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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Eighty-second Meeting
Montreal, 3-7 December 2018

PROJECT PROPOSALS: CHINA

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

Foam

• Conversion of polyurethane foam panels in domestic refrigeration manufacturing at Hisense Kelon from the use of cyclopentane and HFC-245fa to the use of cyclopentane and HFO-1233zd(E) as the blowing agent	UNDP

Phase-out

• HCFC phase-out management plan (stage I) (annual progress report)	UNDP, UNEP, UNIDO, World Bank, Germany, and Japan
• HCFC phase-out management plan (stage II, third tranche):	UNDP, UNEP, UNIDO, World Bank, Germany, Italy and Japan
Extruded polystyrene foam sector plan	UNIDO and Germany
Industrial and commercial refrigeration and air-conditioning sector plan	UNDP
Refrigeration servicing sector plan and enabling programme	UNEP, Germany and Japan
Solvent sector plan	UNDP

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 PROJECT

China

PROJECT TITLE(S)	BILATERAL/IMPLEMENTING AGENCY
(a) Conversion of polyurethane foam panels in domestic refrigeration manufacturing at Hisense Kelon from the use of cyclopentane and HFC-245fa to the use of cyclopentane and HFO-1233zd(E) as the blowing agent	UNDP

NATIONAL COORDINATING AGENCY	Foreign Economic Cooperation Office/ Ministry of Ecology and Environment

LATEST REPORTED CONSUMPTION DATA FOR ODS ADDRESSED IN PROJECT
A: ARTICLE 7 DATA (METRIC TONNES (MT), 2017, AS OF MAY 2018)

HFCs	n/a

B: COUNTRY PROGRAMME SECTORAL DATA (MT, 2017, AS OF MAY 2018)

HFCs	*

*Total consumption of 10,400 mt of HFC-245fa is estimated for 2017 for the manufacture of domestic refrigerators (source: project proposal).

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

CURRENT YEAR BUSINESS PLAN ALLOCATIONS		Funding (US $)	Phase-out (ODP tonnes)
	(a)	1,217,897	0.00

PROJECT TITLE:		
HFC-245fa used at enterprise:	mt	1,200
	mt CO_2-eq.	1,236,000
HFC-245fa to be phased out through this project:	mt	250
	mt CO_2-eq.	257,500
HFC-245fa alternatives to be phased in:	mt	250
	mt CO_2-eq.	750
Project duration (months):		24
Initial amount requested (US $):		2,343,000
Final project costs (US $):		
Incremental capital costs:		148,000
Contingency (10 %):		0
Incremental operating costs:		1,127,000
Total project costs:		1,275,000
Local ownership (%):		100
Export component (%):		8
Requested grant (US $):		1,275,000
Cost-effectiveness:	US $/kg	5.10
	US $/mt CO_2-eq.	4.96
Implementing agency support cost (US $):		89,250
Total cost of project to Multilateral Fund (US $):		1,364,250
Status of counterpart funding (Y/N):		Y
Project monitoring milestones included (Y/N):		Y

SECRETARIAT'S RECOMMENDATION	For individual consideration

PROJECT DESCRIPTION

Background

Consideration of the project proposal for Hisense Kelon at the 81st meeting

1. On behalf of the Government of China, UNDP submitted to the 81st meeting a project proposal to convert the manufacturing of polyurethane (PU) foam panels in domestic refrigerators at Hisense Kelon Electrical Holdings Company Ltd. from the use of cyclopentane and HFC-245fa to cyclopentane and HFO-1233zd(E) as the blowing agent, at a cost of US $3,877,300, plus agency support costs of US $271,411,[1] pursuant to decision 78/3(g).

2. In preparation for the 81st meeting, the Secretariat and UNDP did not reach an agreement on the level of incremental cost for the conversion of the manufacturing line at Hisense Kelon. Notwithstanding this, given the urgent requirement by the Executive Committee to gain experience in the incremental capital costs (ICCs) and incremental operational costs (IOCs) that might be associated with phasing down HFCs in Article 5 countries in light of decision 78/3(g), the Secretariat submitted the project for the consideration of the Executive Committee.

3. At its 81st meeting, the Executive Committee considered the project proposal but did not approve it owing to concerns raised in the contact group established for the discussion of HFC investment projects, particularly that no agreement was reached between the Secretariat and UNDP on the incremental cost of the project.

4. As a result of the discussion, the Executive Committee decided that those HFC investment projects about which concerns had been expressed at the 81st meeting could be resubmitted in accordance with decision 79/45 only if those specific concerns had been addressed (decision 81/53(c)).

Resubmission of the of the project proposal for Hisense Kelon at the 82nd meeting

5. Upon giving due consideration to the suggestions and concerns of the Secretariat regarding the proposal, on behalf of the Government of China, UNDP resubmitted to the 82nd meeting a revised project proposal, at a reduced cost of US $2,343,000, plus agency support costs of US $164,010.

6. The project for Hisense Kelon submitted to the 82nd meeting is the same as the proposal submitted at the 81st meeting, adjusted after discussions with the Secretariat. The following sections[2] comprise a description of the proposal, the Secretariat's comments including the discussion on how the concerns at the 81st meeting have been addressed in the present resubmission, and a recommendation.

HFC consumption and sector background

7. At the 74th or 75th meetings, the Government of China did not submit a request for funding for a survey on ODS alternatives, in line with decision 74/53. Therefore, no information on the total consumption of HFCs and their sectoral distribution in the country is available.

8. The HCFC consumption baseline for China (35,814 ODP tonnes) represented 54 per cent of aggregated baseline for all Article 5 countries (19,269 ODP tonnes). As reference, information on the aggregate level of HFC consumption in Article 5 countries is contained in the reports prepared by the Technology and Economic Assessment Panel (TEAP) Task Force under decisions XXV/5 and XXVI/9. Based on these reports, the aggregate level of HFC consumption in Article 5 countries amounted

[1] UNEP/OzL.Pro/ExCom/81/29.

[2] Information was extracted from document UNEP/OzL.Pro/ExCom/81/29 where relevant.

to 284,325 metric tonnes (mt) in 2015; consumption of HFC-134a, R-410A, R-407C, R-404A and R-507A represented more than 97 per cent of the total consumption. Under a business-as-usual scenario, aggregate HFC consumption would be expected to increase to 1,021,216 mt in 2030, with an average annual growth rate of 9.9 per cent between 2015 and 2025, as shown in Table 1.

Table 1. HFC consumption in Article 5 countries reported by the TEAP Task Force

HFC	Consumption (mt)				Growth rate (%)*
	2015	2020	2025	2030	
HFC-134a	78,688	106,731	139,547	177,432	5.9
R-410A	106,661	192,770	284,682	364,845	10.3
R-407C	55,278	101,216	174,433	285,500	12.2
R-404A	18,202	31,982	55,964	83,845	11.9
R-507A	18,202	31,982	55,964	83,845	11.9
HFC-152a	3,364	5,669	11,280	15,225	12.9
HFC-245fa	2,172	3,840	4,986	5,504	8.7
HFC-365mfc/HFC-227ea	1,758	3,428	4,546	5,020	10.0
Total	284,325	477,618	731,402	1,021,216	9.9

* Average growth rate between 2015 and 2025.

9. The domestic refrigeration manufacturing sector in China accounts for 50 per cent of global production. Between 2011 and 2016, China produced on average 70 million domestic refrigerators/year. In 2017, production increased to 75,160,000 units. Of the more than 200 domestic refrigeration manufacturers in China, 30 produce 95 per cent of the units, and five of them (Haier, Hisense Kelon, Meiling, Midea and Siemens) produce around 70 per cent.

10. Between 2000 and 2015, following the phase-out of CFC-11, cyclopentane was used widely as a blowing agent in the domestic refrigeration sector. Given the increasingly strict requirements relating to energy efficiency, in 2000 the domestic refrigeration sector in China started conducting research into the use of cyclopentane mixed with HFC-245fa (C5+HFC-245fa) to improve the thermal-insulation performance of pure cyclopentane.

11. Hisense Kelon was the first manufacturer in China to commercialize domestic refrigerators using C5+HFC-245fa technology. Around 2015, the blend became one of the main insulation technologies in the domestic refrigerator industry. It is estimated that 10,400 mt of HFC-245fa were used in 2017 in the China domestic refrigerator sector; consumption could grow as enterprises strive to meet stricter energy-efficiency standards.

Enterprise background

12. Hisense Kelon, a locally owned enterprise, is one of the country's largest manufacturers of white-line electrical household appliances, including refrigerators and freezers with volumes from 50 to 650 litres, and washing machines. In 2017, it produced around 10,700,000 domestic refrigerators, about 3,750,000 of which were exported (one million units using C5+HFO-1233zd(E) were exported to the European Union).

13. The enterprise has four production facilities in China; it uses C5+HFC-245fa as its main foaming technology, with total consumption of 1,200 mt of HFC-245fa.

Project description and costs

14. Currently available alternatives to HFC-245fa in domestic refrigeration include cyclopentane, HFO-1233zd(E) and HFO-1336mzz. The enterprise has selected a blend of cyclopentane and HFO-1233zd(E) (C5+HFO-1233zd(E)) owing to the availability of HFO-1233zd(E) on the local market, the high cost of pure HFOs, its past experience with dual-component foaming technology, and the excellent thermal-insulation performance of the blend, which could lead to refrigerator energy-efficiency gains of one per cent in comparison with C5+HFC-245fa.

15. Hisense Kelon aims to convert one domestic-refrigerator manufacturing line (line CD),[3] located in Guandong, with a production capacity of 1,200,000 units/year and consumption of 250 mt of HFC-245fa. The line was established in 2008 and the baseline equipment is from 2008 (tanks and pumps, two pre-mixers and one foam dispenser) and from 2017 (three foam dispensers).

16. The following changes to the manufacturing equipment are proposed to enable the introduction of C5+HFO-1233zd(E):

(a) Replacement of all plastic sealing rings in cylinders, pipes and foaming equipment on account of the solvent properties of HFO-1233zd(E);

(b) Conversion of the polyether-supply control system to address the change in the mixing ratios of blowing agents and polyols;

(c) Conversion of the static pre-mixing unit owing to HFO solvency and temperature sensitivity (replacement of sealing rings, new thermal-static system);

(d) Conversion of the four foam dispensers to meet the stricter temperature-control requirements of HFO-1233zd(E), including: addition of thermostatic control devices in four foaming rooms; addition of water-controlled thermal-static devices to the existing jigs and moulds in 40 workstations; change of parts of the foaming equipment owing to properties of the HFO; a change in ratio between polyols and methylene diphenyl diisocyanate (MDI); and the construction of a new pre-heating system.

17. The above modifications cover only the part of the foaming equipment that produces cabinets. The enterprise itself will fund the conversion of the foam dispenser used to produce doors.

Incremental costs

18. The incremental capital costs (ICCs) for converting line CD as submitted is US $1,899,700, out of which the amount of US $779,000 is being requested from the Multilateral Fund. The difference of US $1,120,700 will be co-financed by the enterprise, as presented in Table 2. Funds for the ICCs requested from the Multilateral Fund in the revised proposal are US $1,534,300 below the funds requested in the original proposal (US $2,313,300) submitted at the 81st meeting.

[3] The project submitted to the 81st meeting proposed to convert a different domestic-refrigerator manufacturing line (line A), located in Guandong, with a production capacity of 1,200,000 units/year and consumption of 250 mt of HFC-245fa. The line was established in 1991 and converted from CFC-11 to cyclopentane in 1997 with the assistance from the Fund. In 2007 the enterprise converted to C5+HFC-245fa technology with its own resources. In 2017, eight per cent of its production was exported to non-Article 5 countries.

Table 2. ICCs of line "CD" conversion at Hisense Kelon (US $)

Category	Equipment	Quantity	Cost per unit	Co-financing	MLF funding	Cost
Storage and supply	Tank, pipes and their sealing rings	1	8,000	8,000	0	8,000
	Pumps and supply-control systems	1	57,000	0	57,000	57,000
Pre-mixing machine	Static pre-mixing machine	1	140,000	0	140,000	140,000
	Thermal-static system	1	110,000	0	110,000	110,000
Foaming machine for cabinet	Thermal-static system for foaming room	2	30,000	60,000	0	60,000
	Thermal-static system for jigs and moulds	26	24,000	240,000	384,000	624,000
	Conversion of wet part of foaming machine	4	160,000	640,000	0	640,000
	Cabinet pre-heating systems	4	22,000	0	88,000	88,000
Sub-total ICCs				**948,000**	**779,000**	**1,727,000**
Contingencies (10 %)						172,700*
Total ICCs						**1,899,700**

*Co-financing.

19. The incremental operating costs (IOCs) were estimated at US $6.00/kg using a medium-capacity refrigeration unit (300 litres) as the reference for the calculation. The funding requested for the total IOCs for one year is US $1,500,000, as shown in Table 3.

Table 3. IOCs for domestic refrigerator manufacturing (PU foam) in Hisense Kelon

Item	Cost before conversion			Cost after conversion			IOCs (US $ per unit)
	Amount (kg/unit)	Price (US $/kg)	Cost (US $/unit)	Amount (kg/unit)	Price (US $/kg)	Cost (US $/unit)	
Cabinet							
Polyols	2.71	2.15	5.83	2.84	2.16	6.15	0.32
HFCs or HFOs	0.19	6.03	1.15	0.18	8.92	1.65	0.50
C5	0.35	1.51	0.53	0.36	1.51	0.55	0.02
MDI	3.91	3.97	15.51	4.04	3.97	16.02	0.51
Door							
Polyols	1.22	2.15	2.63	1.22	2.16	2.64	0.01
HFCs or HFOs	0.07	6.03	0.41	0.07	8.92	0.60	0.19
C5	0.14	1.51	0.21	0.15	1.51	0.22	0.01
MDI	1.72	3.97	6.82	1.72	3.97	6.82	0.00
Cost per unit (US $)			33.08			34.64	1.56
HFC-245fa consumption per sample unit (kg)							0.26
IOCs per kg (US $/kg)							6.00
Baseline HFC-245fa consumption (kg)							250,000
IOCs (US $)							**1,500,000**

20. An additional US $64,000 is requested for technical assistance activities, including research into formulation, staff training, project monitoring and evaluation, an independent safety review and progress reporting and dissemination.

21. The total cost of the revised project proposal, as submitted, amounts to US $2,343,000, with a cost-effectiveness of US $9.37/kg, as shown in Table 4.

Table 4. Total cost for the conversion of domestic refrigerators (PU foam) in Hisense Kelon, as submitted

Item	Cost (US $)	
	Original proposal (81st meeting)	**Revised proposal (82nd meeting)**
ICCs	2,313,300	779,000
IOCs	1,500,000	1,500,000
Technical assistance	64,000	64,000
Total cost	**3,877,300**	**2,343,000**
HFC-245fa consumption (mt)	250	250
HFC-245fa consumption (mt CO_2-eq.)	257,500	257,500
Cost-effectiveness (US $/kg)	15.51	9.37
Cost-effectiveness (US $/mt CO_2-eq.)	15.06	9.09

22. The project will be implemented in 24 months.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

Eligibility

23. This project has been resubmitted in line with decisions 78/3(g) and 79/45. The project endorsement letter from the Government of China indicates: the intention of the Government to ratify the Kigali Amendment; that the Government is aware that, if the project is approved by the Executive Committee, no further funding will be available until the instrument of ratification of the Kigali Amendment has been received by the depositary at the United Nations Headquarters in New York; and that the Government acknowledges that, if the project is approved, any HFC phased out will be deducted from any starting point agreed in the future.

24. The Secretariat has reviewed the project on the basis of similar projects approved for the conversion to HFOs in PU foam.

25. The Secretariat appreciates the submission by UNDP of a revised project proposal including a more suitable manufacturing line to be converted and rationalized levels of ICC. Given the limited experience in the Fund with the baseline technology (C5+HFC-245fa) and the technology proposed (C5+HFO-1233zd(E)), the Secretariat sought technical advice from a foam expert in reviewing the revised submission.

Maturity of the technology, replicability and sustainability of the conversion

26. The potential replicability of this project is high, considering that the line to be converted produces 1.2 million refrigerators, the enterprise produces 10 million of such units, and the entire sector in China produces 70 million. However, the use of C5+HFO is exclusively for units that supply the European Union market, as the price of the products is not competitive in China and in Article 5 countries. UNDP considers that, as governments take action to control the application of technologies with high global-warming potential (GWP), the market demand for products using low-GWP alternatives will likely increase, making C5+HFO-based domestic refrigerators more competitive. At present, it is difficult to estimate the future market after the conversion, but Hisense Kelon plans to promote the new products using C5+HFO on the market, and the Government and industrial associations will promote the use of low-GWP technologies among manufacturing industries.

27. Noting the uncertainty with regard to the commercialization of the product on the local market, the Secretariat asked whether the enterprise could commit not to increase HFC-based manufacturing in other lines in order to compensate for the possible low sales of the C5+HFO-based products. UNDP had indicated that the enterprise can, however, commit only to ceasing the use of ODS or high-GWP HFC in the converted line. UNDP also emphasized that Hisense Kelon played a leading role in introducing the use of pure C5 foaming technology as a replacement for CFC-11 and C5+HFC-245fa to improve insulation performance in the China domestic refrigerator industry. When implementing this project, UNDP and the Government will ask the enterprise to submit a "Letter of Commitment" to vouch that the related amount of HFC-245fa consumption in this enterprise will be phased out as a result of implementing this conversion project.

Incremental cost

28. UNDP reported that there is a supply of HFO-1233zd(E) in China, and that Hisense Kelon is already producing one million refrigerators with C5+HFO-1233zd(E). In this regard, the Secretariat enquired whether it would already be in position to provide information on the ICCs and IOCs of each of the products converted from HFC to HFO. UNDP explained that the conversion had been rather complicated and included procurement of equipment, part of which would not be incremental under the Multilateral Fund.

29. With regard to the equipment included in the project proposal submitted to the 81st meeting, UNDP highlighted that HFO-1233zd(E) has different characteristics from HFC-245fa, including in terms of solvency and thermal sensitivity. The equipment related to pre-mixing, storage and the foaming process needs to be converted to be suitable for HFO applications. Since the stability of HFO is poorer than that of HFC-245fa, owing to its double bond, there will be more stringent requirements placed on pre-mixing and storage facilities that cannot be met with the existing equipment for HFC-245fa. At the time it was also indicated that it might be possible to replace HFC-245fa with HFOs in the newest equipment without substantial ICCs; however, the equipment in line A (27 years old) would require substantial changes or complete replacement.

30. After reviewing existing information on HFOs and seeking technical advice from a foam expert, the Secretariat considered that the equipment items in the project proposal are not incremental for the following reasons:

(a) According to the HFO-1233zd(E) manufacturer, one of the main strengths of this blowing agent is that it can be a "near drop-in replacement for liquid HCFCs, HFCs, hydrocarbons (HCs) and other non-fluorocarbon blowing agents";

(b) The last report of the Rigid and Flexible Foam Technical Options Committee of the TEAP (2014) also highlights the low ICCs required for manufacturing appliances, including those for domestic and commercial refrigeration, using HFO, and the superior energy-efficiency performance in relation to saturated HFCs; the only disadvantage is the high operating cost;

(c) The study on "Blowing agent conversions from HCFC-141b to alternatives in Article 5 countries," prepared by an independent technical expert, and considered by the Executive Committee at its 76th meeting,[4] also indicated that blends of HCs with HFCs or HFOs can be used in the same equipment that is employed to manufacture using HCs. In addition, "for the conversion from HCFCs to HFC, HFOs, water-based systems or methyl formate technology, no additional capital costs for replacing existing high-pressure dispensers will be required by all the rigid PU foam enterprises";

[4] UNEP/OzL.Pro/ExCom/76/58, Annex I.

(d) HFO-1233zd(E) has a boiling point of 19 degrees Celsius, which is higher than that of HFC-245fa (15.3 degrees Celsius); therefore, enterprises using HFC-245fa already have the infrastructure needed to handle the temperature requirements of HFO-1233zd(E); and

(e) Consistent with the points above, a number of other projects requesting funding from the Multilateral Fund for the conversion of HCFC-141b-based foam to HFO in several applications have typically included only development of formulations and IOCs, and no significant ICCs.

31. Prior to the 81st meeting, the Secretariat and UNDP did not reach an agreement on the level of incremental costs for the conversion of manufacturing line A at Hisense Kelon. In preparation for the 82nd meeting, discussions focussed on the incremental cost of converting line CD, which had more recent equipment than the initially proposed line A. The main technical issues discussed were: the need to change ratios of metering units; the need for tighter temperature control during production; solvency characteristics of HFO-1233zd(E) and HFC-245fa; and the extent to which these issues would entail either modifications to the existing equipment or installation of new equipment.

Need to change the ratios of metering units

32. As described in the proposal, the HFO technology leads to loss of compressive strength of the final product; in order to maintain it, the ratio of polyether and MDI needs to be changed, while ensuring accurate metering control. Accordingly, US $57,000 was requested for changing pumps and the supply control system, US $140,000 to modify the pre-mixer and US $160,000 were estimated as co-financing to change the meters of the wet part of the cabinet foaming equipment.

