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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Seventy-fifth Meeting
Montreal, 16-20 November 2015

PROJECT PROPOSAL: INDIA

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

Phase-out

•	HCFC phase-out management plan (stage I, third tranche)	UNDP/UNEP/Germany

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS
India

(I) PROJECT TITLE	AGENCY	MEETING APPROVED	CONTROL MEASURE
HCFC phase out plan (Stage I)	Germany, UNDP (lead), UNEP	66th	10% by 2015

(II) LATEST ARTICLE 7 DATA (Annex C Group l)	Year: 2013	975.94 (ODP tonnes)

(III) LATEST COUNTRY PROGRAMME SECTORAL DATA (ODP tonnes)								Year: 2014	
Chemical	Aerosol	Foam	Fire fighting	Refrigeration		Solvent	Process agent	Lab use	Total sector consumption
				Manufacturing	Servicing				
HCFC-123			0.6		3.0				3.6
HCFC-124									
HCFC-141b	4.1	412.1		22.6		13.6			452.4
HCFC-141b in Imported Pre-blended Polyol									
HCFC-142b		1.8			6.0				7.8
HCFC-22		13.2		194.9	234.7				442.8

(IV) CONSUMPTION DATA (ODP tonnes)			
2009 - 2010 baseline:	1,608.2	Starting point for sustained aggregate reductions:	1,691.25
CONSUMPTION ELIGIBLE FOR FUNDING (ODP tonnes)			
Already approved:	341.77	Remaining:	1,349.48

(V) BUSINESS PLAN		2015	Total
Germany	ODS phase-out (ODP tonnes)	3.2	3.2
	Funding (US $)	222,378	222,378
UNDP	ODS phase-out (ODP tonnes)	23.1	23.1
	Funding (US $)	1,539,184	1,539,184
UNEP	ODS phase-out (ODP tonnes)	1.4	1.4
	Funding (US $)	96,638	96,638

(VI) PROJECT DATA			2012	2013	2014	2015	Total
Montreal Protocol consumption limits			n/a	1,608.2	1,608.2	1,447.4	n/a
Maximum allowable consumption (ODP tonnes)			n/a	1,608.2	1,608.2	1,447.4	n/a
Agreed funding (US$)	Germany	Project costs	925,452	869,508	0	199,440	1,994,400
		Support costs	106,440	100,006	0	22,938	229,384
	UNDP	Project costs	10,000,000	7,000,000	0	1,438,490	18,438,490
		Support costs	750,000	490,000	0	100,694	1,340,694
	UNEP	Project costs	430,800	344,640	0	86,160	861,600
		Support costs	52,388	41,910	0	10,478	104,776
Funds approved by ExCom (US$)		Project costs	11,356,252	8,214,148	0		19,570,400
		Support costs	908,828	631,916	0		1,540,744
Total funds requested for approval at this meeting (US$)		Project costs				**1,724,090**	1,724,090
		Support costs				**134,110**	134,110

Secretariat's recommendation:	For blanket approval

PROJECT DESCRIPTION

1. On behalf of the Government of India, UNDP as the lead implementing agency, has submitted to the 75th meeting a request for funding for the third and final tranche of stage I of the HCFC phase-out management plan (HPMP), at a total cost of US $1,858,200, consisting of US $1,438,490, plus agency support costs of US $100,694 for UNDP, US $86,160, plus agency support costs of US $10,478 for UNEP and US $199,440, plus agency support costs of US $22,938 for the Government of Germany. 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 2016.

Report on HCFC consumption

HCFC consumption

2. The Government of India reported a consumption of 906.58 ODP tonnes of HCFC in 2014. The 2010-2014 HCFC consumption is shown in Table 1.

Table 1. HCFC consumption in India (2010-2014 Article 7 data)

HCFC	2010	2011	2012	2013	2014*	Baseline
Metric tonnes						
HCFC-22	12,503.0	10,266.39	15,646.51	8,029.44	8,050.09	10,945.0
HCFC-123	115.0	-	136.00	196.95	180.82	176.5
HCFC-124	603.0	288.74	69.25	0.00	0.00	611.5
HCFC-141b	7,837.0	7,924.00	6,400.00	4,568.22	4,112.56	7,868.5
HCFC-142b	805.0	645.00	1,308.40	428.94	120.32	1,903.0
Total (mt)	**21,863.0**	**19,124.13**	**23,560.16**	**13,223.55**	**12,463.79**	**21,504.5**
ODP tonnes						
HCFC-22	687.70	564.65	860.56	441.62	442.76	602.00
HCFC-123	2.30	-	2.72	3.94	3.62	3.50
HCFC-124	13.30	6.35	1.52	0.00	0.00	13.50
HCFC-141b	862.10	871.64	704.00	502.50	452.39	865.50
HCFC-142b	52.30	41.93	85.05	27.88	7.81	123.70
Total (ODP tonnes)	**1,617.60**	**1,484.57**	**1,653.85**	**975.94**	**906.58**	**1,608.20**

*Country programme data submitted on 29 September 2015.

