed to adopting a variable speed compressor model at a future date when product acceptance is achieved, costs are more favorable, and energy efficiency becomes a more important driver rather than product cost for the end-user. This conversion will be done at the company's cost.

23. The Secretariat requested clarification on the costs associated with changes in the manufacturing facility, and the costs associated with product redesign, testing facilities and training; in particular, the cost for motor line conversion at US \$975,000 and other modifications in machining equipment and fixtures.

24. Further to discussion with UNDP it was agreed to reduce the costs for the components to US \$925,000, resulting in a co-finance of US \$475,000 by Walton. UNDP further agreed to the reduction of the costs for redesign, testing and prototype development, and to reduce the costs for installation and commissioning. The agreed costs for conversion of the compressor manufacturing facility are shown in Table 6.

Table 6. Agreed costs for conversion of compressor manufacturing at Walton

Particulars	Proposed cost (US \$)	Agreed cost (US \$)
Costs of plant equipment modification	2,260,000	1,400,000
Product redesign, prototype development and testing	500,000	250,000
Safety system for testing and verification	250,000	250,000
Training	20,000	20,000
Installation and commissioning	169,500	108,120
Civil construction and other miscellaneous	50,000	50,000
Total incremental cost (excluding contingency)	3,249,500	2,078,120
Contingency	324,950	207,812
Total funding for conversion	3,574,450	2,285,932
Costs for co-finance by Walton	1,000,000	475,000
Funding request to MLF	2,574,450	1,810,932

Agreed level of funding

25. Based on the review of the Secretariat, and discussions and clarifications provided by UNDP, the proposed incremental costs for conversion for the refrigerator manufacturing component of Bangladesh amounts to US \$3,131,610 to phase-out 230.63 mt (329,801 CO₂-equivalent tonnes) of HFC-134a as shown in Table 7, noting that investment projects submitted in line with decision 78/3(g) were intended in part to gain experience in the incremental costs that might be associated with phasing down HFCs in Article 5 countries.

Table 7. Agreed incremental costs for conversion of refrigerator and compressor manufacturing components

Particulars	US \$	HFC-134a phase-out (mt)	Cost – effectiveness (US \$/kg)
Refrigerator manufacturing	1,160,678	197.30	5.88
Compressor manufacturing	1,810,932		NA
Service sector component*	160,000	33.33	4.80
Total	3,131,610	230.63	

*Decision 74/50 paragraph (c).

26. The enterprise has committed that it will stop using HFC-134a in producing domestic refrigerators upon project completion by December 2019, leading to a reduction of more than 90 per cent of the HFC-134a used in domestic refrigerator manufacturing in the country.

2017-2019 Business plan

27. This project does not fall under the regular business plans submitted to the Secretariat and presented to the Executive Committee as it falls under the purview of decision 78/3(g).

Recommendation

28. The Executive Committee may wish to consider the projects for the conversion of domestic refrigerator manufacturing facility from HFC-134a to isobutane as a refrigerant, and the conversion of compressor manufacturing facility from HFC-134a-based compressors to isobutane-based compressors at

Walton Hitech Industries Limited in the context of its discussion of the proposals for HFC-related projects described in the document on Overview of issues identified during project review (UNEP/OzL.Pro/ExCom/79/19).