33. Upon discussions with UNDP, the Secretariat noted that metering units are typically adjustable by design and, therefore, would not need to be replaced. On this basis, the funding requested for changing pumps and the supply control system and for modifying the pre-mixer was removed, and the estimated cost for modifying the foam dispensers (which is being co-financed by the enterprise) was reduced from US $160,000 to US $100,000. Even though this funding is no longer being requested, the Secretariat considers that this cost estimation is high. The project implementation results will provide more information.

Need for tighter temperature control

34. UNDP explained that there is currently no temperature-control device in the pre-mixing area for HFC-245fa, because it is not needed. Given the lower stability of HFO-1233zd(E), however, the temperature of the foaming process and of the components should be controlled accurately, because all of these will be in contact with the foaming agent or can have an impact on its reaction temperature; therefore, one chiller costing US $110,000 for the pre-mixing area and four chillers costing US $60,000 for the foaming room, are required.

35. The Secretariat noted that the boiling point of HFO-1233zd(E) is higher than that of HFC-245fa and would require an overall higher pre-mix temperature to obtain the same foaming profile. However, after an extensive review of available literature, no justification was found of the need for tighter temperature controls. Furthermore, informal communications between the Secretariat's technical expert and technology providers in the field, suggested that C5+HFO-1233zd(E) is at least as versatile as C5+HFC-245fa systems.

36. On this basis, the Secretariat concluded that none of the ICCs required to upgrade temperature control of the manufacturing plant through replacing the existing equipment or to introduce new equipment to pre-heat the cabinet jigs and moulds are justified. This type of equipment would normally already be in place for HFC-245fa-based systems.

Impact due to the solvency of HFO-1233zd(E)

37. Given the greater solvency power[5] of HFO-1233zd(E) as compared to HFC-245fa, the seals in the tank and pump will need to be replaced. In the case of line CD, the seals are based on fluoro-rubber, acrylonitrile rubber and acrylic rubber, which are not compatible with HFO-1233zd(E), and need to be replaced with polychloroprene, which is compatible with both HFC-245fa and HFO-1233zd(E). On this basis, the Secretariat agreed on the costs to change seals (US $8,000), initially proposed to be co-financed by the enterprise.

38. Based on additional information provided by UNDP, the increased solvency of HFO-1233zd(E) could alter the viscosity of the foam mixture, leading to different flow characteristics through the moulds and potentially differently shaped foam cells (especially to a more spherical orientation), which can lead to decreases in compressive strength for the same foam density, resulting in the need to increase the foam density. Based on formulation provided by UNDP for 11 models using C5+HFC-245fa and C5+HFO-1233zd(E) systems, the foam density of the formulation used in cabinets would increase on average by 4.15 per cent.

39. While the Secretariat had not agreed to an increase in foam density based on the information made available at the 81st meeting, with the additional information provided by UNDP, the Secretariat supports the need for density increase for the cabinets up to 2.075 per cent once the formulation have been optimized. On this basis, the IOCs have been recalculated for a one-year period at a total amount of US $1,127,000.

40. Even though it has been established that increases in density are not required in, for example, the replacement of HCFC-141b blowing agent with cyclopentane, the Secretariat recognizes the novelty of the baseline and replacement technologies in the present project. On this basis, UNDP has been requested to provide detailed information on the formulations developed and used, as well as on the optimization achieved and the IOCs incurred. This information will be included in the final report on incremental costs.

41. To assist in the optimization process, as well as with the several adjustments that may be required in the operation of the existing equipment (no funds are being recommended for modifications, retrofits or new items, except for the seals), the Secretariat suggests that US $140,000 of ICCs be allocated to trials to optimize the process of manufacturing with C5+HFO-1233zd(E) systems. This amount includes costs for research on the technical formulation of polyether and testing; staff training; products trials and safety certificate; and dissemination of experiences.

42. With regard to the potential use of water in the formulation, in order to reduce the IOCs, UNDP indicated that the enterprise tried to increase the ratio of water to reduce the use of HFO, but this resulted in the solidification of the foam and a possible reduction in insulation performance.

Total agreed project costs and cost-effectiveness

43. The total agreed project cost to be requested from the Multilateral Fund is US $1,275,000, consisting of ICCs, technical assistance activities, and IOCs for 12 months. The summary of the project costs and the cost-effectiveness are listed in Table 5.

[5] The degree to which a solvent holds a resin in solution, or reduces its viscosity.

Table 5. Total agreed cost for the conversion of domestic refrigerators (PU foam) at Hisense Kelon

Item	Cost (US $)
ICCs: cleaning of pipes and tanks, change of sealing rings in the blowing agent tank and pump and technical assistance (research on formulation of polyether and testing; adjustments to baseline equipment and optimization trials, staff training, updated safety certificate, and dissemination of experiences)	148,000
IOCs	1,127,000
Total cost	1,275,000
HFC-245fa consumption (mt)	250
HFC-245fa consumption (mt CO_2-eq.)	257,500
Cost-effectiveness (US $/kg)	5.10
Cost-effectiveness (US $/mt CO_2-eq.)	4.96

44. The Secretariat notes that the purpose of implementing projects under decision 78/3(g) is to gain experience in the ICCs and IOCs that might be associated with phasing down HFCs. On the basis of the information available at the time of review, the Secretariat considers that the agreed costs are its best estimate of the overall incremental costs of conversion; these estimates, however, might change as more information becomes available and according to the specific characteristics of the enterprise. The Secretariat, therefore, considers that approval of the project at the levels proposed above would not constitute a precedent.

Climate benefits

45. The project is expected to result in an emissions reduction of 256,750 tonnes of CO_2 equivalent with the reduction of 250 mt of HFC-245fa and the expected introduction of HFOs. No estimate of indirect emissions savings associated with energy efficiency has been provided.

Business plan 2018–2020

46. This project is included in the 2018–2020 business plan of the Multilateral Fund for the year 2019 at a value of US $1,217,897, including agency support costs, with no indication on the amount of HFC to be phased out. The Secretariat notes that as agreed (including support cost), the proposal is US $146,353 above what has been included into the business plan.

RECOMMENDATION

47. The Executive Committee may wish to consider:

(a) The project proposal for the conversion from HFC-245fa and cyclopentane to HFO-1233zd(E) and cyclopentane in the manufacture of domestic refrigerators at Hisense Kelon, in the context of its discussion on HFC stand-alone projects submitted to the 82nd meeting in line with decision 78/3(g), as described in the document Overview of issues identified during project review (UNEP/OzL.Pro/ExCom/82/31); and

(b) Whether or not to approve the project proposal indicated in sub-paragraph (a) above in the amount of US $1,275,000, plus agency support costs of US $89,250 for UNDP, on the understanding, if the project were to be approved:

(i) That no further funding would be available until the instrument of ratification by the Government of China had been received by the depositary at the Headquarters of the United Nations in New York;

(ii) That 250 mt (257,500 mt CO_2-eq.) of HFC-245fa would be deducted from the starting point for sustained aggregate reduction in HFC once it has been established;

(iii) That the project would be completed within 24 months of the transfer of funds to UNDP, and a comprehensive completion report would be submitted within six months of project completion with detailed information on:

a. The eligible incremental capital costs for all equipment and other components, including those not funded under the project;

b. Incremental operating costs, including detailed information on the formulations developed and used, as well as the optimization achieved in the reduction of density;

c. Any possible savings incurred during the conversion, and relevant factors that facilitated implementation (e.g. whether any purchased and/or installed equipment or supplies had gone through a competitive quote/bidding process and the details thereof); and

d. Changes in energy efficiency of the products being manufactured and any related policies undertaken by the Government; and

(iv) That any remaining funds would be returned to the Multilateral Fund no later than one year after the date of project completion.

HCFC PHASE-OUT MANAGEMENT PLAN (STAGE I) (ANNUAL PROGRESS REPORT) (UNDP, UNEP, UNIDO, World Bank, Germany, and Japan)

Note by the Secretariat

Background

48. At its 64th meeting, the Executive Committee approved, in principle, stage I of the HPMP for China for the period 2011 to 2015 at the amount of US $265 million (excluding agency support costs), associated with extruded polystyrene (XPS) foam, polyurethane (PU) foam, industrial and commercial refrigeration and air-conditioning (ICR), room air-conditioning manufacturing (RAC) and refrigeration servicing sector plans, the national enabling programme and the national co-ordination plan. The Committee also decided that the solvent sector, at a maximum level of funding of up to US $5,000,000, (excluding support costs), could be considered at the 65th meeting (decision 64/49). With the approval of the solvent sector plan at the 65th meeting (decision 65/36), the overall funding for stage I of the HPMP for China amounted to US $270,000,000.

49. The Agreement between the Government of China and the Executive Committee was updated several times and finalized at the 67th meeting, reflecting the newly established HCFC baseline for compliance in China, the change in responsibility of co-operating agencies, and the established agency support costs (decision 67/20).

50. To ensure compliance with the Montreal Protocol by China, the 2013 and 2015 HCFC consumption control targets in the six sector plans are shown in Table 1.

Table 1. HCFC consumption limits and targeted phase-out amount in consumption sectors for stage I of the HPMP for China

National/Sectoral level	2013 (ODP tonnes)		2015 (ODP tonnes)	
	Max. allowable consumption	Phase-out amount	Max. allowable consumption	Phase-out amount
National	18,865	n/a	16,979	n/a
Sector plans				
XPS	2,540	338	2,286	254
PU	5,392	673	4,450	942
ICR	2,403	224	2,163	240
RAC	4,109	176	3,698	411
Solvent	494	30	455	39
Servicing	n/a	61	n/a	0
Total	**n/a**	**1,502**	**n/a**	**1,886**

51. All tranches associated with the sector plans have been approved as listed in Table 2.

Table 2. Dates of approvals of sector plans of the HPMP for China

Sector plan	Meeting of the Executive Committee								
	64th	65th	68th	69th	71st	72nd	73rd	74th	75th
XPS	First			Second	Third		Fourth		Fifth
PU	First		Second		Third*		Fourth		Fifth
ICR	First		Second		Third		Fourth		Fifth
RAC	First		Second		Third		Fourth		Fifth
Solvent		First			Second				Third
Servicing	First		Second			Third		Fourth	Fifth

* Approved on an exceptional basis on the understanding that funding would be disbursed by the Treasurer to the World Bank only after the Secretariat had accepted as sufficient information provided by the World Bank to the effect that disbursement of 20 per cent or more of the second tranche to final beneficiaries had been achieved. Funds were transferred from the Treasurer to the Wold Bank in January 2014.

Submission to the 82nd meeting

52. On behalf of the Government of China UNDP, UNEP, UNIDO, the World Bank, and the Governments of Germany and Japan submitted annual progress reports on the implementation of the work programme associated with the final tranche for the XPS foam, PU foam, ICR, RAC and servicing sector plans associated with stage I of the HPMP. A progress report on the solvent sector plan has not been included as stage I has already been completed.

HCFC consumption

53. The Government of China has reported HCFC consumption for 2017 under Article 7 of the Montreal Protocol as shown in Table 3.

Table 3. HCFC consumption in China (2013 to 2017) (Article 7)

Year	2013	2014	2015	2016	2017	Starting point
	Metric tonnes					
HCFC-22	179,350	190,318	153,971	168,687	172,970	209,006
HCFC-123	998	1,006	900	943	990	507
HCFC-124	32	96	(46)	67	(6)	140
HCFC-141b	47,631	51,848	38,584	39,144	40,039	53,502
HCFC-142b	9,790	9,918	11,616	9,471	10,253	22,624
HCFC-225ca/cb	29	33	15	38	38	17
Total	**237,830**	**253,219**	**205,040**	**218,350**	**224,284**	**285,796**
	ODP tonnes					
HCFC-22	9,864	10,468	8,468	9,278	9,513	11,495
HCFC-123	20	20	18	19	20	10
HCFC-124	1	2	(1)	1	(0.13)	3
HCFC-141b	5,239	5,703	4,244	4,306	4,404	5,885
HCFC-142b	636	645	755	616	666	1,471
HCFC-225ca/cb	1	1	1	1	1	1
Total	**15,761**	**16,839**	**13,485**	**14,221**	**14,604**	**18,865**

54. HCFC consumption in China continues to be dominated by three substances, HCFC-22, HCFC-141b and HCFC-142b, which collectively account for 99.9 per cent of the country's consumption (in ODP tonnes). Overall HCFC consumption in 2017 was 2.9 per cent higher (in ODP tonnes) than in 2016 but still lower than in 2014 and previous years. The reason for the variation in HCFC consumption is mainly the economic slowdown in 2015, particularly in the real estate market, followed by economic recovery in 2016. Despite economic fluctuations, China continues to be in compliance with the Montreal Protocol and the Agreement with the Executive Committee for stage II of the HPMP (last consumption target in stage I was 2015).

55. The Government of China has reported country programme (CP) data for 2017. Table 4 presents HCFC consumption per sector for 2017 which demonstrates compliance with the manufacturing sector consumption limits set out in rows 1.3.1, 1.3.2, 1.3.3, 1.3.4 and 1.3.5 of Appendix 2-A of the Agreement between the Government of China and the Executive Committee for stage II of the HPMP.

Table 4. Consumption of HCFC (in ODP tonnes) per sector in China in 2017*

Substance	XPS foam	PU foam	ICR	RAC	Solvent	Servicing
HCFC-22	1,595		2,063	3,025		2,832
HCFC-141b		4,008			396	
HCFC-142b	618		6			43
HCFC-123			13			7
HCFC-124						(13)
HCFC-225ca/cb					1	

Substance	XPS foam	PU foam	ICR	RAC	Solvent	Servicing
Total	**2,213**	**4,008**	**2,082**	**3,025**	**397**	**2,869**
Maximum allowable consumption	2,286	4,450	2,163	3,698	455	n/a

*Data is from the CP report, the distribution between ICR and RAC sectors are submitted by the implementing agencies; aerosol sector not included as it is not part of stage I of the HPMP.

56. The Government of China continued to monitor the consumption in each of the different sectors. Each year, the Foreign Economic Cooperation Office (FECO) collects data from different sources including beneficiary enterprises, verification report of the production sector, the license system and industrial associations. Data is cross-verified with the actual consumption in the enterprises only for some sectors and substances, such as the RAC sector (with limited consuming enterprises) and HCFC-22. For sectors with large number of small and medium-sized enterprises (SMEs) (i.e., XPS foam, PU foam, ICR, and servicing sector) consumption is monitored through the national system of licensing and quotas for HCFC imports, exports, production and consumption. The domestic production quotas control HCFC sold in the local market and subsequent consumption in SMEs. Quotas are also issued to enterprises with an annual consumption of HCFCs over 100 metric tonnes (mt), for each of the different sectors.

57. In addition, FECO is cooperating with the local Environmental Protection Bureaus (EPBs) to strengthen policies that can support the reduction of HCFC consumption, including a ban for new HCFC-based manufacturing facilities.

Verification of consumption of HCFCs in China

58. The World Bank commissioned an independent verification of 2017 HCFC production and consumption in China. The verification confirmed that the consumption of HCFCs in 2017 was within the limits established by the Agreement for the consumption sector.

Overview of progress

59. An overview of the main achievements in the implementation of stage I of the HPMP include:

(a) Establishment of licensing and quota system to control the overall compliance in each one of the manufacturing sectors including the application of quota permits to enterprises consuming more than 100 mt of HCFC per year, resulting in compliance with all the manufacturing sector consumption limits during the years of implementation;

(b) Ban on the establishment, retrofitting or expansion of facilities for production or use of ozone depleting substances (ODS), except for HCFC produced for feedstock, in which case enterprises are required to submit documentation to the Ministry of Ecology and Environmental (MEE) ensuring that the facility is only for feedstock purposes and committing not to use HCFCs in any applications controlled by the Montreal Protocol;

(c) *XPS foam sector:* Stage I of the XPS foam sector plan was operationally completed. All the 25 XPS foam enterprises included in stage I converted to CO_2-based technology with the total phase-out of 9,590 mt of HCFC-22 and HCFC-142b. Seven of the converted plants are awaiting national acceptance. Additional 441 mt were reduced through the application of regulations;

(d) *PU foam sector:* Forty-two PU foam enterprises converted with a phase-out of 10,859 mt of HCFC-141b; after completion of conversion of the remaining 15 enterprises the total phase-out will reach of 12,969.10 mt of HCFC-141b. Additional 1,716 mt are being reduced through the application of regulations;

(e) *ICR sector:* Thirty-four production lines in the ICR sector converted with a phase-out of 8,786.4 mt of HCFC-22 (including the demonstration projects and the phase-out of 445.20 mt by non-Article 5 enterprises as of 2016). Three of the converted lines are awaiting national acceptance;

(f) *RAC sector:* Twenty-seven RAC lines converted (R-290, R-410A and compressors) with the total phase-out of 10,128.4 mt of HCFC-22 (of which 9,802.8 mt is associated with Article 5 ownership and the remaining 325.6 mt had been phased out without assistance from the Fund); after completion of conversion of the remaining two lines for which contracts have been signed, the total phase-out will reach 10,813.7 mt of HCFC-22 (of which 10,488.1 mt is associated with Article-5 ownership). In addition, 240 mt of HCFC-22 were phased out through the demonstration project at Midea approved at the 61st meeting;

(g) *Solvent sector:* Sector plan completed operationally (December 2017);

(h) *Refrigeration servicing sector:* Activities included *inter-alia* completion of an automatic approval system to update ODS import/export control system; training workshop on customs management of ODS imports/exports; capacity-building of national and local authorities through training on law enforcement in ODS management for 50 enforcement officers from 28 EPBs at city level and 17 EPBs at provincial level; training on good servicing practices and handling R-290 refrigerant for a total of 63 technicians/trainers and 1,054 technicians/students; awareness activities focusing on compliance with the Montreal Protocol; and monitoring of remaining activities under stage I; and

(i) Through the national coordination component, UNDP (as the lead implementing agency of stage I) assisted FECO in the coordination and monitoring of the implementation of stage I among stakeholders; submission of the progress report of the production and the five consumption sectors to the 82nd meeting and commissioning and submission of the financial audit report including funding disbursement and accrued interest of each sector in 2017.

Request of extension in date of completion of sector plans

60. The date of completion of stage I of the HPMP established in the Agreement between the Government and the Executive Committee was December 2016. At the 75th meeting, when the last tranche of stage I was submitted, the dates of completion of each sector plan were extended in order to allow the completion of the planned activities. As specified in decisions 75/29(a), 75/54, 75/55, 75/56 and 75/57, project completion reports (PCRs) for the XPS foam, PU foam, solvents and refrigeration servicing sectors were expected to be submitted six months after the operational completion of the sector plans and no later than the final meeting of the Executive Committee in 2018, and PCRs for the ICR and RAC sectors six months after the operational completion of the sector plans and no later than the final meeting of the Executive Committee in 2019.

61. The XPS foam and solvent sector plans were operationally completed and the PCRs submitted before the 82nd meeting. The RAC sector plan is due for completion in 2019, with the PCR to be submitted to the 84th meeting; no request for extension of the sector was submitted to the present meeting. The PU foam and the servicing sector plans were not completed as per the dates established at the 75th meeting, and are requesting extension of their completion dates. Details on the reasons for the request of these extensions and the comments and recommendations by the Secretariat are included in the stand-alone progress reports on the implementation of the PU and servicing sector plans attached to the Note by the Secretariat.

Monitoring of the sustainability of the conversions in the sector plans that completed stage I (XPS foam and solvent)

62. The Secretariat followed up on the processes in place to monitor the sustainability of conversions achieved in sector plans that have operationally completed stage I. The following feedback was provided by the relevant implementing agencies in consultation with the Government of China:

(a) *XPS foam:* UNIDO explained that projects have been supervised and monitored by the Government during implementation and after completion. During the conversion, FECO, the implementing support agency (ISA), accounting firms and technical experts conducted technical and performance verifications to ensure the achievement of each conversion milestone. After the plants conversion, the local EPBs witnessed the destruction of their baseline equipment used to manufacture with HCFCs, and conducted regular supervision and monitoring of the completed conversion sub-projects. In addition, the Government approves every year HCFC quotas to enterprises consuming more than 100 mt of HCFCs annually (average 2009-2010), and the EPBs record HCFC consumption by enterprises and inspect them on a daily basis. In case of identified non-compliance by any enterprise, a penalty is imposed according to the provisions stipulated in the ODS Management Regulation. UNIDO also continues to conduct supervision missions to China on a regular basis, to visit beneficiaries and conduct its own technical verifications; and

(b) *Solvent sector:* UNDP indicated that the Government of China has put in place a monitoring and evaluation mechanism to ensure the sustainable phase-out of HCFCs in this sector. Before implementation, all beneficiary enterprises underwent a verification process from an independent accounting firm to validate eligibility, consumption, and financial viability prior to issuing contracts. Each contract also stipulated milestones for project progress and payment which had to be agreed by the enterprise before signature. Once all the contracts are signed, FECO, through technical experts and personnel monitor the agreed milestones, verification reports are prepared after each enterprise visit and disbursement against each milestone is made only after confirmation. After conversion, a project acceptance mission is undertaken by an independent audit firm, technical experts, FECO personnel, the local EPB, and relevant local authorities to verify project completion. This visit includes confirmation that all activities in the contract have been completed, all invoices for purchase of equipment and material, and other documents related to procurement are submitted and reviewed. After national acceptance is granted to the enterprise, the regular monitoring of their activities are passed on to the local EPB whose capacities to maintain and sustain such phase out have been increased through intensive training by FECO. UNDP as lead implementing agency for the solvent sector also participates in these verification missions, and undertakes separate on-site project implementation and monitoring missions; and has led the independent verifications for the completed conversion projects in accordance with the requirement stipulated in the Agreement between China and the Executive Committee.