3. Except for a peak in 2012, HCFC consumption in India has been decreasing since 2010. In 2014, it was already 43.6 per cent below the HCFC consumption baseline. The reduction is attributed to the phase-out of HCFC-141b associated with foam enterprises converted under stage I; regulations for controlling and monitoring HCFC consumption, particularly relating to HCFC-141b use in foam applications; controls in HCFC production; and promotion of alternatives during awareness and information outreach programmes.

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 2013 was 975.94 ODP tonnes and 906.58 ODP tonnes for 2014. The verification reported that the licensing and quota system is independent, comprehensive, stringent, and reliable; and therefore it did not provide suggestions for specific improvements.

Country programme (CP) implementation report

5. The Government of India reported HCFC sector consumption data under the 2014 CP implementation report which is consistent with the data reported under Article 7.

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

Legal framework

6. The most recent measures that have come into force include the ban on issuance of licenses for imports of pre-blended polyols containing HCFCs from January 2013; the ban on issuance of licenses for imports of blend containing HCFCs from January 2013; the ban on establishing new capacity to manufacture products made with or containing HCFCs; and the ban on imports of air-conditioning and refrigeration equipment and other products using HCFCs from 1 July 2015.

Manufacturing sector

7. A total of 15 polyurethane (PU) foam enterprises consuming 269.17 ODP tonnes of HCFC-141b are being converted to cyclopentane. An overview of progress in the conversion of these enterprises is shown in Table 1.

Table 1. Summary of HCFC-141b phase-out in the PU foam manufacturing sector in India

Sub-sectors	No of enter-prises	Planned phase-out (ODP tonnes)	Actual phase-out (ODP tonnes)	Status of implementation
Domestic refrigerators	8	178.75	169.73	Seven enterprises completed trial production with cyclopentane and are awaiting final verification for project completion. One enterprise is completing equipment installation.
Continuous panels	2	49.61	Nil	Both enterprises are in the process of procuring equipment. The delay is due to regulatory approvals for flammable blowing agents). Completion of projects expected in December 2015 and September 2016, respectively.
Discontinuous panels	5	41.25	17.60	Two enterprises completed trial production with cyclopentane and are awaiting final verification for project completion. Three enterprises are completing installation of equipment.
Total*	**15**	**269.17**	**187.33**	**So far 70 per cent of the total phase-out target has been achieved.**

*In addition, one non-eligible enterprise will phase out 8.36 ODP tonnes of HCFC-141b.

8. In addition, 15 system houses are receiving technical assistance to develop new formulations of pre-blended polyols using low-global warming potential (GWP) foam blowing agents. All of the systems houses assisted under the project have developed formulations based on HCFC-free alternatives that can be adopted by downstream-users, subject to commercial factors. An overview of the findings on the main alternatives used in the project is presented in Table 2.

Table 2. Overview of low-GWP alternatives used in pre-blended polyols formulations in India

Alternative	No. of systems houses	Percentage of blowing agent in the polyol	Advantages and disadvantages
HFO-1233zd (E)	5	8% to12% depending on the application	Advantages: Better energy efficiency, easy to adopt. Disadvantages: Causes blend storage stability issue which is yet to be resolved. Cost is about ten times higher than HCFC-141b.
FEA-1100*		14% to 18% depending on density of foam and insulation value	Advantages: Good technical properties of the foam including the K value** and strength. Easy to adopt. Disadvantages: Cost is about ten times higher than HCFC-141b.
Methyl formate	14	5% to 6.5% depending on applications	Advantages: Very good solubility in polyester as well as polyether based systems. It provides smooth surface finish. It can be used with low and high pressure machines. Easy replacement of HCFC for some application like thermoware. Disadvantages: Premix stability is poor, particularly, in high water formulation. Corrosive and flammable and may lead to some rusting in commercial refrigeration stand-alone units.
Pre-blended cyclopentane	2	13% to 15% depending on application	Advantages: Very stable with special polyols and special formulations. Can be easily used in certain applications especially in medium size enterprises. Proven blowing agent with low operating cost. Disadvantages: Highly flammable blowing agent, safety measures are to be strictly applied. Require change in foaming machine and on peripheral jig and fixtures. Safety costs may be significant.
Methylal	3	6% to 8% depending on applications***	Formulation development and tests ongoing.