Disbursement of funds and interest accrued under stage I and stage II

63. Based on decision 69/24, each of the sector plans submitted included information on funds disbursed and interest accrued, as shown in the respective sector plans of this document. The level of funds disbursed is summarized in Table 5 and the interests accrued are summarized in Table 6.

Table 5. Level of disbursement per sector as of September 2018 (US $)

Sectors	Funds approved (US $) (tranches 1-5)	Disbursements from IA to FECO		Disbursements by FECO*	
		US $	%	US $	%
XPS foam sector plan (UNIDO/Germany)	50,000,000	45,135,000	90	43,460,745	87
PU foam sector plan (World Bank)	73,000,000	73,000,000	100	52,887,588	72
ICR sector plan (UNDP)	61,000,000	60,999,473	100	51,024,336	84
RAC sector plan (UNIDO)	75,000,000	60,727,617	81	46,793,169	62
Solvent (UNDP)	5,000,000	5,000,000	100	5,000,000	100
Servicing (UNEP /Japan)	5,640,000	5,640,000	100	4,719,589	84
National coordination (UNDP)	360,000	360,000	100	360,000	0
Total all sectors	**270,000,000**	**250,862,090**	**93**	**204,245,427**	**76**

*Disbursements by FECO are to beneficiary enterprises for investment activities and to service providers, contractors, equipment for technical assistance (TA) activities.

64. Ninety-three per cent of the funds approved for the implementation of stage I have been disbursed to FECO, and 74 per cent have been disbursed to final beneficiaries.

65. Information on interest accrued as of the end of 2017 was provided by an audit report on the disbursement for stage I and stage II of the HPMP sector plans of 2017 submitted by UNDP on 23 September 2018. The audit report submitted also indicates that the accrued interest from 2014 to 2016 of some of the sector plans from stage I HPMP was different from the figures reported previously. Table 6 presents the information on interests accrued between 2012 and 2016 from the original audit reports and from the revised audit reports, as well as the interest accrued in 2017.

Table 6. Information provided on interest accrued

Year	XPS (UNIDO, Germany)	PU (World Bank)*	ICR (UNDP)	RAC (UNIDO)	Solvent (UNDP)	Servicing (UNEP, Japan)	Total HPMP
Stage I							
Original reports							
2012	12,583	-	70,628	10,016	2,289	642	96,158
2013	43,153	5,195	87,093	66,791	5,293	1,427	208,952
2014	62,905	6,431	33,651	94,424	7,091	1,079	205,581
2015	24,945	3,443	103,708	62,305	2,656	663	197,720
2016	12,621	4,813	97,468	49,273	1,101	886	166,162
Total	156,208	19,882	392,548	282,809	18,430	4,696	874,573
Revised reports							
2012	12,583	-	70,628	10,016	2,289	642	96,158
2013	43,153	5,195	87,093	66,791	5,293	1,427	208,952
2014	62,905	6,431	104,279	94,424	7,091	1,079	276,209
2015	41,703	5,700	112,436	76,415	4,887	488	241,629
2016	13,382	7,608	97,468	49,273	1,101	886	169,718
Sub-total	173,727	24,934	471,904	296,918	20,661	4,521	992,665
2017	3,678	10,048	94,166	50,233	615	1,761	160,501
Difference between the original and revised reports							
2012	-	-	-	-	-	-	-
2013	-	-	-	-	-	-	-
2014	-	-	70,628	-	-	-	70,628
2015	16,758	2,257	8,728	14,110	2,231	(175)	43,909
2016	761	2,795	-	-	-	-	3,556
Sub-total	17,519	5,052	79,356	14,110	2,231	(175)	118,092
2017	3,678	10,048	94,166	50,233	615	1,761	160,501
Total stage I	21,197	15,099	173,522	64,343	2,845	1,586	278,592

Year	XPS (UNIDO, Germany)	PU (World Bank)*	ICR (UNDP)	RAC (UNIDO)	Solvent (UNDP)	Servicing (UNEP, Japan)	Total HPMP
Stage II							
2017	1,059	-	7,299	1,948	1,992	1,041	13,338
Interest accrued in stage I and stage II to be offset from future approvals							
Total	22,256	15,099	180,821	66,291	4,836	2,627	291,930

*The interest in the PU foam sector is calculated based on the total interest accrued in the PU foam and the production sectors proportionally to the funding received for each sector.

66. UNDP explained that the accrued interest in some sectors for the years 2014, 2015 and 2016 had to be revised for the following reasons:

(a) When the Executive Committee approved the tranche requests of the sector plans, the interest accrued from the previous year of each sector plan was offset against the approved annual tranches. Since the actual tranches transferred by the Fund to the implementing agencies were lower than the agreed funding due to the offset of interest, FECO will transfer the offset interest from the interest on the book to the specific annual tranche according to the Executive Committee decisions. At the beginning, the financial audit report used net interest on the book as the interest accrued in a specific year. However, when the interest was transferred to annual tranches, the net interest will be lower than the total accrued interest. The financial audit firm reported the net interest for the ICR sector in 2014, the PU foam sector and production sector in 2015 and 2016, which excluded the transferred interest to the annual tranches. This issue was identified during the audit process conducted this year and corrected in the 2017 financial audit report; and

(b) During the financial audit undertaken this year, FECO's Financial Division found out that the financial audit firm had some misunderstandings in the financial management of projects and calculation of the total interest accrued, in particular in the years 2015 and 2016 due to frequent staff change of the financial audit firm in recent years. FECO's Financial Division and the financial audit firm cross-checked all the interest figures of previous years and corrected other relevant figures in the 2017 financial audit report.

67. UNDP confirmed that all the accrued interest figures are consistent with the bank slips.

Secretariat's recommendation

68. The Executive Committee may wish:

(a) To request the Treasurer to offset future transfers to UNIDO by US $22,256, representing additional interest accrued by the Government of China up to December 2017 from funds previously transferred for the implementation of the XPS foam sector plan for China under stages I and II of the HPMP, as per decisions 69/24 and 77/49(b)(iii);

(b) To request the Treasurer to offset future transfers to the World Bank by US $15,099, representing interest accrued by the Government of China up to 31 December 2017 from funds previously transferred for the implementation of the PU foam sector plan for China under stage I of the HPMP, as decisions 69/24 and 77/49(b)(iii);

(c) To request the Treasurer to offset future transfers to UNDP by US $180,821, representing additional interest accrued by the Government of China up to 31 December 2017 from funds previously transferred for the implementation of the ICR sector plan for China under stages I and II of the HPMP as per decisions 69/24 and 77/49(b)(iii);

(d) To request the Treasurer to offset future transfers to UNIDO by US $66,291, representing interest accrued by the Government of China up to 31 December 2017 from funds previously transferred for the implementation of the RAC sector plan for China under stages I and II of the HPMP, as per decisions 69/24 and 77/49(b)(iii);

(e) To request the Treasurer to offset future transfers to UNEP by US $2,627, representing interest accrued by the Government of China up to 31 December 2017 from funds previously transferred for the implementation of the refrigeration servicing sector plan and the national enabling programme for China under stages I and II of the HPMP, as per decisions 69/24 and 77/49(b)(iii); and

(f) To request the Treasurer to offset future transfers to UNDP by US $4,836, representing interest accrued by the Government of China up to 31 December 2017 from funds previously transferred for the implementation of the solvent sector plan for China under stages I and II of the HPMP, as per decisions 69/24 and 77/49(b)(iii).

Progress reports

69. Detailed stand-alone progress reports on the implementation of the XPS foam, PU foam, ICR, RAC and servicing sector plans are attached to the Note by the Secretariat. Each report provides a progress report on the implementation of the last tranche; the level of fund disbursement; the activities to be implemented in 2017-2018; comments by the Fund Secretariat; and the recommendation.

HPMP (stage I): XPS foam sector (UNIDO (Lead) and Germany)

Progress report on the implementation

70. A total of 25 extruded polystyrene (XPS) foam enterprises with a consumption of 9,590 metric tonnes (mt) (566 ODP tonnes) of HCFC-22 and HCFC-142b[6] participated in stage I of the HPMP. Eighteen of those enterprises with a combined consumption of 7,257 mt (428 ODP tonnes) have already completed their conversion and passed national commissioning. The remaining seven beneficiaries (2,333 mt or 138 ODP tonnes) have completed their conversions, and are preparing for national commissioning. All 25 enterprises have chosen CO_2-based technology. The progress in the enterprises' conversions is presented in Table 1.

Table 1. Progress in the implementation of the XPS foam sector plan

Status of implementation	Number of enterprises	HCFC consumption		Share of stage I target (%)
		mt	ODP tonnes	
Enterprise conversions				
Project completed including national acceptance	18	7,257	428	72.3
Project completed awaiting national acceptance	7	2,333	138	23.3
Sub-total	**25**	**9,590**	**566**	**95.6**
Additional reductions through regulations		441	26	4.4
HCFC reduction target		**10,031**	**592**	**100.0**

71. Additional technical assistance activities implemented include: completion of the standard on XPS foam board for thermal insulation and its submission to the National Standards Commission; completion of the laboratory study on new flame retardants and preparation of technical reports on CO_2 optimization; finalization of the book on good practices for the safe production of XPS foam using CO_2 technology; and support to FECO and enterprises to complete the conversions and prepare national acceptance by the implementation support agency (ISA).

72. A circular was issued in January 2018, prohibiting the establishment, retrofitting or expansion of facilities for the production or use of ozone-depleting substances, except for HCFC produced for feedstock, in which case enterprises are required to submit documentation to the Ministry of Ecology and the Environment (MEE), ensuring that the facility is for feedstock purposes only and committing not to use HCFCs in any applications controlled by the Montreal Protocol.

Level of fund disbursement

73. As of September 2018, of the US $50,000,000 approved, US $43,460,745 (87 per cent) had been disbursed from FECO to beneficiaries, as shown in Table 2. The remaining funds (US $6,539,255) will be disbursed between 2018 and May 2019.

[6] The ratio of HCFC-22 to HCFC-142b in the XPS foam sector in China as calculated in stage I of the XPS foam sector plan was on average 60 to 40 per cent in mt.

Table 2. Status of disbursements for the XPS foam sector plan as of September 2018

Component	Funds approved	Disbursed as of September 2018 (US $)	Planned disbursement October 2018 - June 2019 (US $)
Enterprise activities	45,234,352	39,820,955	5,413,397
Technical assistance	1,958,648	1,138,710	819,938
PMU	2,807,000	2,501,080	305,920
Total	**50,000,000**	**43,460,745**	**6,539,255**

Remaining activities in the XPS foam sector plan

74. In line with decision 81/29, UNIDO submitted the project completion report for stage I of the XPS foam sector plan, which confirms its operational completion. All substantive activities have been completed, and the remaining balance, which is already committed on the completed conversions and technical assistance activities, will be disbursed between October 2018 and May 2019, when the project will be financially completed. Potential fund balances will be calculated upon finalization of national acceptance for the remaining enterprises and returned to the Fund upon confirmation of the amount of those surpluses during the financial closure of the project. The financial information in the PCR will be updated at that time.

75. FECO will continue enforcing the quota permits for XPS foam enterprises consuming more than 100 mt of HCFCs per year; and will process, before the end of 2018, the national acceptance of the last seven enterprises that have completed their conversions.

Secretariat's comments

HCFC consumption

76. Consumption of HCFCs in the XPS foam manufacturing sector in 2017 was 38,500 mt (2,213 ODP tonnes), which is lower than the 38,746 mt (2,286 ODP tonnes) allowable consumption in the Agreement between the Government of China and the Executive Committee, as shown in Table 3.

Table 3. Consumption of HCFCs in the XPS foam sector

XPS foam sector		2009	2010	2011	2012	2013	2014	2015	2016	2017
Consumption*	mt	41,000	45,100	43,905	44,200	41,164	39,200	30,100	35,500	38,500
	ODP tonnes	2,419	2,661	2,583	2,529	2,377	2,249	1,761	2,043	2,213
Maximum allowable consumption**	mt	n/a	n/a	n/a	n/a	43,051	43,051	38,746	38,746	38,746
	ODP tonnes	n/a	n/a	n/a	n/a	2,540	2,540	2,286	2,286	2,286
Phase-out target	mt	n/a	n/a	n/a	n/a	5,726	n/a	4,305	n/a	n/a
	ODP tonnes	n/a	n/a	n/a	n/a	338	n/a	254	n/a	n/a

*As per the country programme implementation report.
**As per the Agreement signed at the 67th meeting for stage I up to 2015, and as per the Agreement signed at the 79th meeting for stage II for 2016 and 2017.

77. HCFC consumption in the sector grew in 2016 and 2017 due to the increased demand for XPS foam products for insulation. UNIDO and FECO continued accelerating the completion of conversion projects under stage I, as well as new projects under stage II, and FECO continued applying the HCFC production quota and the domestic sales quota issued for each producer, as well as the HCFC consumption quotas for manufacturing enterprises using more than 100 mt.

Status of implementation, disbursement and completion of stage I

78. The Secretariat noted the overall progress in stage I, including the completion of all 25 conversions of XPS foam enterprises to CO_2. Out of these, seven enterprises await the national acceptance of the conversion, which is provided by the Government and is expected to take place in 2018. UNIDO confirmed that after the submission of the progress report to the 82nd meeting, three additional enterprises have received national acceptance, leaving only four pending. UNIDO further confirmed that all 25 enterprises have already stopped the use of HCFCs, destroyed their baseline equipment and started production with CO_2. The balance of US $5.4 million in the investment component is related to the final payment, including incremental operational costs, to those enterprises that are currently completing their national acceptance, and is expected to be disbursed between October and December 2018.

79. UNIDO provided confirmation that all technical assistance activities have been completed, and that the remaining balance of US $819,938 corresponds to final payments under the technical assistance contracts, which include those associated with the assistance provided to enterprises by the ISA to complete their national acceptance process, as well as the final payments of all other technical assistance activities reported under stage I (e.g., formulation of standards, research on CO_2 optimization, training workshops, revision of the book on the safe production of XPS foam with CO_2). All funding for these activities had already been committed; final products have been delivered and associated payments will continue taking place until May 2019, when the stage will be financially completed and closed (one year after operational completion).

80. With regard to the balance of US $305,920 in the PMU, UNIDO explained that it is committed, as it is associated to the activities completed under stage I, according to FECO's principle of performance-based approach to the use of the PMU allocation.

Conclusion

81. The Secretariat notes that stage I of the XPS foam sector plan has been operationally completed, including the conversion of 25 enterprises to CO_2, resulting in the phase-out of 9,590 mt of HCFC-22 and HCFC-142b (566 ODP tonnes). This reduction represents around 95.6 per cent of the HCFC reduction target for stage I of the XPS foam sector plan. The remaining reductions of 441 mt (26 ODP tonnes) to reach the target of 10,031 mt (592 ODP tonnes) will occur through the application of the licensing system by FECO. The Government of China and UNIDO are currently finalizing the national acceptance process for the last four enterprises and undertaking the final disbursements related to the technical assistance component. UNIDO submitted a project completion report and will return remaining balances, if any, to the 84th meeting. HCFC consumption in the XPS foam sector in China is below the maximum allowable consumption target in its Agreement with the Executive Committee. Close monitoring of the consumption by the Government of China and acceleration of the ongoing conversions in stage II will be needed to ensure that compliance is maintained in future years.

Secretariat's recommendation

82. The Executive Committee may wish:

(a) To note the 2018 progress report on the implementation of the fifth tranche of the extruded polystyrene (XPS) foam sector plan of stage I of the HCFC phase-out management plan (HPMP) for China submitted by UNIDO; and

(b) To request UNIDO and the Government of Germany to return at the 84th meeting any remaining balances of funds approved under the XPS foam sector plan of stage I of the HPMP for China.

HPMP (stage I): PU foam sector (World Bank)

Progress report on the implementation

83. The China Household Electrical Appliance Association (CHEAA) completed the preparation of the ban on using HCFC-141b as blowing agent in the sub-sectors of reefer containers, refrigerators and freezers, and small household appliances, and submitted it for approval to the Ministry of Ecology and Environment (MEE). The ban is expected to be issued in the first quarter of 2019.

84. Out of the 57 polyurethane (PU) foam enterprises assisted in stage I, 42 with a consumption of 10,589 metric tonnes (mt) (1,164.81 ODP tonnes) have completed their conversion and introduced hydrocarbon (HC) or water-blown technologies. Project completion has been verified and a certificate of national acceptance has been provided to these enterprises. An additional enterprise (80 mt of HCFC-141b or 8.84 ODP tonnes) is preparing for national acceptance and eight enterprises (1,582 mt of HCFC-141b or 174.06 ODP tonnes) have completed their trial production. The remaining six enterprises (717 mt of HCFC-141b or 78.89 ODP tonnes) are at different stages of equipment procurement and delivery, and are expected to complete their projects by December 2018. Table 1 shows progress on the implementation of stage I of the PU foam sector plan.

Table 1. Progress in the implementation of the PU foam sector plan in China

Status of implementation	Number of enterprises	HCFC consumption (mt)	Expected date of completion	Share of stage I target (%)
Enterprise conversions				
Project completed including national acceptance	42	10,589	Completed	72
Preparing for national acceptance	1	80	2018	1
Trial runs completed	8	1,582	2018	11
At different stages of equipment procurement and delivery	6	717	2018	5
Sub-total	**57**	**12,969**		**88**
Estimated additional reductions through regulations	n/a	1,716		12
HCFC reduction target	n/a	**14,685**		**100**

85. Out of the six systems houses included in stage I, two have completed their trials and received approval by the local environmental protection bureau (EPB) and safety departments. One of them has obtained national acceptance for the project. The remaining four systems houses are currently procuring and installing equipment and are expected to complete their projects in December 2018.

86. Technical assistance (TA) activities implemented included a workshop for beneficiary enterprises on alternative technology development in the PU foam sector (April 2018); continuation of the comparative studies on alternative technologies in the spray and panels foam sub-sectors; revision of safety standards for the use of cyclopentane in foam manufacturing; establishment of a training centre to assist small and medium-sized enterprises to select and access alternative technologies; safety-expert visits to review the safety measures put in place by the beneficiary enterprises converting to cyclopentane; monitoring activities to ensure sustained phase-out of HCFC-141b by six provinces where PU foam manufacturers are located; a survey of technical standards and formulations required in the production and usage of alternative blowing agents; a report on the research on optimizing alternative foaming formulations; and support to the Foreign Economic Cooperation Office (FECO) and to beneficiary enterprises by the implementation support agency (ISA).

Level of fund disbursement

87. As of 30 September 2018, of the US $73,000,000 approved, 100 per cent had been disbursed from the World Bank to FECO, and US $52,887,588 (72 per cent) had been disbursed by FECO to beneficiaries, as shown in Table 2.

Table 2. Status of disbursements for the PU foam sector plan as of September 2018

Component	Funds approved (US $)	Funds disbursed as of September 2018 (US $)	Planned disbursement (US $)	
			October-December 2018	January-June 2019
Enterprise activities	64,890,448**	47,636,770	8,224,233	9,029,445
TA	4,459,552**	1,874,568	769,876	1,815,108
PMU* activities	3,650,000	3,376,250	273,750	0
Total	**73,000,000**	**52,887,588**	**9,267,859**	**10,844,553**

* Project implementation and monitoring unit.
** Including the three new enterprises for US $1,527,021. The funds to convert these enterprises were reallocated from TA.

Remaining activities in the PU foam sector plan and request for extension of stage I

88. Noting that there are still ongoing activities, but that decision 75/55(b) had requested the submission of the project completion report (PCR) by the last meeting of 2018, the World Bank on behalf of the Government of China requested an extension of stage I until 30 June 2019. This extension would allow the finalization of the conversion of the remaining 15 beneficiary enterprises and four systems houses by December 2018 and the completion of ongoing TA activities by June 2019.

Secretariat's comments

HCFC consumption

89. Consumption of HCFC-141b in the PU foam manufacturing sector in 2017 was 36,438.76 mt (4,008.26 ODP tonnes), which is lower than the maximum allowable consumption established for the same year in the Agreement between the Government of China and the Executive Committee, as shown in Table 3.

Table 3. HCFC-141b consumption and targets for the PU foam sector

PU foam sector		2010	2011	2012	2013	2014	2015	2016	2017
Consumption*	mt	52,069	63,570	59,109	46,338	46,864	34,202	34,821	36,439
	ODP tonnes	5,727.5	6,992.7	6,501.9	5,097.2	5,155.0	3,762.0	3,830.3	4,008.3
Maximum allowable consumption **	mt	n/a	n/a	n/a	49,018	49,018	40,451	40,451	40,451
	ODP tonnes	n/a	n/a	n/a	5,392.2	5,392.2	4,449.6	4,449.6	4,449.6
Phase-out target	mt	n/a	n/a	n/a	6,116	n/a	8,569	n/a	n/a
	ODP tonnes	n/a	n/a	n/a	672.8	n/a	942.6	n/a	n/a

* As per the country programme implementation report.
** As per Agreement approved at the 67th meeting for stage I of the HPMP up to 2015 and as per Agreement approved at the 79th meeting for stage II for 2017.

90. While some additional conversions of PU foam enterprises to low-GWP alternatives were completed since 2016, there is still growth in other enterprises and sectors not yet addressed. This growth is due to economic development and policies enacted in various provinces in China requiring the insulation of buildings. This trend is expected to be reversed as additional enterprises from stage I and stage II complete their conversions, and as the ban on the use of HCFC-141b as blowing agent in the sub-sectors of reefer containers, refrigerators and freezers, and small household appliances enters into force.

91. As part of stage I, a total of 12,969.10 mt of HCFC-141b will be phased out through the conversion of PU foam enterprises. The remaining 1,715.90 mt of HCFC-141b phase-out required to reach the stage I reduction target will be achieved through policy measures, including the quota system for PU foam enterprises consuming more than 100 mt of HCFC-141b per year, and the ban covering sub-sectors in stage I, which will ensure that other non-eligible enterprises in the sector will also stop the use of HCFC-141b.

92. The World Bank explained that the timing of the ban on using HCFC-141b in sub-sectors covered in stage I of the HPMP has been postponed from 2018 to 2019 due to some updates and adjustments to the overarching ODS regulatory framework, as well as institutional changes in various ministries, including restructuring of the MEE. FECO has provided the MEE with all the necessary information for justifying the ban and the MEE is committed to accelerating the issuance of the ban.

Extension of the date of completion of stage I

93. At the 80th meeting, in light of decision 75/55(b) requesting the submission of the PCR by the last meeting of 2018, the Secretariat asked the World Bank if an extension of the date of completion of the sector plan was required. At the time, the World Bank envisaged that stage I of the PU foam sector plan would be completed by June 2018 and no extension was needed. However, that was not the case, as explained below.

Investment activities

94. The World Bank explained that two enterprises have faced financial problems in raising the required counterpart funds. FECO is following their progress and assisting them where possible. At the same time, the enterprises have received a deadline of 31 December 2018 to complete their conversions. For any project that is not completed by that date, the existing contracts will be cancelled and balances returned to the Fund. In addition, two systems houses have not been able to secure local authorization to proceed with development and production of HC-pre-blended polyol at their current sites. In the event that this issue is resolved before the deadline of 31 December 2018, the Government of China could provide them assistance with funds from stage II of the HPMP.

TA and PMU

95. The World Bank explained that activities associated with enterprise conversions, including verifications, visits, and assistance by the ISA, will need to continue until the completion of the projects. In addition, other TA activities are still ongoing due to difficulties encountered while completing tasks, or because these activities started only after experience was gathered from completed conversions. The Government of China considers it important to complete these activities, which will also benefit enterprises in the stage I-targeted sub-sectors that did not receive financial assistance and will have to stop the use of HCFC-141b once the ban is in place. Moreover, local enforcement agencies cannot wait until stage II to monitor enterprises and to begin enforcing policy in the sub-sectors and in the entire PU foam sector.

96. The World Bank explained that although the level of disbursement is low in some activities, all the remaining funds in stage I are already committed through contracts and are expected to be paid upon completion of the activities, as shown in Table 4.

Table 4. Expected dates of completion of ongoing TA activities in the PU foam sector

Activity	Expected date of completion
Survey of technical standards and testing methods (completed in August 2018, experts addressing comments provided)	December 2018
Safety experts consultation (five visits to converted enterprises completed, five additional visits to be completed by December 2018)	
Catalyst agent and foam stabilizer optimization (assessment report on stabilizer/catalyst system for HCFC alternatives in panel and spray foam submitted to FECO, comparative study on agents and catalyst systems to be submitted to FECO by December 2018)	
Study tour to North America with blowing agent supplier to PU foam enterprises using alternative technologies in different applications	
Formulation and revision of safety standards relating to cyclopentane (draft submitted to FECO and discussed in July 2018, experts addressing the comments provided)	March 2019
Provincial monitoring activities on ODS sellers, systems houses, users, collection and test of samples of blowing agents to monitor and regulate sales and consumption and prevent return to HCFC-141b in the sub-sectors converted	June 2019
Verification of completion of project implementation milestones by enterprises to provide disbursements	
Research on cyclopentane application in the panel sub-sector (research report completed, optimization research to be submitted to FECO in December 2018)	
Comprehensive evaluation and completion report for the 57 enterprises and six systems houses and wrap-up meeting on stage I of the PU foam sector plan	

97. In explaining to the Secretariat how these TA activities could have synergies with other TA activities being undertaken with balances from the CFC phase-out plan, the World Bank indicated that the activities under stage I of the HPMP and the CFC phase-out plan are implemented and budgeted separately, based on the technical and policy needs of the group of enterprises assisted. Specifically with regard to the monitoring activities, the World Bank confirmed that, while the budgets of the CFC phase-out plan and stage I of the HPMP cover different provinces,[7] when visiting enterprises converted under stage I of the HPMP or under the CFC phase-out plan, the Government of China monitors the phase-out of both CFC-11 and HCFC-141b.

98. With regard to the PMU funds still to be disbursed under stage I, the World Bank explained that disbursements related to the PMU are activity-based and allocated according to progress in the implementation (e.g., tasks associated with contract signing and execution, performing fiduciary and environmental/social safeguard responsibilities at the sub-project level, financial management as per agreed payment installments). The remaining balance will be exclusively used in activities related to stage I, and separated from stage II.

99. With the extension of the completion date to June 2019, the Government of China and the World Bank will submit to the 84th meeting the PCR and updated information on the level of funds disbursed and potential balances to be returned to the Multilateral Fund.

Conclusion

100. The PU foam sector plan continues to progress, with 42 conversion projects completed, nine additional conversions about to obtain national acceptance, and the remaining six conversions planned for completion by December 2018, along with the completion of projects at the remaining four systems houses (out of six) and the TA activities. The 57 eligible enterprises assisted will phase out 12,969 mt (1,427 ODP tonnes) of HCFC-141b, representing 88.0 per cent of the HCFC reduction target for stage I of the PU foam sector plan. The remaining reductions to meet the target of 14,685 mt (1,615.35 ODP tonnes)

[7] The CFC phase-out plan is monitoring the provinces of Shandong, Tianjin, Hebei, Henan and Sichuan, and stage I of the HPMP is monitoring the provinces of Zhejiang, Jiangsu, Guangdong, Shanghai, Liaoning and Qingdao.

will be achieved through the application of regulations, including the quota system and the ban on the use of HCFC-141b for manufacturing of refrigerators, freezers, reefers and containers, and small household appliances in 2019. The level of disbursement has increased to 72.4 per cent of the overall funding approved, and the remaining funds are already committed and expected to be disbursed between 2018 and the first half of 2019. Based on the discussions, the Secretariat concluded that the Government of China and the PU foam sector will benefit from the extension of stage I to 30 June 2019, as the remaining enterprises will complete their conversions and the ongoing TA activities will help ensure that the reductions of HCFC are sustainable.

Secretariat's recommendation

101. The Executive Committee may wish:

(a) To note the 2018 progress report on the implementation of the fifth tranche of the polyurethane (PU) rigid foam sector plan of stage I of the HCFC phase-out management plan (HPMP) in China submitted by the World Bank;

(b) To approve the extension of the duration of stage I of the HPMP to 30 June 2019, on the understanding that no further extensions will be approved; and

(c) To request the Government of China and the World Bank to submit to the 84th meeting the project completion report and updated information on the level of funds disbursed and potential balances to be returned to the Multilateral Fund.

HPMP (stage I): ICR sector (UNDP)

Progress report on implementation

102. A total of 30 equipment manufacturing lines and four compressor lines in 18 enterprises have been converted to phase out 8,029.24 metric tonnes (mt) (441.61 ODP tonnes) of HCFC-22 in stage I of the ICR sector plan of the HPMP. Including the demonstration projects and the phase-out of 445.20 mt by non-Article 5 enterprises, the total phase-out in the ICR sector amounts to 8,786.4 mt (483.25 ODP tonnes). The selected alternative technologies included HFC-32, R-410A, CO_2, NH_3, HFC-134a, NH_3/CO_2, CO_2/HFC-134a, and HFO/HFC-134a as presented in paragraph 51 of document UNEP/OzL.Pro/ExCom/80/37.

103. As of September 2018, the conversions of 34 manufacturing lines had been completed and three of the converted lines are awaiting national acceptance. It is expected that the national acceptance of the conversion of two lines of industrial and commercial water chiller (heat pump) to HFC-32 and one line of scroll compressor manufacturing to HFC-32 will be completed by November 2018.

104. A plan for disbursing incremental operating costs (IOCs) has been developed jointly by the Foreign Economic Cooperation Office (FECO) and the China Refrigeration and Air-conditioning Industrial Association (CRAA) and IOCs will be disbursed after receiving application from enterprises and verification of production and sales. IOCs have been paid to 10 enterprises based on the products they produce and sell. These include three NH_3/CO_2 lines, three HFC-134a lines and four R-410A lines as shown in Table 1.

Table 1: Overview of IOC disbursement for conversions in stage I

Enterprise	Phase-out (mt)	Technology/Application	IOC (US $)		
			Total	Disbursed	Outstanding
Zhuhai Gree	828.42	R-32: unitary AC*	1,117,247	0	1,117,247
Zhuhai Gree	865.09	R-32: unitary AC	1,049,605	0	1,049,605
Zhuhai Gree	208.04	R-410A: multi-connected AC units, unitary AC	122,283	122,283	0
Zhuhai Gree	373.92	R-32: industrial and commercial water chiller (heat pump)	496,359	0	496,359
Zhuhai Gree	331.66	R-32: small-sized water chiller (heat pump)	406,553	0	406,553
Dunan Environment	57.78	R-32: unitary AC	91,285	0	91,285
Dunan Environment	101.87	R-32: industrial and commercial water chiller (heat pump)	147,707	0	147,707
Guangdong Midea	606.79	R-410A: multi-connected AC units	698,000	698,000	0
Guangdong Midea	593.55	R-410A: unitary AC	1,023,000	1,023,000	0
Guangdong Midea	670.96	R-410A: unitary AC	1,141,000	0	1,141,000
Guangdong Midea	357.79	R-32: industrial and commercial water chiller (heat pump)	436,000	0	436,000
Shandong Geruide	33.57	R-134a: industrial and commercial water chiller (heat pump)	67,139	67,139	0
Shandong Geruide	72.84	R-32: industrial and commercial water chiller (heat pump)	116,544	0	116,544
Qingdao Haier	395.854	R-32: unitary AC	480,000	0	480,000
Nanjing TICA	81.46	R-410A: unitary AC	89,100	89,100	0
Nanjing TICA	90.85	R-32: industrial and commercial water chiller (heat pump)	114,000	0	114,000
Wuhan Xinshijie	95.295	R-717: Industrial & commercial water chiller (heat pump)	107,620	0	107,620
Wuhan Xinshijie	31.765	R-134a: industrial and commercial water chiller (heat pump)	36,020	0	36,020
Chongqing Midea	233.07	R-134a: industrial and commercial water chiller (heat pump)	304,529	304,529	0

Enterprise	Phase-out (mt)	Technology/Application	IOC (US $)		
			Total	Disbursed	Outstanding
Chongqing Midea	47.67	R-134a: industrial and commercial water chiller (heat pump)	76,623	0	76,623
Chongqing Midea	223	R-32: industrial and commercial water chiller (heat pump)	380,352	0	380,352
Ningbo Aux	370.75	R-32: unitary AC	430,082	0	430,082
Ningbo Aux	73.57	R-32: unitary AC	107,750	0	107,750
Dunham-Bush	82.53	R-134a: industrial and commercial water chiller (heat pump)	127,953	127,953	0
Shandong Shenzhou	77.573	R-717/R-744: freezing and cold storage system	193,962	193,962	0
Haier-Carrier	65.75	R-134a/R-744: supermarket cold storage system	112,947	0	112,947
Dalian Refrigeration	75.284	R-717/R-744: freezing and cold storage system and condensing units	170,814	170,814	0
Dalian Refrigeration	231.391	R-717/R-744: freezing and cold storage system and condensing units	615,688	0	615,688
Dalian Refrigeration	370.142	R-717/R-744: freezing and cold storage system and condensing units	1,093,444	0	1,093,444
Yantai Moon	381	R-717/R-744: freezing and cold storage system and condensing units	1,200,000	1,200,000	0
Jiangsu Xuemei		R-744	0	0	0
Zhejiang Shangji		R-32	0	0	0
Shanghai Hanzhong		HFO/R-134a screw compressor	0	0	0
Guangzhou Rili		R-32 scroll compressor	0	0	0
Total	**8,029.23**		**12,553,606**	**3,996,780**	**8,556,826**

*AC = Air conditioning

105. A number of technical assistance (TA) activities have been implemented in stage I to remove technical barriers, facilitate the implementation of the conversion projects and assist in a smooth transition to non-ODS technologies, including:

(a) Eight studies on the application of low-GWP alternative technologies to assist in their adoption, including R-32 water chiller and unitary air-conditioning, water chillers using HFO/HFO blends, R-290 commercial heat pump, CO_2 heat pump and CO_2 technology in supermarkets;

(b) The revision of 11 technical and product standards; the revision of the National Standard for Safety and Environmental Requirements for Refrigeration Systems and Heat Pumps (GB-9237) to allow for the use of flammable refrigerants has been completed and went into effect on 1 July 2018;

(c) Thirteen demonstration projects for promoting low-GWP technologies, including heat pumps and CO_2 in supermarkets;

(d) Surveys, workshops and consultant services to verify eligibility and performance milestones; and

(e) Support to the industrial and commercial refrigeration and unitary air-conditioning association to facilitate smooth implementation.

106. Most TA activities have been completed except for four technology demonstration projects, four research projects for application of HFOs, and the consultant services for verification of milestones and technical support for stage I conversions, which are planned to be completed by the end of 2018.

Level of fund disbursement

107. As of end of September 2018, of the US $61,000,000 approved so far, all funds had been disbursed from UNDP to FECO, and US $51,024,336 (83.6 per cent) had been disbursed by FECO to beneficiaries. The remaining balance mainly represents IOCs and will be disbursed after October 2018 up until completion of the sector plan, according to the procedures for disbursement of IOCs developed by FECO and the CRAA.

Table 2. Status of disbursement of stage I of the ICR sector plan as of end of October 2018 (US $)

Component	Funds approved	Funds disbursed		Planned disbursement
		From UNDP to FECO	From FECO to beneficiaries	October 2018- December 2019
Enterprise activities	61,000,000	61,000,000	41,985,961	9,285,633
TA			5,073,375	690,031
PMU			3,965,000	0
Total	**61,000,000**	**61,000,000**	**51,024,336**	9,975,664

Remaining activities in the ICR sector plan

108. In 2019, the Government will complete the conversion of the remaining three manufacturing lines in three enterprises (US $728,807 of incremental capital costs (ICCs) to be disbursed); complete the four demonstration projects on heat pumps (US $166,921 to be disbursed); complete four studies on the application of HFOs in ICR sector (US $165,056); conduct verification of conversions, production and sales (US $172,080 to be disbursed); and start to disburse IOCs for the converted lines once production with the selected technology begins. A total IOCs of US $8,556,826 will be disbursed to 20 lines in 12 enterprises.

109. FECO, with the support of CRAA, will organize workshops to promote the alternative technologies among manufacturing enterprises, designing firms, engineering companies, end-users, and other stakeholders. At the workshops, enterprises that have already sold their products overseas will share their marketing strategy and experiences. Participants will analyse the domestic market to identify barriers, and find solutions for accelerating the market adoption of these alternatives. FECO will also work with enterprises to develop a marketing strategy suitable for their products, develop detailed production and sales plans and facilitate the disbursement of IOCs.

Secretariat's comments

HCFC consumption

110. The consumption of HCFCs in the ICR sector in 2017 was 38,234 mt (2,081.23 ODP tonnes), which is lower than the maximum allowable consumption of 2,162.50 ODP tonnes established in the Agreement between the Government of China and the Executive Committee, as shown in Table 3. The HCFC consumption in the ICR sector increased in 2016 due to the recovery of the ICR industry from the economic downturn in 2015. In 2017, HCFC consumption in the ICR sector remained at a similar level to 2016.

Table 3. Reduction in HCFC consumption in the ICR sector

	2013	2014	2015	2016	2017
ODP tonnes					
Maximum allowable consumption	2,402.80	2,402.80	2,162.50	2,162.50	2,162.50
Actual consumption in ICR sector*	2,224.80	2,219.48	1,981.70	2,082.09	2,081.23
Reduction target set in HPMP	224.50	0.00	240.30	0.00	0.00
Metric tonnes					
Maximum allowable consumption	43,925.00	43,925.00	39,320.00	39,320.00	39,320.00

	2013	2014	2015	2016	2017
Actual consumption in ICR sector*	40,805.00	40,749.00	36,385.00	38,254.70	38,234.00
Reduction target set in HPMP	4,080.00	0.00	4,370.00	0.00	0.00

*The consumption in the ICR sector is based on estimated amounts, as actual amounts cannot be accurately verified.

Technical issues

111. Noting that 13 equipment manufacturing lines were converted to HFC-32, but IOCs have not been paid to any of these lines, the Secretariat inquired about the barriers for technology adoption. UNDP explained that the national safety standard (GB-9237) was implemented only on 1 July 2018. The market promotion activities for HFC-32-based products have just started. Converted enterprises are in the process of planning the promotion and sales. Once the market uptake has occurred and the enterprises are successful in selling their HFC-32 products, FECO will initiate IOC payment to these enterprises. The Government expects that the promotion activities will gradually increase end user confidence in these new products and create their acceptance in the market. While the Secretariat noted the Government's efforts in promoting the adoption of the alternative technologies, UNDP confirmed that market penetration of HFC-32 products might still take some time. For other alternative technologies, the enterprises have started to produce and sell their products.

Completion of stage I

112. As per decision 75/56, stage I of the ICR sector plan shall be completed by the end of 2018 and the project completion report submitted to the second meeting of 2019. However, the Secretariat noted that most IOCs have not been disbursed; while market penetration of HFC-32 technology has just started, it might take time for this technology to be accepted by end users. Accordingly, the Secretariat considers beneficial to allow more time for enterprises to produce and sell the converted products using HFC-32 technology to increase the market penetration through IOC support. After discussing with UNDP, it was agreed to extend stage I of the ICR sector plan to the end of 2019. UNDP confirmed that all activities under stage I will be operationally completed by December 2019, and that the project completion report will be submitted no later than the first meeting of 2020; and funding balance will be returned to the Fund upon financial completion.

Conclusion

113. A licensing and quota system has been implemented to achieve compliance in the ICR sector. The conversion of 34 manufacturing lines has been completed and the acceptance of three remaining manufacturing lines will be completed by November 2018. The national safety standard for flammable refrigerants (GB-9237) went into effect in July 2018. Enterprises with converted lines have gradually started to produce and sell products using the selected alternatives. IOCs will be disbursed as an incentive for enterprises after verification of production and sales of units with alternative technologies. TA activities have been implemented to assist the conversion of manufacturing capacity. Awareness-raising and technology-promotion activities will continue to be implemented to promote the market adoption of the converted products with low-GWP in China and the global market. In order to allow market pick up of HFC-32 technology through IOC support, it is recommended to extend the completion date of stage I to December 2019.

Secretariat's recommendation

114. The Executive Committee may wish:

(a) To note the 2018 progress report on the implementation of the industrial and commercial refrigeration and air conditioning (ICR) sector plan of stage I of the HCFC phase-out management plan (HPMP) in China submitted by UNDP;

(b) To approve the extension of project implementation period of stage I of the ICR sector plan of HPMP for China to 31 December 2019; and

(c) To request the Government of China and UNDP to submit a project completion report to the first meeting of 2020 and return all remaining funding balances upon financial completion.