* FEA-100 is a foam expansion agent with a GWP of 5.

** K factor is a rate of which heat flows through a material. Values for insulation are normally based on one-inch thickness of one homogenous material. The lower the K factor, the better the insulation value of the material.

*** Methylal as blowing agent in the manufacture of PU foam systems. An assessment for application in MLF projects (UNDP 2012).

9. The systems houses are currently in the process of identifying the downstream users for demonstration. However, current technical and commercial issues like pre-mix stability, corrosion, lack of availability or very high cost of some of these blowing agents are significant barriers for their commercial adoption.

Refrigeration servicing sector

10. A total of 50 trainers and 11,276 technicians received training through 408 training programmes on refrigeration servicing (9,240 technicians) and installation of refrigeration equipment (2,036 technicians). Training modules for commercial refrigeration systems are being developed. Training programmes on good servicing practices have been initiated for the technical staff of large institutional HCFC users like Defence Services and Indian Railways Services.

11. Eleven sets of equipment and tools required for conducting the hands-on training were distributed to training institutions; and training material, including a handbook in English and Hindi, was developed and distributed as reference material to trained technicians.

12. The performance of the trainers and the quality of the training programmes were monitored by external consultants. Post-training monitoring is planned to verify whether trained technicians are implementing good servicing practices at work including refrigerant recovery, whether there is any

perceivable reduction in refrigerant consumption, and whether there have been any impediments in the implementation of good servicing practices.

13. Under the pilot project to promote refrigerant recovery and reclamation, the current status of the existing reclamation centres was assessed; two regional workshops to raise awareness amongst potential customers for the centres were held; and findings from these meetings and regional workshops were discussed by the implementing agency, the Government and relevant stakeholders for further action.

Enabling activities for compliance with stage I of the HPMP

14. Nine awareness-raising workshops were organised with 714 participants covering HCFC-related regulations, HCFC phase-out commitments, and challenges to adopting alternative technologies including adequate knowledge on issues of flammability, toxicity, and best operating practices. This included four general workshops addressed to stakeholders, as well as five workshops addressed specifically to refrigerant dealers on minimizing and eventually eliminating emissions of HCFCs through better refrigerant transfer practices and leak prevention; and increased use of non-ODS-refrigerant-based equipment.

15. The Refrigeration and Air-conditioning Service Sector Society (RASSS) was established and registered as an official body on 26 February 2014 and together with its launching, a workshop was organised with the participation of 208 RASSS member technicians. This institution will assist with the technicians' certification system.

16. A website page and videos on technical subjects were created by UNEP in cooperation with the Ministry of Environment and Forests and the PMU to support the HPMP activities.

17. An amendment for non-HCFC building codes and a template for amending the curriculum of architectural colleges to include ODS issues is underway. Equipment procurement was completed and 28 refrigerant identifiers have been supplied to customs.

18. In May 2015 the Directorate of Revenue Intelligence (DRI), India, won the Asia Environmental Enforcement Award (AEEA) in the organization category for the successful enforcement operations that led to the seizure of various environmentally sensitive goods, including 45,790 cylinders of ODS.

Project implementation and monitoring unit (PMU)

19. The Government monitors implementation of the HPMP at the end-user enterprises. Upon completion of the project, sales of HCFCs to these enterprises are prohibited. This monitoring helps the Government works with the industry to sustain HCFC phase-out.

Level of fund disbursement

20. As of October 2015, of the US $19,570,400 approved so far, US $12,859,173 had been disbursed (US $11,021,623 for UNDP, US $375,000 for UNEP and US $1,462,550 for the Government of Germany). The balance of US $6,711,227 will be disbursed in 2016 (Table 3).