HPMP (stage I): RAC sector (UNIDO)

Progress report on the implementation

115. As of August 2018, contracts for the conversion of 18 R-290 RAC lines, eight R-410A RAC lines and three R-290 compressor lines had been signed. A total of 10,813.7 metric tonnes (mt) of HCFC-22 will be phased out once the conversion of those lines have been completed, of which 10,488.1 mt are associated with Article-5 ownership. The phase-out of 325.6 mt of HCFC-22 associated with non-Article 5 ownership was funded from sources outside the Multilateral Fund. Another 240 mt of HCFC-22 were phased out through the demonstration project at Midea approved at the 61st meeting.

116. Of the 18 R-290 RAC lines, 16 have been converted, 15 of which have completed national acceptance; one line has finished the equipment bidding process; and the remaining line has started the equipment bidding process; national acceptance for the remaining two R-290 lines is expected in 2019. All eight R-410A RAC and three R-290 compressor lines have been converted and completed national acceptance. The status of conversions as of August 2018 is presented in Table 1.

Table 1. Progress in the implementation of the RAC sector plan in China

Type of lines	Total	Converted	National acceptance	HCFC-22 consumption (mt)
R-290 RAC	18	16	15	7,827.3
R-410A RAC	8	8	8	2,986.4
R-290 compressor	3	3	3	n/a
Total	**29**	**27**	**26**	**10,813.7**

117. The following technical assistance (TA) activities were implemented:

(a) Completed research on R-290 technology, including experiments and risk assessment on leakage of R-290; performance optimization of R-290 compressor based on reduced lubricant use; and refrigerant charge reduction through the use of microchannel technology;

(b) Completed research on existing efficiency codes and standards[8] on refrigerants uses in 2017; and

(c) Public awareness and consultation activities were conducted, including an Ozone-to-Climate (O2C) roundtable to raise awareness of R-290 technology and one event to promote R-290 air conditioners and to raise awareness of the technology at two residential communities in Beijing; and an international workshop on R-290 technology development in the RAC sector.

118. The converted lines continue to have limited manufacturing output: approximately 6,800 R-290 split units and 470,000 R-290 compressors have been sold. Therefore, no additional incremental operating costs (IOCs) beyond those reported to the 80th meeting (i.e., US $2,416,502 to four enterprises) have been disbursed.

Level of fund disbursement

119. As of October 2018, of the US $75,000,000 approved, US $60,727,617 (81 per cent) had been disbursed by UNIDO and US $46,793,169 (62 per cent) had been disbursed by FECO to the beneficiaries. Table 2 shows the disbursement by tranche in the RAC sector.

[8] An energy efficiency standard for RAC is currently in place in China (GB 4706.32).

Table 2. Disbursement (US $) by tranche in the RAC sector

	Tranche 1	Tranche 2	Tranche 3	Tranche 4	Tranche 5	Total
MLF Funding*	36,430,000	9,200,000	8,495,000	9,625,000	11,250,000	75,000,000
Disbursed by UNIDO	32,786,917	8,316,800	7,608,900	8,662,500	3,352,500	60,727,617
Committed by FECO	36,430,000	9,200,000	8,434,000	9,625,000	11,175,000	74,864,000
Disbursed by FECO	24,166,608	7,329,616	7,045,859	6,328,800	1,922,286	46,793,169

* Excluding agency support costs

120. Table 3 shows the allocation, disbursement and remaining funding by activity in the RAC sector.

Table 3. Allocation, disbursement and remaining funding (US $) by activity in the RAC sector

Description		Allocation	Disbursement	Balance
Production lines conversion	R-290 (ICC)*	35,410,952	27,842,490	7,568,462
	R-290 (IOC)	20,865,066	2,416,502	18,448,564
	R-410a	4,548,219	4,165,578	382,641
	R-290 Compressor	4,112,902	4,112,902	-
Technical assistance	Technical R&D**	2,221,474	2,210,711	10,763
	Standards	669,757	288,879	380,878
	MIS*** and quota management	250,000	179,626	70,374
	Training	100,000	28,841	71,159
	Public awareness	360,000	311,857	48,143
	Technical communication	204,500	189,704	14,796
	Verification	520,580	481,174	39,406
Management fee	FECO	4,236,550	3,374,145	862,405
	CHEAA****	1,500,000	1,190,760	309,240
Total		**75,000,000**	**46,793,169**	**28,206,831**

* ICC = Incremental capital cost
** R&D = Research and development
*** MIS = Management information system
**** CHEAA= China Household Electric Appliances Association

Remaining activities in the RAC sector plan

121. The following activities will be implemented in 2018 and 2019: continuation of HCFC-22 quota enforcement; completion of conversion at the remaining two R-290 lines, and national acceptance for three R-290 lines; verification of completed conversion projects; promotion of alternative technologies, including a workshop on R-290 and payment of IOCs based on a revised IOC incentive scheme; training on installation and servicing of the R-290 RAC; and awareness activities. The planned completion date of the first through the third tranche is March 2019, while the fourth tranche will be completed by June 2019, and the fifth tranche by December 2019.

Secretariat's comments

HCFC consumption

122. The consumption of HCFC-22 in the RAC sector in 2017 was 55,000 mt (3,025 ODP tonnes), which is lower than the maximum allowable consumption in the Agreement between the Government of China and the Executive Committee (Table 4). The 2018 quota for the sector has been issued at 47,502 mt (2,612.6 ODP tonnes), which is lower than the maximum allowable consumption specified in the Agreement.

Table 4. HCFC-22 consumption and targets for the RAC sector

RAC sector plan		2009	2010	2011	2012	2013	2014	2015	2016	2017
Consumption*	mt	71,500	77,900	74,700	72,600	68,900	62,000	54,000	55,000	55,000
	ODP tonnes	3,932.5	4,284.5	4,108.5	3,993.0	3,789.5	3,410.0	2,970.0	3,025.0	3,025.0
Max. allowable consumption	mt	n/a	n/a	n/a	n/a	74,700	74,700	67,231	67,231	67,231
	ODP tonnes	n/a	n/a	n/a	n/a	4,108.5	4,108.5	3,697.7	3,697.7	3,697.7

*Data from the progress report

Status of implementation

123. Notwithstanding continued efforts by the Government of China, CHEAA, industry and UNIDO, the production of R-290 equipment on the converted lines remains very low. To address the low production, the Government of China proposed changes to the IOC incentive scheme and sought a commitment from manufacturers to produce and sell R-290-based equipment. Accordingly, eight manufacturers committed to selling at least 220,000 R-290-based units for the domestic market and for export to Article 5 countries by mid-2019. While noting this commitment with appreciation, the Secretariat noted that the sales would account for approximately 3 per cent of the capacity converted under stage I, and a negligible fraction of the R-410A sales.

124. Among the challenges that contribute to the low production, are the longer installation time for an R-290-based unit; domestic and international standards; and the higher cost relative to other products that are already mass-produced and benefit from economies of scale. UNIDO emphasized that the longer installation time than that for HCFC-22- and R-410A-based equipment was due to the need for additional safety precautions. From a technical perspective, it was not clear to the Secretariat why installation of R-290 AC equipment would take longer given that the equipment was shipped with the refrigerant charge wholly contained within the outdoor unit, and the connection of the indoor and outdoor units was accomplished without brazing. Moreover, increasing the installation standards of HCFC-22-and R-410A-based equipment to be more on par with that of R-290-based equipment (e.g., evacuation of the indoor unit) would improve the performance and energy efficiency of that equipment.

Changes to the IOC incentive scheme

125. While the continued efforts by the Government and all stakeholders under both stage I and stage II are expected to accelerate market acceptance of R-290-based equipment, the remaining IOCs (i.e., US $18,448,564) would not be paid to enterprises until sales of the R-290-based equipment had been achieved. Given this situation, the Government of China had proposed the following changes to the IOC incentive scheme:

(a) IOCs will only will only be provided to split AC units as these units need more promotion; factory-sealed units (e.g., dehumidifiers, portable ACs units) are already accepted by the market and no longer will be compensated with IOCs;

(b) IOCs of a specific beneficiary will not be limited, and will be paid according to the sales amount (i.e., enterprises that sells R-290 split AC units faster will receive more IOCs); and

(c) IOCs will be paid in accordance to sales of R-290 split AC units and based on the energy efficiency of the equipment, according to the Table 5.

Table 5. Proposed IOC incentive scheme (RMB)*

Split units	Criteria	
	Inverter (RMB)	Fixed-speed (RMB)
Local sales		
Grade 1 energy efficiency	600	500
Grade 2 energy efficiency	360	300
Grade 3 energy efficiency	200	150
Export to Article 5 countries	360	300

*RMB= renminbi

126. While the Secretariat considers the proposed scheme to be a constructive approach to encouraging sales, in particular focusing the IOCs only on split units rather than also including factory-sealed units, which have already gained market acceptance, and encouraging the market uptake of more energy efficient equipment, the Secretariat does not consider the IOC values proposed to be consistent with decision 60/44(f)(viii). Following the proposed incentive scheme, IOCs would vary between US $75.39/kg and US $18.85/kg.[9] Furthermore, if sales are dominated by the most energy efficient models, which is expected, the committed sales of 220,000 units would fully utilize all the remaining IOCs; assuming sales are equally split between the different categories in Table 5, the converted lines would have to sell approximately 370,000 units to disburse all the remaining IOCs. In either case, the sales would constitute a small proportion of the capacity converted to R-290 under stage I, a negligible fraction of the R-410A sales, and are unlikely to have a sustainable impact on the market acceptance of R-290-based equipment. While IOCs for higher energy efficiency equipment could be above the US $6.30/kg threshold specified in decision 60/44(f)(viii), IOCs were assessed based on the conversion of approximately seven million units/year. The Secretariat therefore considers it important that IOCs not be fully disbursed until the converted capacity is utilized.

127. Alternative approaches to the proposed IOC incentive scheme that could yield more sustainable manufacturing of the production lines that have been converted and that are currently idle due to the low market penetration of the converted AC units could be considered. For example:

(a) Graduated payment of IOCs for early sales ensuring more sustainable manufacturing of R-290-based split ACs. For example, IOCs could be provided at one third of the values proposed for the first 220,000 units sold, resulting in a disbursement between approximately US $3.7 million and US $6.4 million; the next 500,000 units sold could receive IOCs at one sixth of the values proposed, resulting in further disbursement between approximately US $4.2 million and US $7.2 million; the next, 1,000,000 units sold could receive IOCs at one twelfth of the values proposed (i.e., between US $6.30/kg and US $1.57/kg), resulting in further disbursement between approximately US $4.2 million and US $7.2 million; and the remaining IOCs could be disbursed based on sales of the remaining approximately 5 million units; and

(b) At the 81st meeting,[10] the Secretariat had noted that the conversions of AC manufacturing lines to R-290 technology could have the unintended consequence of increased manufacturing of R-410A -based equipment in other manufacturing lines, to offset the idle capacity. Accordingly, the Secretariat proposed to deduct from the country's starting point for aggregate reduction of HFC consumption, once it was established, the amount of

[9] Based on the exchange rate at the time of finalization of the present document, and an average charge of 1.15 kg/unit.
[10] UNEP/OzL.Pro/ExCom/81/29.

R-410A contained in equipment temporarily being manufactured by the enterprises assisted under stage I after 1 January 2020, based on the converted capacity that was idle, until the converted lines were manufacturing equipment based on the agreed technology.

Extension of the completion date of the project

128. Decision 75/57(b) calls for the submission of the stage I RAC project completion report six months after the operational completion of the sector plan and no later than the final meeting of the Executive Committee in 2019. Based on the IOC incentive scheme proposed, the Government of China did not consider that an extension was required. The Secretariat does not consider it realistic that sales of R-290-based split ACs would reach approximately seven million before the last meeting of 2019. Accordingly, the Secretariat considers that the operational completion of the project would need to be extended.

129. At the time of finalization of the present document, the Government of China needed further time to consider changes to the IOC scheme, and whether to request an extension of the project. The Government was not in a position to agree to the proposal to deduct the equivalent R-290 manufacturing capacity that was idle after 1 January 2020 from the country's starting point for HFCs. The Executive Committee may wish to provide guidance on those matters.

Conclusion

130. The RAC sector plan continues to progress, with 16 R-290 AC lines, eight R-410A AC lines, and three R-290 compressor lines converted. The total phase-out in the sector of all the lines that have signed contracts is 10,813.8 mt of HCFC-22, which is larger than the anticipated phase-out of 10,670 mt from stage I. The demonstration project at Midea phased out an additional 240 mt of HCFC-22. The disbursement from FECO to the final beneficiaries is 62 per cent. Notwithstanding continued and commendable efforts by the Government of China, CHEAA, industry and UNIDO, the production of R-290 equipment on the converted lines remains very low, reflecting the local and global market penetration.

131. The Secretariat recalled that the Government of China, rather than converting to R-410A, had chosen to convert the 18 lines under stage I to R-290, which is a more challenging technology and requires considerable work to achieve market acceptance. The commitment by manufacturers to sell a minimum number of R-290-based units by mid-2019 is a meaningful step that will help the market introduction of R-290-based equipment. The Secretariat considers it important that this momentum not be slowed, and therefore supports the use of an innovative IOC incentive scheme to encourage sales of more energy efficient equipment. Finally, the Secretariat appreciates that manufacturers would wish to use caution during initial installations; it is expected that as installers become familiar with R-290 equipment, including through the trainings that are conducted under both stage I and stage II, the difference in installation time between R-290-based equipment and HCFC-22- and R-410A-based equipment will decrease. Accordingly, the Secretariat considers it appropriate that IOCs above the level specified in decision 60/44(f)(viii) could be provided for a limited number of sales, with IOCs gradually decreasing with increasing sales so that all IOCs were disbursed once the converted capacity is utilized.

132. The Secretariat considers that it would be appropriate to deduct the total amount of R-410A contained in equipment based on the R-290 manufacturing converted capacity that is idle from the country's starting point for aggregate reduction on HFCs consumption, once it is established, starting from 1 January 2020. The Secretariat is seeking the Executive Committee's guidance on this matter.

Secretariat's recommendation

133. The Executive Committee may wish:

(a) To note the 2017 progress report on the implementation of the room air-conditioning (RAC) sector plan of stage I of the HCFC phase-out management plan (HPMP) in China submitted by UNIDO;

(b) To consider whether or not to deduct from the country's starting point for sustained aggregated reductions of HFC consumption, once it was established, the amount of R-410A contained in equipment being manufactured by the enterprises assisted under stage I after 1 January 2020, based on the converted capacity that was idle, until the converted lines were manufacturing equipment based on the agreed technology; and

(c) To request the Government of China and UNIDO to submit to the 83rd meeting a revised progress report on the implementation of the RAC sector plan of stage I of the HPMP in light of the guidance provided by the Executive Committee at the 82nd meeting.

HPMP (stage I): Refrigeration servicing sector and the national enabling programme (UNEP and Japan)

Progress report on the implementation

134. The following activities have been implemented:

(a) Design of an automatic approval system to update the ODS import/export control system was completed and expected to be operational by the end of 2018; training workshop on Customs management of ODS imports/exports, international cooperation on control of ODS illegal trade, responsibility of Commerce Department in ODS import and export control and ODS recognition and disposal was conducted for 80 Customs officers. Training programme of Shanghai Customs Academy has been completed and final progress report was submitted; additional 20 refrigerant identifiers were procured and distributed to 10 local Customs offices. The study on the application of criminal penalty laws in processing ODS illegal trade in China, and the overseas study tour on control of ODS import/export for Customs officers were not conducted, and the associated funds were used to support the update of the ODS import/export control system;

(b) Capacity building of national and local authorities through training on law enforcement in ODS management for 50 enforcement officers from 28 environmental protection bureaus (EPBs) at city level and 17 EPBs at provincial level was carried out; regular communication took place with local ozone officers to address concerns on project implementation; monthly meetings were held with relevant government agencies to discuss issues related to compliance with the Montreal Protocol and project implementation; the Handbook of the Montreal Protocol was distributed to the national ozone unit officers and local EPBs;

(c) Training programme was conducted by 13 training centres that were already in place, of which, contracts for five (four regional and one international) training centres were renewed. A total of 63 technicians/trainers and 1,054 technicians/students were trained on good servicing practices and handling R-290 refrigerant; 3,000 copies of the training publication on good servicing practices for refrigeration and air-conditioning equipment were distributed;

(d) Awareness activities, including 2018 Ozone Day celebration and coordination meeting for the implementation of the HCFC phase-out management plan (HPMP) and a workshop on compliance capacity building were organized. Two short videos on understanding and protecting the ozone layer were distributed; brochures about the Montreal Protocol in Chinese and English were disseminated; and Chinese media reported on China's progress and challenges on compliance with the Montreal Protocol; and

(e) Monitoring all remaining activities under stage I of the HPMP through field visits to training centres and stakeholder meetings.

Level of fund disbursement

135. As of September 2018, of the US $5,640,000 approved so far, all has been disbursed by the Government of Japan and UNEP to the Foreign Economic Cooperation Office (FECO) under the Project Cooperation Agreement (PCA), and US $4,719,589 has been disbursed by FECO, as shown in Table 1.

Table 1. Status of disbursements for the servicing sector and enabling activities component as of September 2018

Description		Tranche 1	Tranche 2	Tranche 3	Tranche 4	Tranche 5	Total
Funds approved (US $)*		1,659,000	678,000	1,184,000	1,253,000	866,000	5,640,000
Disbursement to FECO	Amount (US $)	1,659,000	678,000	1,184,000	1,253,000	866,000	5,640,000
	Disbursement ratio (%)	100	100	100	100	100	100
Disbursement by FECO	Amount (US $)	1,659,000	678,000	1,184,000	847,915	350,674	4,719,589
	Disbursement ratio (%)	100	100	100	68	40	84

*Total funds approved for UNEP and the Government of Japan that requested UNEP to manage the implementation of their portion of the approved amount, i.e. US $80,000 for each tranche.

Remaining activities in the refrigeration servicing sector

136. Between October and December 2018, FECO will complete the training of over 1,000 technicians/trainers and students at the four training centres; prepare an assessment of the training programme, covering, *inter alia*: feedback of the trained technicians, students, and servicing workshops on the performance of trained technicians and the effectiveness of training centres; an analysis of the outcome in consultation with relevant industry associations; and the finalisation of reports and financial obligations.

Secretariat's comments

HCFC consumption

137. The consumption of HCFCs in the servicing sector in 2017 was 52,486.66 mt (2,881.42 ODP tonnes), as shown in Table 2. While this figure is higher than the previous year's consumption of 48,125.09 mt (2,638.29 ODP tonnes), there is no maximum allowable consumption for the servicing sector in the Agreement between the Government of China and the Executive Committee; and the overall total consumption for the country in 2017 was not exceeded.

Table 2. HCFC consumption in the servicing sector in China (2013-2017 country programme data)

HCFC	2013	2014	2015	2016	2017	Average (2009-2010)
Metric tonnes						
HCFC-22	54,467.71	56,704.98	42,557.47	47,398.35	51,482.65	64,466.58
HCFC-123	425.97	356.78	314.91	288.14	347.29	113.75
HCFC-124	119.89	96.23	-46.32	67.16	-5.71	139.56
HCFC-142b	1,491.04	518.41	1,016.42	371.44	662.43	5,338.58
Total (mt)	**56,504.61**	**57,676.40**	**43,842.48**	**48,125.09**	**52,486.66**	**70,058.47**
ODP tonnes						
HCFC-22	2,995.72	3,118.77	2,340.66	2,606.91	2,831.55	3,545.68
HCFC-123	8.52	7.14	6.30	5.76	6.95	2.30
HCFC-124	2.64	2.12	-1.02	1.48	-0.13	3.05
HCFC-142b	96.92	33.70	66.07	24.14	43.06	347.03
Total (ODP tonnes)	**3,103.8**	**3,161.72**	**2,412.01**	**2,638.29**	**2,881.42**	**3,898.06**

Date of completion of stage I

138. UNEP confirmed that the Government of China will not seek further extension for the servicing sector plan and that the remaining activities will be completed by the end of 2018. The remaining financial obligations will be completed by the first half of 2019 following a review process; the project completion report will be submitted to the 83rd meeting.

Conclusion

139. The Secretariat noted the substantive progress in the implementation of the planned activities for the servicing and enabling component of stage I. A total of 4,481 technicians/trainers and students have been trained in stage I; policy and law enforcement workshops were organized for local authorities; and awareness activities continued. Disbursement to FECO is 100 per cent and FECO has disbursed 84 per cent of this amount to stakeholders and partners. The overall consumption of the servicing sector was reduced from 3,898.06 ODP tonnes (average in 2009-2010) to 2,881.42 ODP tonnes in 2017.

Secretariat's recommendation

140. The Executive Committee may wish:

(a) To note the 2018 progress report on the implementation of stage I of the refrigeration servicing sector plan and the national enabling programme of stage I of the HCFC phase-out management plan (HPMP) in China submitted by UNEP;

(b) To approve the extension of the duration of stage I of the HPMP to 31 December 2018, on the understanding that no further extension of project implementation would be requested; and

(c) To request the Government of China, UNEP and the Government of Japan to submit the project completion report to the first meeting in 2019.

HCFC PHASE-OUT MANAGEMENT PLAN (STAGE II, SECOND TRANCHE) (UNDP, UNIDO, Germany and Italy)

Overarching strategy of stage II of the HPMP for China

Background

141. Between the 76th and 79th meetings, the Executive Committee approved stage II of the of the HCFC phase-out management plan (HPMP) for China with associated sectors plans as follows:

(a) At the 76th meeting, approved in principle the solvent sector plan for the period 2016 to 2026, for the complete phase-out of all HCFCs in that sector, in the amount of US $44.8 million, plus agency support costs;

(b) At the 76th meeting, approved in principle the refrigeration and air-conditioning servicing sector and enabling programme component for the period 2016 to 2020, to reduce HCFC consumption by 734.0 ODP tonnes, in the amount of US $20.29 million, plus agency support costs;

(c) At the 77th meeting, approved in principle stage II of the HPMP for China for the period 2016 to 2026 in the amount of US $500,100,000, plus agency support costs, to reduce HCFC consumption by 37.6 per cent of the baseline by 2020, which included: the ICR sector plan to reduce HCFC consumption in the sector by 33 per cent by 2020; the RAC sector plan to reduce HCFC consumption in the sector by 45 per cent by 2020; and the polyurethane (PU) foam sector and the extruded polystyrene (XPS) foam sector plan to achieve the total phase-out of HCFCs in these sectors by 2026; and

(d) At the 79th meeting, approved the Agreement between the Government of China and the Executive Committee for the implementation of stage II of the HPMP, and set the agency support costs for UNDP, UNIDO, and the World Bank at 6.5 per cent, on the understanding that the agency support costs could be reconsidered at the 81st meeting, and maintained the level of agency support costs for the bilateral agencies and UNEP in place under the current administrative cost regime.

142. The HCFC consumption limits and targeted phase-out amounts for the period of 2016 to 2026[11] in the six sectors are shown in Table 1.

Table 1. HCFC consumption limits and phase-out in consumption sectors for stage II of the HPMP for China (ODP tonnes)

Maximum allowable consumption							
	2016-17	**2018-19**	**2020-21**	**2022**	**2023-24**	**2025**	**2026**
National	16,978.9	15,048.1	11,772.0*	n/a	n/a	n/a	n/a
XPS	2,286.0	2,032.0	1,397.0	1,397.0	762.0	165.0	0.0
PU	4,449.6	3,774.5	2,965.7	2,965.7	1,078.4	330.0	0.0
ICR	2,162.5	2,042.4	1,609.9*	n/a	n/a	n/a	n/a
RAC	3,697.7	2,876.0	2,259.7	n/a	n/a	n/a	n/a
Solvent	455.2	395.4	321.2	321.2	148.3	55.0	0.0
Servicing and enabling component	n/a	n/a	n/a	n/a	n/a	n/a	n/a

[11] The national HCFC consumption target, as well as the targets for the ICR and RAC sectors for the period 2021 to 2026 would be determined during the submission of stage III of the HPMP.

Phase-out by sector						
	2018	**2020**	**2023**	**2025**	**2026**	**Total**
XPS	254.0	635.0	635.0	597.0	165.0	2,286
PU	675.1	808.8	1,887.3	748.4	330.0	4,449.6
ICR	120.1	432.5	n/a	n/a	n/a	552.6
RAC	821.7	616.3	n/a	n/a	n/a	1,438
Solvent	59.8	74.2	172.9	93.3	55.0	455.2
Servicing and enabling component		734.0	n/a	n/a	n/a	734.0
Total	**1,930.7**	**3,300.8**	**2,695.2**	**1,438.7**	**550.0**	**9,915.4**

*This is the national maximum allowable consumption for 2020 only; for the period 2021 to 2026 it will be determined during submission of stage III of the HPMP.

Submission to the 82nd meeting

143. On behalf of the Government of China, UNDP, UNIDO and the Governments of Germany and Italy submitted requests for third tranches of the XPS foam, ICR, solvent and servicing sector plans and second tranche of the PU foam sector plan associated with stage II of the HPMP for China as shown in Table 2, together with an independent verification of HCFC production and consumption in 2017 (World Bank), annual implementation reports covering the activities undertaken so far, and annual implementation plans for the activities to be implemented in 2018-2019.

144. The request for the third tranche of the RAC sector plan (US $18 million) was not submitted to the 82nd meeting because the level of disbursement of funds approved for the second tranche had not reached 20 per cent.

Table 2. Tranche requests of sector plans submitted to the 82nd meeting (excluding support costs)

Sector plan (lead and co-operating agency)	**Overall funding approved in principle (US $)**	**First two tranches approved (US $)**	**First two tranches approved as share of overall approved in principle (%)**	**Funding requested at 82nd meeting (US $)**	**Share of funding approved and requested of total approved in principle (%)**
XPS (UNIDO, Germany)	112,786,630	16,514,867	14.6	8,000,000	21.7
PU (World Bank)	141,471,210	7,045,027*	5.0	0**	5.0
ICR (UNDP)	89,144,797	33,368,756	37.4	20,000,000	59.9
RAC (UNIDO, Italy)	89,144,797	31,562,981	35.41	0**	35.41
Solvent (UNDP)	47,262,566	6,599,127	14.0	2,959,930	20.23
Servicing and enabling programme (UNEP, Germany, Japan)	20,290,000	6,329,132	31.2	3,650,000	49.18
Total	**500,100,000**	**101,419,890**	**20.3**	**34,609,930**	**27.20**

*Only one tranche approved in the PU foam sector plan
**Tranche request not submitted to the 82nd meeting

145. After reviewing the project proposals and documents associated to the third tranche requests for the XPS foam, ICR, solvent and refrigeration sector plans, the Secretariat concluded that all of them had merits to warrant their submission for consideration at the 82nd meeting.

146. The request for the second tranche of the PU foam sector plan, however, did not meet the requirements specified in paragraph 5 of the Agreement. At the time of submission of the request (i.e., 12 weeks before the Executive Committee meeting), the Grant Agreement between the World Bank and the Government of China had not been signed and, therefore, no disbursement had taken place, either from

the World Bank to FECO or from FECO to the final beneficiaries. Accordingly, this proposal is not being presented for consideration at the 82nd meeting.

147. The World Bank indicated that, despite the non-signature of the agreements, a kick-off workshop for potential beneficiaries in the PU foam sector has been held; twelve potential beneficiaries have been identified, trained in preparing subproject proposals for consideration by FECO; the baseline consumption and existing equipment of potential beneficiaries have been reviewed; and eight enterprises consuming 1,031 mt of HCFC-141b are ready to sign agreements with FECO. The agreement between the World Bank and FECO is expected to be signed before the end of 2018 and effective immediately thereafter. It is expected that at least an additional 16 enterprises will be ready for signing agreements requiring additional resources of more than US $9 million from the second tranche.

148. The World Bank also indicated that if it was not possible to consider the second tranche at the 82nd meeting, the Government of China would like to allocate the funding tranche into revised funding tranches for 2019 and 2020. These changes are presented below in the section related to the revision of the Agreement.

Overview of progress

149. An overview of the main achievements in the implementation of stage II of the HPMP include:

(a) Establishment and continuous implementation of the licensing and quota system to control the overall compliance in each one of the manufacturing sectors, including the application of quota permits to enterprises consuming more than 100 mt of HCFCs per year resulting in compliance with all the manufacturing sector consumption limits during the years of implementation;

(b) *XPS foam sector:* The contract between FECO and UNIDO for the implementation of the XPS foam sector plan was signed in September 2017. Eleven XPS foam enterprises (4,522 mt of HCFC-22 and HCFC-142b) were identified and ten of them (4,297 mt of HCFC-22 and HCFC-142b) were verified, signed contracts with FECO for conversion to CO_2-based technology and received first disbursements. The first two enterprises started equipment procurement;

(c) *ICR sector:* Contracts were signed with 17 enterprises for the conversion of 17 manufacturing lines to phase out 2,520.84 mt of HCFC-22. The conversions are progressing well and are being closely monitored according to the defined milestones. The product design and procurement of equipment have been completed for five lines; the remaining 11 lines are in the process of product design and procurement of equipment;

(d) *RAC sector:* Contract between FECO and UNIDO for the implementation of the RAC sector plan was signed in October 2017; FECO signed contracts with the China Household Electric Appliances Association (CHEAA) and the auditing firm that will independently verify the lines to be converted. Contracts for the conversion of four compressor manufacturing lines with a total production capacity of 5,423,441 units/year and with five RAC manufacturing lines with a total consumption of 2,221 mt of HCFC-22 have been signed. Of the US $31,562,981 approved, a total of US $3,454,396 (10 per cent) has been disbursed to the final beneficiaries;

(e) *Solvent sector:* Twenty-four eligible enterprises have signed contracts with FECO. Thirteen of these completed equipment procurement process and signed contracts with the equipment suppliers. The remaining 11 enterprises are preparing for equipment procurement process. The total phase¬ out associated with these enterprises is 1,176.19 mt

(129.38 ODP tonnes) of HCFC-141b. An additional 27 enterprises (mostly small and medium-sized enterprise (SMEs) with annual consumption above five mt of HCFC-141b) have submitted proposals for conversion that would result in an additional phase out of 436.00 mt (47.96 ODP tonnes) of HCFC-141b; FECO has arranged the screening process and baseline verifications for these enterprises; and

(f) *Refrigeration servicing sector:* The project cooperation agreement (PCA) for the second tranche of the refrigeration servicing sector and enabling components of stage II between UNEP and the FECO was signed in September 2018, and funds were subsequently transferred in October 2018; agreements with three pilot cities (Guangzhou, Shenzhen and Tianjin) with agreed work plans were finalised; a capacity building workshop on enforcing ODS regulations for local EPBs was conducted; agreement and work plan for the national executive agency for the delivery of the technician training programme was finalised; the terms of reference (TOR) for developing the codes for the servicing and maintenance of air conditioning units and water chillers were finalised and the procurement process and contracts were initiated; the implementation agreement (IA) for the Government of Germany's component of the first tranche was signed, and one beneficiary (Chaoshifa supermarket chain) for the demonstration of a CO_2 transcritical system application was identified; six trainers from vocational training centres and six managers/engineers from the cold chain and supermarket sub-sector participated in an overseas training workshop/study tour on the application of low-GWP refrigerants (e.g. R-290, NH_3, and CO_2) in the sub-sector; the survey report for the barrier analysis and market mechanism study on HCFC recovery was drafted and reviewed; and awareness raising activities were continued.

Disbursement of funds

150. As of October 2018, of the US $101,419,890 approved under the first and second tranches, US $41,033,311 have been disbursed from implementing agencies to FECO, and US $26,636,769 have been disbursed from FECO to beneficiaries, as summarized in Table 3.

Table 3. Level of disbursement per sector (as of October 2018)

		Tranche 1	Tranche 2	Total
XPS foam sector plan (UNIDO/Germany)				
Funds approved		7,514,867	9,000,000	16,514,867
Disbursements from implementing agencies to FECO	Amount (US $)	3,757,434	2,619,784	6,377,218
	Disbursement ratio	50.0%	29.1%	38.6%
Disbursements from FECO to beneficiaries	Amount (US $)	1,696,963	2,222,886	3,919,848
	Disbursement ratio	22.6%	24.7%	23.7%
PU foam sector plan (World Bank)				
Funds approved		7,045,027	-	7,045,027
Disbursement from the World Bank to FECO	Amount (US $)	-	-	-
	Disbursement ratio	0.0%	0.0%	0.0%
Disbursement from FECO to beneficiaries	Amount (US $)	-	-	-
	Disbursement ratio	0.0%	0.0%	0.0%
ICR sector plan (UNDP)				
Funds approved		13,368,756	20,000,000	33,368,756
Disbursements from UNDP to FECO	Amount (US $)	13,368,756	10,000,000	23,368,756
	Disbursement ratio	100.0%	50.0%	70.0%
Disbursements from FECO to beneficiaries	Amount (US $)	7,979,885	7,084,062	15,063,947
	Disbursement ratio	59.7%	35.4%	45.1%
RAC sector plan (UNIDO)				
Funds approved		15,562,981	16,000,000	31,562,981
Disbursement from UNIDO to FECO	Amount (US $)	4,309,022	-	4,309,022
	Disbursement ratio	27.7%	0.0%	13.7%
Disbursement from FECO to beneficiaries	Amount (US $)	3,454,396	-	3,454,396
	Disbursement ratio	22.2%	0.0%	10.9%

		Tranche 1	Tranche 2	Total
Solvent (UNDP)				
Funds approved		2,821,937	3,777,190	6,599,127
Disbursement from UNDP to FECO	Amount (US $)	2,796,990	1,280,036	4,077,026
	Disbursement ratio	99.1%	33.9%	61.8%
Disbursement from FECO to beneficiaries	Amount (US $)	2,551,776	1,094,408	3,646,184
	Disbursement ratio	90.4%	29.0%	55.3%
Servicing (UNEP/Germany/Japan)				
Funds approved		3,679,132	2,650,000	6,329,132
Disbursement from UNEP to FECO	Amount (US $)	1,601,290	1,300,000	2,901,290
	Disbursement ratio	43.5%	49.1%	45.8%
Disbursement by FECO	Amount (US $)	552,394	-	552,394
	Disbursement ratio	15.0%	0.0%	8.7%
Total all sectors				
Funds approved by the Executive Committee		49,992,700	51,427,190	101,419,890
Disbursements to FECO	Amount (US $)	25,833,491	15,199,820	41,033,311
	Disbursement ratio	51.7%	29.6%	40.5%
Disbursements from FECO to beneficiaries	Amount (US $)	16,235,414	10,401,356	26,636,769
	Disbursement ratio	32.5%	20.2%	26.3%

151. As at the time of submission of the tranche requests (twelve weeks before the 82nd meeting), the rate of disbursement of funding from FECO to beneficiaries was above 20 per cent in the XPS foam, ICR, solvent and refrigerant servicing sectors.

Revision of the Agreement for stage II

152. The Agreement between the Government of China and the Executive Committee for stage II of the HPMP was agreed at the 79th meeting (decision 79/35). At the 81st meeting the Secretariat noted that the Agreement would need to be revised to include the level of the agency support costs that the Executive Committee might decide at the 81st meeting, and to reflect potential changes in the fund distribution in the PU foam sector plan given the delay in the submission of the second tranche, which would also result in changes to the distribution of the overall funding of stage II of the HPMP. Subsequently, the Executive Committee decided to adjust to 7 per cent the agency support costs associated with the second and future tranches of all sector plans of stage II of the HPMP for China for UNDP, UNIDO and the World Bank; and to revise, at the 82nd meeting, the Agreement for stage II of the HPMP (decision 81/45).

153. The Secretariat and UNDP as lead agency discussed a revised Agreement for stage II of the HPMP submitted for consideration, including the following adjustments in Appendix 2-A:

(a) The Agency support cost for UNDP, UNIDO and the World Bank was adjusted to 7 per cent from the second to the last tranche in line with decision 81/45(a). This adjustment represents an increase of US $2,162,056 in the agency support cost previously calculated at 6.5 per cent in the Agreement approved at the 79th meeting;

(b) As the preconditions for the approval of the second tranche of the PU foam sector plan (due at the 80th meeting) have not been fulfilled at the 82nd meeting, there is a two-year delay in the funding to be released for the implementation of this sector plan. The HCFC reduction commitments and duration of the sector plan are not modified, but the value of the 2017 and 2018 tranches (US $10.6 million and US $9.0 million) has been distributed among the 2019, 2020, 2024 and 2025 tranches;

(c) As the second tranche of the RAC sector plan due in 2017 was only approved at the 81st meeting (2018) and the third tranche due in 2018 was not submitted to the 82nd meeting in 2018, there is a one-year delay. Accordingly, the remaining tranches of the sector (2018 to 2021) were moved one year (2019 to 2022), having the last tranche in 2022 instead of

2021. Submission of tranche requests will continue to take place in the second meeting of the year, as stipulated in the Agreement; and

(d) The tranche distribution of the solvent sector plan was adjusted by increases in the 2018, 2019, 2020 and 2023, and decreases in 2021, 2022, 2024 and 2025 to meet the cash flow needed for signing up new enterprises, and timely payment according to their implementation progress upon completion of milestones, and to reflect incremental operating cost payments needed once the first set of enterprises had completed their conversions.

154. Upon discussion of the proposed tranche distribution, few adjustments were made to ensure that the total annual tranches levels were maintained as close as possible to the originally agreed ones.

155. The Secretariat considers that the adjustments in the tranche distribution in the PU foam and the RAC sector are in line with the delays incurred and the need for funding in the next years. For the solvent sector, the Secretariat had already noted at the 80th meeting that the original tranche distribution might cause difficulties to make expenditure to the 24 enterprises with ongoing projects and additional 27 SMEs expected to complete verifications of consumption and enter into contracts with FECO during the first quarter of 2019. With regard to the total annual tranche distribution including all sectors in the HPMP, the most significant change can be summarized as a reduction of around US $37.5 million in 2017 and 2018 offset with increases in future tranches, mostly 2019 (US $15.7 million), 2020 (US $10.5 million) and 2022 (US $10.7 million). The details are presented in Annex II to the present document.

156. Appendix 3-A of the Agreement for stage II of the HPMP stipulates that funding for the future tranches will be considered for approval at the last meeting of each year specified in Appendix 2-A. The Secretariat and the World Bank as implementing agency of the PU foam sector plan considered that, if the conditions for the request of the second tranche are fulfilled by December 2018 as the World Bank envisages, the consideration of the request for the second tranche of the PU foam sector plan at the first meeting of 2019 (83rd meeting) would help the Government of China to address the delays and start conversion of enterprises as soon as possible. The third and future tranches for this sector would continue to be submitted at the last meeting of the year starting 2020, in line with the Agreement. The revised Appendix 2-A of the Agreement is presented in Annex I. The full updated Agreement will be appended to the final report of the 82nd meeting, including in addition to the changes above, paragraph 17 was added to show that this updated revised Agreement replaces the one agreed between the Government and the Executive Committee at the 79th meeting and Appendix 2-A was updated as explained above.

157. The Executive Committee may wish to consider:

(a) Noting that the Fund Secretariat had updated Appendix 2-A of the Agreement between the Government of China and the Executive Committee, based on the changes in the annual tranche distribution in the polyurethane foam, room air-conditioning and solvent sectors, and the adjustment of the agency support cost for UNDP, UNIDO and the World Bank, and that a new paragraph 17 had been added to indicate that the updated Agreement superseded that reached at the 79th meeting, as contained in Annex I to the present document; and

(b) Allowing the submission of the second tranche of the PU foam sector plan to the 83rd meeting, on the understanding that the conditions for submission are fulfilled.

Tranche progress reports and funding requests

158. Detailed stand-alone progress reports on the implementation of the XPS foam, ICR, solvent and refrigeration servicing sector plans and requests for funding for the second tranches are attached to the Note by the Secretariat. Each report provides a progress report on the implementation of the first tranche; the level of fund disbursement; implementation plans for the second tranches; comments by the Fund Secretariat; and the recommendation.

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS

China

(I) PROJECT TITLE	AGENCY	MEETING APPROVED	CONTROL MEASURE
HCFC phase-out plan (stage II) XPS foam sector	Germany and UNIDO (lead)	77th	100 % in 2026

(II) LATEST ARTICLE 7 DATA (Annex C Group I)	Year: 2017	14,604.66 (ODP tonnes)

(III) LATEST COUNTRY PROGRAMME SECTORAL DATA (ODP tonnes)						Year: 2017
Chemical	Aerosol	Foam	Refrigeration		Solvent	Total sector consumption
			Manufacturing	Servicing		
HCFC-22		1,595.00	5,087.50	2,831.55		9,514.05
HCFC-123			12.88	6.95		19.83
HCFC-124				-0.13		-0.13
HCFC-141b		4,008.26			396.00	4,404.26
HCFC-142b		617.50	5.85	43.06		666.41
HCFC-225ca					1.11	1.11

(IV) CONSUMPTION DATA (ODP tonnes)			
2009 - 2010 baseline:	19,269.00	Starting point for sustained aggregate reductions:	18,865.44
CONSUMPTION ELIGIBLE FOR FUNDING (ODP tonnes)			
Already approved:	12,161.02	Remaining:	6,704.42

(V) BUSINESS PLAN		2018	2019	2020	Total
UNIDO	ODS phase-out (ODP tonnes)	139.43	161.10	167.31	467.84
	Funding (US $)	8,520,000	9,844,313	10,224,000	28,588,313
Germany	ODS phase-out (ODP tonnes)	0.00	6.21	0.00	6.21
	Funding (US $)	4,463	399,016	0	403,479

(VI) PROJECT DATA			2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Montreal Protocol consumption limits			17,342.1	17,342.1	17,342.1	17,342.1	12,524.9	12,524.9	12,524.9	12,524.9	12,524.9	6,262.4	6,262.4	n/a
Maximum allowable consumption (ODP tonnes)			2,286.0	2,286.0	2,032.0	2,032.0	1,397.0	1,397.0	1,397.0	762.0	762.0	165.0	0.0	n/a
Agreed funding (US $)	UNIDO	Project costs	7,514,867	8,732,614	8,000,000	9,243,486	9,600,000	14,788,765	11,400,000	11,300,000	9,550,000	9,600,000	11,971,763	111,701,495
		Support costs	526,041	611,283	**560,000**	**647,044**	**672,000**	**1,035,214**	**798,000**	**791,000**	**668,500**	**672,000**	**838,023**	**7,819,105**
	Germany	Project costs	-	267,386		356,514		211,235			250,000	-	-	1,085,135
		Support costs	-	31,877	-	42,502	-	25,183	-	-	29,804	-	-	129,365
Funds approved by ExCom (US $)		Project costs	7,514,867	9,000,000										16,514,867
		Support costs	526,041	643,160										1,125,538
Total funds requested for approval at this meeting (US $)		Project costs			8,000,000									8,000,000
		Support costs			560,000									560,000

Secretariat's recommendation:	For individual consideration

PROJECT DESCRIPTION

159. On behalf of the Government of China, UNIDO as the lead implementing agency, has submitted a request for funding for the third tranche of the extruded polystyrene (XPS) foam sector plan of stage II of the HCFC phase-out management plan (HPMP), at the amount of US $8,000,000, plus agency support costs of US $560,000 for UNIDO only.[12] The submission includes a progress report on the implementation of the second tranche of the XPS foam sector plan together with the tranche implementation plan for 2018 to 2019.