Table 3. Financial report of stage I of the HPMP for India (US $)

Agency	First tranche		Second tranche		Total approved	
	Approved	Disbursed	Approved	Disbursed	Approved	Disbursed
UNDP	10,000,000	9,440,120	7,000,000	1,581,503	17,000,000	11,021,623
UNEP	430,800	275,000	344,640	100,000	775,440	375,000
Germany	925,452	925,452	869,508	537,098	1,794,960	1,462,550
Total	**11,356,252**	**10,640,572**	**8,214,148**	**2,218,601**	**19,570,400**	**12,859,173**
Disbursement rate (%)		93.7		27.0		65.7

Implementation plan for the third tranche of the HPMP

21. The main activities to be implemented in 2016 are presented below:

(a) Complete the remaining PU foam enterprise conversions;

(b) Continue providing capacity building to training partners and training to technicians, and implement the training impact monitoring system;

(c) Finalize revision of the training institutes' syllabus to include good servicing practices and provide additional training for institutional HCFC users;

(d) Continue customs training and awareness and information outreach activities including the update and maintenance of the website on HCFC phase-out, and facilitate the establishment of a refrigeration and air-conditioning servicing enterprise association; and

(e) Continue project monitoring, including coordination among implementing agencies, project review, and increasing awareness about ODS issues on the part of senior decision makers.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

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

Legal framework

22. The Government of India has already issued HCFC import and production quota for the year 2015 for 906.3 ODP tonnes.

23. With regard to the ban on imports of HCFC-based refrigeration and air-conditioning equipment from 1 July 2015, UNDP informed that as of now, the Government has not faced any specific challenges in imposing this measure; however, based on prevailing technology on the market, equipment currently imported is largely HFC-410A-based. Currently there are no incentives in place to promote imports of a specific type of equipment.

Manufacturing sector

24. The major progress achieved in the completion of the majority of conversions was noted. UNDP explained that the technology conversion process was smooth, as India has been implementing HC-based conversion in PU foam manufacturing since the late 1990s. There have not been major implementation issues. The reason why some of the enterprises have not completed their conversion as originally planned has been implementation planning, keeping in mind their business requirements and operational logistics. It is expected that all conversions will be completed in 2016.

25. With regard to the technical and economic barriers experienced for the introduction of low-GWP foam formulations through system houses, UNDP considers that these barriers are to be addressed prior to technology adoption by downstream users. Currently, technical improvements are being made to the formulations. The increased availability of HFOs and the regulations which are already in place will be the main drivers for adoption of HCFC-free blowing agents. Downstream-user demonstrations included in stage I are expected to be completed by December 2016. However, it is envisaged that mainstream

commercialization of the new formulations would take place later during the implementation of stage II, i.e., by 2018.

Refrigeration servicing sector

26. The Secretariat followed up on the reorientation of the retrofit component in light of decisions 72/17 and 73/34 on retrofit of HCFC-based refrigeration and air-conditioning equipment to flammable or toxic refrigerants. UNDP explained that the Government of Germany as the implementing agency for the refrigeration servicing sector, in consultation with the NOU and national stakeholders, agreed to replace the retrofit component by additional technician-training programmes on good servicing practices that include topics such as safety and maintenance, recovery, recycling and reclamation of refrigerants.

Conclusion

27. The Secretariat noted that HCFC consumption in India has decreased in the last two years to levels below the baseline, and that the country has an operational licensing and quota system for imports, exports and production. There has also been substantive progress achieved in the implementation of approved activities, including the conversion of nine PU foam enterprises with a phase-out of 187.33 ODP tonnes. In addition, 15 systems houses developed polyol formulations based on low-GWP blowing agents; 11,276 technicians received training in good practices in refrigeration; and awareness activities have been implemented to support the HPMP. Sixty-five per cent of the funds approved so far have been disbursed. The only pending major activity is the demonstration of low-GWP polyol formulations in downstream users, which UNDP expects to undertake upon identifying candidates and addressing technical issues. In view of the above, the Secretariat recommends approval of the third and final tranche of stage I.

RECOMMENDATION

28. The Fund Secretariat recommends that the Executive Committee:

(a) Takes note of the progress report on the implementation of the second tranche of stage I of the HCFC phase-out management plan of (HPMP) for India; and

(b) Requests the Government of India, UNDP, UNEP and the Government of Germany to submit progress reports on a yearly basis on the implementation of the work programme associated with the third tranche until the completion of the project, verification reports until approval of stage II, and the project completion report to the second meeting of the Executive Committee in 2017.

29. The Fund Secretariat further recommends blanket approval of the third and final tranche of stage I of the HPMP for India, and the corresponding 2016 tranche implementation plan, at the funding levels shown in the table below:

Project title	Project funding (US $)	Support cost (US $)	Implementing agency
HCFC phase-out management plan (stage I, third tranche)	1,438,490	100,694	UNDP
HCFC phase-out management plan (stage I, third tranche)	86,160	10,478	UNEP
HCFC phase-out management plan (stage I, third tranche)	199,440	22,938	Germany