Progress report on the implementation of the second tranche of stage II

160. The contract between FECO and UNIDO for the implementation of the XPS foam sector plan (stage II) was signed in September 2017. The first group of 11 XPS foam enterprises has undergone verification of their baseline information (i.e., non-Article-5 ownership, baseline equipment, HCFC consumption and financial data). Ten of these enterprises were selected as beneficiaries and have already signed contracts with FECO for conversion to CO_2 with other low global-warming potential (low-GWP) co-blowing agents[13] as alternative technology. The status of progress of the 10 ongoing projects is presented in Table 1.

Table 1. Status of progress of XPS foam enterprises selected in the first and second tranches

Status of implementation	Number of enterprises	HCFC consumption 2016	
		mt	ODP tonnes*
Equipment procurement in progress	2	1,146	66
Signed contract with FECO	8	3,151	181
Total	**10**	**4,297**	247

* The ratio of HCFC-22 to HCFC-142b is 75 to 25 per cent (measured in mt).

161. The first two projects will be completed by December 2019, and the remaining eight between January and March 2020.

Technical assistance activities

162. Technical assistance activities implemented since the second half of 2017 include a workshop on alternative technologies in the XPS foam sector held in September 2017; technical support by the implementation support agency (ISA) to FECO and the enterprises with day-to-day operations and on-site baseline and performance verifications; and public awareness activities to facilitate HCFC phase-out in the XPS foam sector. An additional workshop on HCFC phase-out strategy, policies and alternative technologies is currently being organized with the Government of Germany, with the participation of equipment suppliers and XPS foam manufacturers.

Level of fund disbursement

163. As of September 2018, of the US $16,514,867 approved, US $3,919,848 (23.7 per cent) had been disbursed by FECO to beneficiary enterprises. Table 2 presents the status of total disbursement.

[12] As per the letter of 4 September 2018 from the Ministry of Environmental Protection of China to UNIDO.

[13] Alcohol for XPS board thickness below 60 mm; CO_2 and small amounts of HFC-152a (GWP<200) for XPS board thickness above 60 mm.

Table 2. Status of disbursements for the XPS foam sector plan (as of September 2018)

XPS foam sector plan (UNIDO/Germany)		Tranche 1	Tranche 2	Total
Funds approved	UNIDO	7,514,867	8,732,614	16,247,481
	Germany	0	267,386	267,386
	Total (US$)	**7,514,867**	**9,000,000**	**16,514,867**
Disbursements from implementing agencies to FECO	UNIDO	3,757,434	2,619,784	6,377,218
	Germany	0	0	0
	Total (US $)	**3,757,434**	**2,619,784**	**6,377,218**
	Disbursement ratio	50.0%	29.1%	38.6%
Disbursements from FECO to beneficiaries	UNIDO	1,696,963	2,222,886	3,919,848
	Germany	0	0	0
	Total (US $)	**1,696,963**	**2,222,886**	**3,919,848**
	Disbursement ratio	22.6%	24.7%	23.7%

Implementation plan for the third tranche of stage II

164. FECO will continue enforcing the quota permits for XPS foam enterprises consuming more than 100 metric tonnes (mt) of HCFCs per year; continue with the conversion of the 10 enterprises; and select between two and six additional enterprises for conversion, resulting in an additional reduction of at least 1,213 mt of HCFCs. The following technical assistance activities will be implemented: two technical workshops on HCFC phase-out strategy, policies, and alternative technologies; and continuation of ongoing public awareness activities to facilitate HCFC phase-out in the XPS foam sector, including regular meetings and information dissemination.

165. Table 3 presents the budget of the activities to be implemented during the implementation of the third tranche.

Table 3. Budget for the third tranche of the XPS foam sector plan in China

Activity	Budget (US $)
Conversion of XPS foam enterprises to CO_2 technology	7,287,752
Technical assistance activities	295,416
Project monitoring	416,832
Total third tranche	**8,000,000**

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

HCFC consumption and status of progress

166. The overview of HCFC consumption in the XPS foam manufacturing sector in 2017 is contained in paragraph 76 and 77 above.

167. The Secretariat noted the efforts by the Government of China and the implementing agencies to initiate the first 10 conversions (247 ODP tonnes),[14] as well as the plan to start two to six additional conversions under the third tranche (estimated at 70 ODP tonnes). The HCFC reductions generated by all of these projects together would amount to 317 ODP tonnes, which would be taking place between 2019 and 2020, considering a two-year duration of each conversion. However, in line with the Agreement, HCFC

[14] The ratio of HCFC-22 to HCFC-142b in the XPS foam sector in China as calculated in stage II of the XPS foam sector plan was on average 75 to 25 per cent in mt.

consumption would have to be reduced by 181 ODP tonnes from the 2017 consumption level no later than in 2018, with an additional reduction of 635 ODP tonnes by 2020. The Secretariat enquired whether all funding requested under the third tranche and more funds from the second tranche should be allocated to investment projects to ensure additional HCFC reductions.

168. UNIDO explained that stage II of the XPS foam sector plan will eliminate a total of 2,286 ODP tonnes of HCFCs not only from the conversion of eligible enterprises, but also from the self-funded conversion of ineligible ones, and will be supported by technical assistance that will strengthen the technical capacity of the industry and facilitate the adoption of low-GWP alternatives. Also, policy and regulatory interventions, including the HCFC production quota and domestic sales quota issued for each producer, as well as the HCFC consumption quotas for manufacturing enterprises using more than 100 mt, will ensure timely and sustained phase-out of HCFCs in the sector.

169. UNIDO also provided reassurance that FECO and UNIDO were identifying and engaging more eligible enterprises to participate in conversion projects as soon as possible.

Conclusion

170. The Secretariat notes that China continues to be in compliance with the Montreal Protocol and its Agreement with the Executive Committee with regard to the XPS foam sector plan. There is significant progress in the implementation of the first two tranches of stage II, including the initiation of 10 conversion projects and several technical assistance activities. The level of disbursement to beneficiary enterprises is above 20 per cent of the funds approved in the second tranche. Given the imminent HCFC reductions in the Agreement in 2018 and 2020, the funding from the third tranche is required to continue implementing investment projects, technical assistance activities and policy and regulatory measures, to ensure that HCFC consumption in the sector is reduced and maintained below the maximum allowable consumption in the Agreement.

RECOMMENDATION

171. The Executive Committee may wish to consider:

(a) Noting the progress report on the implementation of the second tranche of the extruded polystyrene (XPS) foam sector plan of stage II of the HCFC phase-out management plan (HPMP) for China; and

(b) Approving the third tranche of the XPS foam sector plan of stage II of the HPMP for China, and the corresponding 2019-2020 tranche implementation plan, at the amount of US $8,000,000, plus agency support costs of US $560,000 for UNIDO.

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS

China

(I) PROJECT TITLE	AGENCY	MEETING APPROVED	CONTROL MEASURE
HCFC phase-out plan (stage II) industrial and commercial refrigeration and air-conditioning	UNDP	77th	33% by 2020

(II) LATEST ARTICLE 7 DATA (Annex C Group l)	Year: 2017	14,604.66 (ODP tonnes)

(III) LATEST COUNTRY PROGRAMME SECTORAL DATA (ODP tonnes)									Year: 2017
Chemical	Aerosol	Foam	Fire fighting	Refrigeration		Solvent	Process agent	Lab use	Total sector consumption
				Manufacturing	Servicing				
HCFC-22		1,595.00		5,807.50	2,831.55				9,514.05
HCFC-123				12.88	6.95				19.83
HCFC-124					(0.13)				(0.13)
HCFC-141b		4.008.26				396.00			4,404.26
HCFC-142b		617.50		5.85	43.06				666.41
HCFC-225ca						1.11			1.11

(IV) CONSUMPTION DATA (ODP tonnes)			
2009 - 2010 baseline:	19,269.0	Starting point for sustained aggregate reductions:	18,865.44
CONSUMPTION ELIGIBLE FOR FUNDING (ODP tonnes)			
Already approved:	12,161.02	Remaining:	6,704.42

(V) BUSINESS PLAN		2018	2019	2020	After 2020	Total
UNDP	ODS phase-out (ODP tonnes)	209.14	278.85	278.85	205.23	972.07
	Funding (US $)	12,780,000	17,040,000	17,040,000	12,541,484	59,401,484

(VI) PROJECT DATA			2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Montreal Protocol consumption limits			17,342.1	17,342.1	17,342.1	17,342.1	12,524.9	12,524.9	12,524.9	12,524.9	12,524.9	6,262.4	6,262.4	n/a
Maximum allowable consumption (ODP tonnes)			2,162.5	2,162.5	2,042.4	2,042.4	1,609.9	1,609.9	*	*	*	*	*	n/a
Agreed funding (US $)	UNDP	Project costs	13,368,756	20,000,000	12,000,000	16,000,000	16,000,000	11,776,041	-	-	-	-	-	89,144,797
		Support costs	935,813	1,400,000	**840,000**	**1,120,000**	**1,120,000**	**824,323**	**-**	**-**	**-**	**-**	**-**	**6,240,136**
Funds approved by ExCom (US $)		Project costs	13,368,756	20,000,000										33,368,756
		Support costs	935,813	1,400,000										2,335,813
Total funds requested for approval at this meeting (US $)		Project costs			12,000,000									12,000,000
		Support costs			840,000									840,000

* Maximum allowable total consumption of Annex C, Group I substances in the ICR sector for the period 2021 to 2026 will be determined later, but would in no case be greater than 1,609.9 ODP tonnes prior to 2025, and no greater than 781 ODP tonnes thereafter.

Secretariat's recommendation:	For individual consideration

PROJECT DESCRIPTION

172. On behalf of the Government of China, UNDP, as the designated implementing agency, has submitted a request for funding for the third tranche of the industrial and commercial refrigeration and air-conditioning (ICR) sector plan of stage II of the HCFC phase-out management plan (HPMP), at the amount of US $12,000,000, plus agency support costs of US $840,000[15]. The submission includes the progress report on the implementation of the second tranche and the tranche implementation plan for 2018-2019.

Progress report on the implementation of the first tranche

Enterprise-level activities

173. Contracts were signed with 17 enterprises for the conversion of 17 manufacturing lines to phase out 2,485.09 mt of HCFC-22 after verification of the baseline consumption and capacity of these lines. The conversion is progressing and is being closely monitored according to the defined milestones.[16] The product design and procurement of equipment have been completed for eight lines; the remaining nine lines are in the process of product design and procurement of equipment. Table 1 shows the progress in the conversion of manufacturing lines under the first two tranches.

Table 1. Progress in the conversion of manufacturing lines under tranche I and II

No.	Name of enterprise	Phase-out of HCFC-22 (mt)	No. of lines	Type of products	Alternative technology	Funding (US $)	Milestones achieved
1-1	Yantai Moon	590.23	1	Water chiller (heat pump)	R-290	9,319,613	Completed design and procurement contracts
1-2	Dunham-Bush	20.42	1	Heat pump water heater	R-32	282,762	Completed design and procurement contracts
1-3	Nanjing TICA	91.58	1	Water chiller (heat pump)	NH_3/CO_2	968,400	Signed contract
1-4	Nanjing TICA	32.52	1	Heat pump water heater	CO_2	547,038	Signed contract
1-5	TCL ZhongShan	115.31	1	Unitary air-conditioning	R-32	1,020,456	Signed contract
1-6	Guangdong Jirong	21.13	1	Unitary air-conditioning	R-32	292,769	Completed design and procurement contracts
Total tranche I		**871.19**	**6**			**12,431,038**	
2-1	Yantai Aowei	108.07	1	Freezers, refrigeration and condensing units	NH_3/CO_2	1,561,153	Completed design and procurement contracts
2-2	Yantai Aowei	75.28	1	Freezers, refrigeration and condensing units	NH_3/CO_2	1,168,935	Completed design and procurement contracts
2-3	Zhejiang Guoxiang	42.18	1	Unitary air-conditioning	R-32	504,288	Completed design and procurement contracts

[15] As per the letter of 10 September 2018 from the Foreign Economic Cooperation Office (FECO) of the Ministry of Environmental Protection of China to UNDP.

[16] The milestones include: signing the conversion contract (30 per cent payment); completion of design and procurement contract (20 per cent payment); completion of prototype manufacture, conversion of lines and performance test (30 per cent payment); and trial production, training, and equipment disposal upon project acceptance (20 per cent payment).

No.	Name of enterprise	Phase-out of HCFC-22 (mt)	No. of lines	Type of products	Alternative technology	Funding (US $)	Milestones achieved
2-4	Haixin Shandong	85.26	1	Unitary air-conditioning	R-32	819,134	Completed design and procurement contracts
2-5	Haixin Shandong	105.31	1	Unitary air-conditioning	R-32	953,449	Completed design and procurement contracts
2-6	Qingdao Haier	492.00	1	Unitary air-conditioning	R-32	3,265,986	Signed contract
2-7	Dunham-Bush	112.20	1	Water chiller (heat pump)	R-513A	1,610,512	Signed contract
2-8	Dunan Environment	147.34	1	Water chiller (heat pump)	R-513A	2,030,774	Signed contract
2-9	Zhejiang Guoxiang	95.22	1	Water chiller (heat pump)	R-513A	1,407,457	Signed contract
2-10	Dalian Refrigeration	237.04	1	Water chiller (heat pump)	R-290	3,373,561	Signed contract
2-11	Shandong Shenzhou	114.00	1	Freezers, refrigeration and condensing units	NH_3/CO_2	1,633,116	Signed contract
Total tranche II		**1,613.90**	**11**			**18,328,365**	

174. Eleven enterprises, each with one manufacturing line, submitted letters of intent to convert their manufacturing lines; of which 10 are small and medium-sized enterprises (SMEs) that manufacture freezers, condensing units and refrigeration equipment. Based on the preliminary data, total consumption to be addressed through the conversion of 11 manufacturing lines amounts to 500 mt of HCFC-22 at a total estimated cost of US $8,695,857. The actual consumption and manufacturing capacity will be verified and the contracts are expected to be signed by the end of 2018. Implementation of these conversions are planned for the third tranche.

Technical assistance (TA) activities

175. The following TA and awareness-raising activities were also implemented:

(a) A contract has been signed with the China Refrigeration and Air-conditioning Industrial Association (CRAA) to assist in the smooth implementation of phase-out activities, including providing assistance with project application and verification; monitoring progress of conversion and overall phase-out in the sector; coordinating workshops, seminars and awareness-raising activities; tracking alternative technology development, assessing emerging alternatives in the ICR sector and providing advice to enterprises on technology selection; and collecting data and monitoring sector consumption. After signing the contract, CRAA has assisted FECO in identifying 28 manufacturing lines in 22 enterprises for conversion, verifying baseline consumption, and monitoring the progress of conversion projects;

(b) Two contracts were also signed with Daxin Certified Public Accountant (DCPA) to conduct verification of the baseline consumption and eligibility of the manufacturing lines to be converted and verification of performance milestones during the conversion process. Since the signature of the contracts, DCPA has verified the consumption of 18 manufacturing lines and the project implementation milestones of eight manufacturing lines;

(c) A research project was initiated to develop a methodology for evaluating the performance and energy consumption of the CO_2 refrigeration system in supermarkets. The TA is intended to compare two refrigeration systems, one using CO_2 and the other using HCFC-22, and to collect and analyse the data on system performance and energy consumption. Through the TA, a methodology for evaluating such systems will be proposed. The project started in February 2018 and is progressing. Field testing of refrigeration equipment in several supermarkets is ongoing;

(d) A study on energy conservation in small and medium-sized cold-storage and compression-condensing units was launched to develop a methodology for the evaluation of the energy efficiency of cold-storage equipment (20-70 refrigeration tonnes of capacity). It will assist in the establishment of an energy-efficiency standard for refrigeration equipment, eliminating the obsolete technologies and removing barriers for the transition to energy-efficient and environment-friendly technologies. The project is progressing; and

(e) A study on the safety requirements and evaluation methodology for using flammable refrigerants in industrial refrigeration and air-conditioning equipment has been started. The TA intends to collect data and analyse the information for implementing a safety certification system in order to reduce the safety risks linked to the manufacturing and use of such products. The study covers both product safety and manufacturing-process safety. The manufacturing-process safety certification is to ensure that the manufacturing facilities (including the testing equipment) meet the safety requirements for using flammable refrigerants. The current certification system in China does not include products using flammable refrigerants.

Project implementation and monitoring unit (PMU)

176. FECO is responsible for the overall implementation of the ICR sector plan. After approval of the second tranche, FECO identified new enterprises and productions lines, organized training workshops to disseminate policies and procedures for project, undertook verification missions, and signed contracts with enterprises. FECO also developed terms of reference for five TA projects and signed contracts for the TA activities.

Level of fund disbursement

177. As of August 2018, of the US $33,368,756 approved so far, US $23,368,756 has been disbursed from UNDP to FECO, and US $15,063,947 had been disbursed to final beneficiaries and for TA activities, accounting for 45 per cent of the total funding approved. The disbursement of US $7,084,062 from the second tranche accounts for 35 per cent of the funding for the second tranche, as shown in Table 2.

Table 2. Status of disbursement of stage II of the ICR sector plan as of September 2018 (US $)*

ICR sector plan		**Tranche I (2016)**	**Tranche II (2017)**	**Total**
Funds approved by the Executive Committee		13,368,756	20,000,000	33,368,756
Disbursement from UNDP to FECO	Amount	13,368,756	10,000,000	23,368,756
	Disbursement ratio	100%	50%	70%
Disbursement from FECO to beneficiaries	Amount	7,979,885	7,084,062	15,063,947
	Disbursement ratio	60%	35%	45%
Enterprise conversions		6,884,322	6,353,609	13,237,931
TA		398,998	209,413	608,411
PMU		696,565	521,040	1,217,605
Total		**7,979,885**	**7,084,062**	**15,063,947**

*The interest of US $103,708 for 2015 and US $97,468 for 2016 held by China have been deducted from the funding tranches approved for 2016 and 2017 respectively.

Implementation plan for the third tranche

178. During the third tranche, it is planned to phase out 500 mt of HCFC-22 at a total cost of US $10,774,752 through enterprise conversion. The manufacturing lines that have already been identified for conversion in 11 enterprises, are listed in Table 3. The conversion process will be closely monitored and milestones achieved during conversion will be verified by an independent consultant firm.

Table 3. Manufacturing lines identified for conversion in the third tranche of the ICR sector plan

No.	Name of enterprise	Phase-out of HCFC-22 (mt)	No. of lines	Type of products	Alternative technology	Funding (US $)
3-1	Dalian Refrigerant	83.00	1	Water chiller (heat pump)	R-290	1,464,877
3-2	Haerbin Haixin	40.00	1	Freezers and refrigeration and condensing units	NH_3	522,200
3-3	Hunan Nanfang	33.00	1	Freezers and refrigeration and condensing units	NH_3/CO_2	612,620
3-4	Jinan Bingsiyuan	45.00	1	Freezers and refrigeration and condensing units	NH_3/CO_2	791,900
3-5	Liaoning Gaoxiang	48.00	1	Freezers and refrigeration and condensing units	NH_3/CO_2	836,720
3-6	Quanzhou Zhiyuan	47.00	1	Freezers and refrigeration and condensing units	NH_3/CO_2	821,780
3-7	Shanghai Meileke	50.00	1	Freezers and refrigeration and condensing units	NH_3/CO_2	866,600
3-8	Shenyang Anjie	38.00	1	Freezers and refrigeration and condensing units	NH_3/CO_2	687,320
3-9	Shenyang Gulun	37.00	1	Freezers and refrigeration and condensing units	NH_3/CO_2	672,380
3-10	Sichuan Ruifu	34.00	1	Freezers and refrigeration and condensing units	NH_3/CO_2	627,560
3-11	Tianjin Fashihao	45.00	1	Freezers and refrigeration and condensing units	NH_3/CO_2	791,900
	Total	**500.00**	**11**			**8,695,857**

179. The TA activities started in the first and second tranches will continue to be implemented during the third tranche. The following additional TA activities have been identified for implementation during the third tranche, and additional activities may be identified and implemented as required:

(a) A study on the application of HFOs in water-chiller heat pumps to understand the technical applicability of HFO refrigerants in various applications to provide advice to enterprises on technology selection, as well as advice to the Government on strategic planning for HCFC phase-out. The activities include a literature review on the use of HFO refrigerants, identifying key parameters and considerations when selecting HFO refrigerants, analysing the characteristics of the refrigeration cycle, optimizing the design to integrate energy-saving features. The applications include large and medium-sized office spaces, shopping malls, stadiums, convention centers, airports, train stations and hospitals (US $50,000);

(b) Developing safety guidelines for CO_2 refrigeration systems includes analysing the safety requirements laid out in the "Safety regulations for CO_2 refrigeration systems" and developing technical guidelines to meet these requirements. The guidelines will cover system design, equipment manufacturing, requirements for onsite construction (installation or assembling) and proper operation and maintenance of the CO_2 refrigeration systems. (US $50,000);

(c) A demonstration of R-290 chiller to promote its use in the dairy products and meat processing industry. It includes manufacturing a prototype chiller unit and installing it at a demonstration site; collecting data and monitoring its operation; analysing the data and developing a report; disseminating the outcomes of the demonstration (US $100,000); and

(d) Two demonstration projects on sub-critical CO_2 refrigeration systems and one demonstration project on trans-critical CO_2 refrigeration systems for supermarket applications, to optimize the performance of the CO_2 technology and to gain experience in the application of CO_2 technology in supermarkets. It includes system design, equipment installation and commissioning, operational testing, data collection and analysis. The estimated cost is US $100,000 each for the two demonstration of sub-critical CO_2 refrigeration systems and US $200,000 for the trans-critical technology (US $400,000).

180. FECO will coordinate and monitor the progress of implementation (US $625,248). The proposed budget for the third tranche is presented in Table 4.

Table 4. Proposed budget for the implementation plan of the third tranche

Activities	Funding (US $)
Conversion of manufacturing lines	10,774,752
TA activities	
Study on the application of HFOs for water-chiller heat-pump units	50,000
Establishment of the national safety standards for CO_2 refrigeration systems	50,000
Demonstration of R-290 chiller in diary and meat processing industry	100,000
Three demonstrations: two on sub-critical CO_2 and one on trans-critical CO_2 refrigeration system in supermarket applications	400,000
Sub-total for TA activities	600,000
PMU	625,248
Total	**12,000,000**

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

Alternative technologies used in conversion projects

181. In accordance with paragraph 2 of Appendix 8-A of the Agreement of stage II of the HPMP for the ICR sector, China agrees:

(a) That a maximum quantity of 3,150 mt in the unitary air-conditioning (UAC) sub-sector could be converted to HFC-32;

(b) Would have flexibility in the UAC sub-sector to convert to alternatives with a lower GWP than HFC-32 as long as the cost and tonnage to be phased out remained the same;

(c) Would have flexibility to convert industrial and commercial HPWH lines to HFC-32 on the understanding that UAC and industrial and commercial HPWH conversions to HFC-32 combined would not exceed 3,150 mt;

(d) That at least 20 per cent of the total phase-out of HCFC-22 in the ICR sector would be from the conversion of SMEs (i.e. those consuming 50 mt or less); and

(e) That, in sectors other than the UAC sub-sector, would have flexibility to select from among the six low-GWP technologies identified in Table 8 of the ICR sector of document UNEP/OzL.Pro/ExCom/76/25, excluding HFC-32, and would make best efforts to ensure that the tonnage remained within 30 per cent of the amount specified for each technology in that table, at no additional cost to the Multilateral Fund, and that any deviation from that range would be reported to the Executive Committee for its consideration.

182. Based on the Secretariat's review of the alternative technologies selected so far for conversions under stage II of the ICR sector plan, the amounts for all the technologies and applications are within the allowable levels that were specified in paragraph 2 of Appendix-8 of the Agreement. The Secretariat will report to the Executive Committee when a deviation occurs.

Conversion of SMEs

183. In approving stage II of the ICR sector plan, the Executive Committee included the condition that at least 20 per cent of the total phase-out of HCFC-22 in the ICR sector would be from enterprises that consume 50 mt or less. The Secretariat noted that the Government has put effort into meeting this condition, and that more manufacturing lines in SMEs have been identified for conversion under the third tranche. This has increased the phase-out in SMEs from 5 per cent to 18 per cent of the total phase-out. To assist the smooth implementation of conversions in SMEs, the Government will provide greater financial resources and enhanced TA and training for SMEs, taking into account their limited technical and financial capacity to adopt the change of technology.

Conclusion

184. The Secretariat notes that implementation of the second tranche of the ICR sector plan has progressed well. Seventeen conversion contracts have been signed to phase out 2,485.09 mt of HCFC-22. Of this amount, 65 per cent of the consumption will be converted to low-/zero-GWP technologies other than HFC-32. The conversion of manufacturing capacity is progressing and product design and equipment procurement have been completed in the conversion of eight lines. Several TA activities have been launched, including technology studies, demonstration of alternative technologies, the development of technical guidelines for meeting safety regulations and the revision of standards to assist in the conversion of manufacturing capacity and encourage market adoption of the alternative technologies. The phase-out of HCFC-22 consumption used by SMEs has been increased from 5 per cent to 18 per cent of the total phase-out. In view of the progress made and the overall disbursement rate of 45 per cent, the Secretariat recommends approval of the third tranche.

RECOMMENDATION

185. The Executive Committee may wish to consider:

(a) Noting the 2018 progress report on the implementation of the second tranche of the industrial and commercial refrigeration and air-conditioning (ICR) sector plan of stage II of the HCFC phase-out management plan (HPMP) for China; and

(b) Approving the third tranche of the ICR sector plan of stage II of the HPMP for China, and the corresponding 2018-2019 tranche implementation plan, in the amount of US $12,000,000, plus agency support costs of US $840,000 for UNDP.

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS

CHINA

(I) PROJECT TITLE	AGENCY	MEETING APPROVED	CONTROL MEASURE
HCFC phase-out plan (stage II) refrigeration servicing and enabling programme	UNEP (lead), Germany and Japan	76th	n/a

(II) LATEST ARTICLE 7 DATA (Annex C Group l)	Year: 2017	14,604.66 (ODP tonnes)

(III) LATEST COUNTRY PROGRAMME SECTORAL DATA (ODP tonnes)									Year: 2017
Chemical	Aerosol	Foam	Fire fighting	Refrigeration		Solvent	Process agent	Lab use	Total sector consumption
				Manufacturing	Servicing				
HCFC-22		1,595.00		5,087.50	2,831.55				9,514.05
HCFC-123				12.88	6.95				19.83
HCFC-124					-0.13				-0.13
HCFC-141b		4,008.26				396.00			4,404.26
HCFC-142b		617.50		5.85	43.06				666.41
HCFC-225ca						1.11			1.11

(IV) CONSUMPTION DATA (ODP tonnes)			
2009 - 2010 baseline:	19,269.0	Starting point for sustained aggregate reductions:	18,865.44
CONSUMPTION ELIGIBLE FOR FUNDING (ODP tonnes)			
Already approved:	12,161.02	Remaining:	6,704.42

(V) BUSINESS PLAN		2018	2019	2020	Total
UNEP	ODS phase-out (ODP tonnes)	101.78	58.73	62.22	222.73
	Funding (US $)	6,485,492	3,742,484	3,964,590	14,192,566
Germany	ODS phase-out (ODP tonnes)	5.23	3.49	0.0	8.72
	Funding (US $)	336,000	224,000	0	560,000
Japan	ODS phase-out (ODP tonnes)	1.39	1.39	1.39	4.17
	Funding (US $)	180,800	90,400	90,400	361,600

(VI) PROJECT DATA			2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Montreal Protocol consumption limits			17,342.1	17,342.1	17,342.1	17,342.1	12,524.9	12,524.9	12,524.9	12,524.9	12,524.9	6,262.4	6,262.4	n/a
Maximum allowable consumption (ODP tonnes)			16,978.9	16,978.9	15,048.1	15,048.1	11,772.0	*	*	*	*	*	*	n/a
Agreed funding (US $)	UNEP	Project costs	3,299,132	2,570,000	3,270,000	3,370,000	3,570,000	2,810,868	-	-	-	-	-	18,890,000
		Support costs	364,651	284,061	361,431	372,484	394,590	310,684	-	-	-	-	-	2,087,900
	Germany	Project costs	300,000	-	300,000	200,000	-	200,000	-	-	-	-	-	1,000,000
		Support costs	36,000	-	36,000	24,000	-	24,000	-	-	-	-	-	120,000
	Japan	Project costs	80,000	80,000	80,000	80,000	80,000	-	-	-	-	-	-	400,000
		Support costs	10,400	10,400	10,400	10,400	10,400	-	-	-	-	-	-	52,000
Funds approved by ExCom (US $)		Project costs	3,679,132		2,650,000									6,329,132
		Support costs	411,051		294,461									705,512
Total funds requested for approval at this meeting (US $)		Project costs			3,650,000									3,650,000
		Support costs			407,831									407,831

* Maximum allowable total consumption of Annex C, Group I substances for the period 2021 to 2026 would be determined at a later date, but would in no case be greater than 11,772 ODP tonnes prior to 2025, and no greater than 6,131 ODP tonnes thereafter.

Secretariat's recommendation:	For individual consideration

PROJECT DESCRIPTION

186. On behalf of the Government of China, UNEP as the lead implementing agency, has submitted a request for funding for the third tranche of the refrigeration servicing sector and enabling components of stage II of the HCFC phase-out management plan (HPMP), at a total cost of US $4,057,831, consisting of US $3,270,000, plus agency support costs of US $361,431 for UNEP, US $300,000, plus agency support costs of US $36,000 for Germany and US $80,000, plus agency support costs of US $10,400 for Japan.[17] The submission includes a progress report on the implementation of the second tranche and the tranche implementation plan for 2018 to 2020.

Progress report on the implementation of the second tranche of stage II

187. The following activities were implemented:

(a) The project cooperation agreement (PCA) for the second tranche between UNEP and FECO was signed in September 2018, and funds were subsequently transferred in October 2018;

(b) Agreement with Customs was reached on the selection of the districts for law enforcement capacity building activities, and possible type of activities was adjusted;

(c) Agreements with three pilot cities (Guangzhou, Shenzhen and Tianjin) with agreed work plans were finalised; a capacity building workshop on enforcing ODS regulations for 47 participants from local environmental protection bureaus (EPBs) was conducted;

(d) Agreement and work plan for the national executive agency for the delivery of the technician training programme was finalised; criteria for selection of new training centres was completed; proposals submitted by 23 training centres were reviewed; contract signature process for the additional 15 training centres was initiated;

(e) The terms of reference (TOR) for developing the codes for the servicing and maintenance of air-conditioning units and water chillers were finalised and the procurement process and contracts were initiated; the TOR for the adjustments in the standards for the installation of room air-conditioners were revised, and the development of the codes of good practices for installation and servicing of air-conditioners was finalised;

(f) Implementation agreement for the Government of Germany's component of the first tranche was signed; one beneficiary (Chaoshifa supermarket chain) for the demonstration of a CO_2-transcritical system application was identified; six trainers from vocational training centres and six managers/engineers from the sub-sector participated in an overseas training workshop/study tour on the application of flammable refrigerants (e.g. R-290, NH_3, and CO_2) in the cold chain and supermarket sub-sector;

(g) Survey on HCFC recovery was conducted; the survey report for the barrier analysis and market mechanism study on HCFC recovery was drafted and reviewed; and

(h) Awareness raising activities continued including the upgrade of the website "OzonAction in China" and developing publicity materials; the Ozone2Climate Alternative Roadshow and Roundtable, and International Ozone Day 2018 celebration was organized.

[17] As per the letter of 5 September 2018, from the Foreign Economic Cooperation Office (FECO), Ministry of Environmental Protection of China, to UNEP.

Project implementation and monitoring unit (PMU)

188. FECO has established a PMU[18] for the direct coordination, implementation and monitoring of the activities of the servicing sector plan of the HPMP, as well as capacity building of national and local authorities, and the awareness and outreach strategy.

Level of fund disbursement

189. As of August 2018, of the US $6,329,132 approved so far, US $2,901,290 had been disbursed (US $2,840,000 for UNEP and US $61,290 for Germany) as shown in Table 1. The balance of US $3,427,842 will be disbursed in 2019-2020.

Table 1. Financial report of refrigeration servicing sector plan for China (US $)

Agency	First tranche		Second tranche		Total approved	
	Approved	Disbursed	Approved	Disbursed	Approved	Disbursed
UNEP	3,299,132	1,540,000	2,570,000	1,300,000	5,869,132	2,840,000
Germany	300,000	61,290	0	0	300,000	61,290
Japan	80,000	0	80,000	0	160,000	0
Total	3,679,132	1,601,290	2,650,000	1,300,000	6,329,132	2,901,290
Disbursement rate (%)		43.5		49.1		45.8

Implementation plan for the third tranche

190. The following activities will be implemented between January 2019 and December 2020:

(a) Organizing one training workshop each for local commercial officers, ODS dealers and local Customs officers to strengthen import/export management and selecting four Customs districts to further conduct capacity-building activities on ODS import/export control (UNEP) (US $205,000);

(b) Continuing capacity building of local EPBs through one training workshop on ODS phase-out management at provincial level; providing technical and policy assistance to local EPBs on management and supervision activities related to the HPMP implementation, compiling a book on China's regulations and policies on ODS management (UNEP) (US $375,000);

(c) Signing contracts with pilot cities (Guangzhou, Shenzhen and Tianjin) for the implementation of the pilot city project under stage II following internal procurement procedures (funds from previous tranche);

(d) Signing contracts with 17 training centres to implement the technicians training programmes, including training coordination and monitoring by China Association of Staff and Workers Education and Vocational Training (CASWEVT) (UNEP/Japan) (US $1,820,000);

(e) Training of 3,000 technicians through manufacturers' servicing workshops (UNEP/Japan) (US $340,000);

(f) Finalising the study on the revision of the national certification examination for servicing technicians to support the changes proposed to the national certification criteria, and formalization of the technicians' certification programme (UNEP/Japan) (US $100,000);

[18] Referred to as Working Group for the refrigeration servicing sector plan of the HPMP.

(g) Conducting one workshop to prepare policy recommendations following the completed study on management of HCFC recovery in the refrigeration servicing sector; (UNEP/Japan) (US $50,000)

(h) Implementing a demonstration project for CO_2-transcritical system in the selected supermarket (Chaoshifa); organizing two training workshops for 200 managers and technicians on HCFC management and phase-out in the supermarket sub-sector; developing training materials to promote the use of low-GWP refrigerants in the supermarket sub-sector; conducting overseas study tour on the cold chain sector for technicians (Germany) (US $300,000);

(i) Continuing outreach activities in the servicing sector (e.g., 2019 Ozone2Climate Technologies Roadshow and Roundtable, 2019 International Workshop on the Alternatives to HCFC-22 in the room air-conditioning manufacturing and heat pump water heaters sector); and for other stakeholders and the public, promoting awareness on the preservation of ozone layer and maintaining and updating the "OzonAction in China" website (UNEP) (US $205,000); and

(j) Operation of the Working Group (PMU) (UNEP) (US $255,000).

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

Progress report on implementation of the second tranche

191. UNEP provided a detailed work plan for the activities associated with the component for the Government of Germany until 2020, and included the qualification of technicians and development of training materials for the supermarket sector, assessment and study of the supermarkets in China, demonstration projects with selected supermarkets, and Green Energy labelling for supermarkets based on European Union conditions.

192. With regard to the status of Shanghai as one of the pilot cities, UNEP explained that this will be further discussed with the relevant departments in Shanghai, and FECO is confident that an agreement would be reached to implement demonstration activities in this city for the servicing sector.

193. In describing the minimum progress so far in implementing training activities, UNEP emphasised the need to put in place the training delivery strategy first, and the identification of the training centres, to adjust these based on lessons learned from stage I. The implementation plan of technicians training programme under stage II was reviewed and approved internally by FECO following a meticulous process, after which the training programmes are expected to commence in 2019.

194. With regard to specific activities included in the second tranche, UNEP clarified that a number of activities had been delayed by three to four months, for instance the signature of contracts with training centres was moved from June to October 2018, the workshop for HCFC recovery was moved to October 2018, and training workshops planned for the third quarter were moved to the fourth quarter of the year. UNEP reassured that FECO is on track to ensure that there will be no further delays in the implementation of activities in the servicing sector.

195. Upon a request for clarification, UNEP also confirmed that there was no overlap in the funding provided for the institutional strengthening (IS) project and the awareness and outreach activities being implemented under the servicing sector, as those activities included in the servicing sector plan are not carried out through the IS.

Conclusion

196. The Secretariat notes that implementation of the second tranche of the servicing sector plan and the enabling programme is ongoing. While several activities proposed in the second tranche had been delayed, outstanding issues have been addressed, allowing the full implementation of the servicing sector plan without further delays. Initial and preparatory activities including some workshops were completed, the work plan for stage II has been finalised, and the groundwork has been laid for a faster implementation of the activities in this sector. The overall disbursement rate is 46 per cent.

RECOMMENDATION

197. The Executive Committee may wish to consider:

(a) Noting the progress report on the implementation of the second tranche of the servicing sector plan and the enabling programme of stage II of the HCFC phase-out management plan (HPMP) for China; and

(b) Approving the third tranche of the servicing sector plan and the enabling programme of stage II of the HPMP for China, and the corresponding 2018-2020 tranche implementation plan, in the amount of US $4,057,831, consisting of US $3,270,000, plus agency support costs of US $361,431 for UNEP, US $300,000, plus agency support costs of US $36,000 for the Government of Germany and US $80,000, plus agency support costs of US $10,400 for the Government of Japan.

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS

China

(I) PROJECT TITLE	AGENCY	MEETING APPROVED	CONTROL MEASURE
HCFC phase-out plan (stage II) solvent	UNDP	77th	100 % by 2026

(II) LATEST ARTICLE 7 DATA (Annex C Group I)	Year: 2017	14,604.66 (ODP tonnes)

(III) LATEST COUNTRY PROGRAMME SECTORAL DATA (ODP tonnes)									Year: 2017
Chemical	Aerosol	Foam	Fire fighting	Refrigeration		Solvent	Process agent	Lab use	Total sector consumption
				Manufacturing	Servicing				
HCFC-22		1,595.00		5,087.50	2,831.55				9,514.05
HCFC-123				12.88	6.95				19.83
HCFC-124					-0.13				-0.13
HCFC-141b		4,008.26				396.00			4,404.26
HCFC-142b		617.50		5.85	43.06				666.41
HCFC-225ca						1.11			1.11

(IV) CONSUMPTION DATA (ODP tonnes)			
2009 - 2010 baseline:	19,269.0	Starting point for sustained aggregate reductions:	18,865.44
CONSUMPTION ELIGIBLE FOR FUNDING (ODP tonnes)			
Already approved:	12,161.02	Remaining:	6,704.42

(V) BUSINESS PLAN		2018	2019	2020	Total
UNDP	ODS phase-out (ODP tonnes)	51.6	56.3	62.8	170.6
	Funding (US $)	3,152,326	3,438,917	3,835,153	10,426,396

(VI) PROJECT DATA			2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Montreal Protocol consumption limits			17,342.1	17,342.1	17,342.1	17,342.1	12,524.9	12,524.9	12,524.9	12,524.9	12,524.9	6,262.4	6,262.4	n/a
Maximum allowable consumption (ODP tonnes)			455.2	455.2	395.4	395.4	321.2	321.2	321.2	148.3	148.3	55.0	0.0	n/a
Agreed funding (US $)	UNDP	Project costs	2,821,937	3,777,190	**5,549,492**	**6,070,000**	**5,570,000**	**6,060,000**	**5,440,000**	**5,210,000**	**1,560,000**	**1,200,000**	**4,003,947**	47,262,566
		Support costs	197,536	264,403	**388,464**	**424,900**	**389,900**	**424,200**	**380,800**	**364,700**	**109,200**	**84,000**	**280,276**	**3,308,380**
Funds approved by ExCom (US $)		Project costs	2,821,937	3,777,190										6,599,127
		Support costs	197,536	264,403										461,939
Total funds requested for approval at this meeting (US $)		Project costs			5,549,492									5,549,492
		Support costs			388,464									388,464

Secretariat's recommendation:	For individual consideration

PROJECT DESCRIPTION

198. On behalf of the Government of China, UNDP, as the designated implementing agency, has submitted a request for funding for the third tranche of the solvent sector plan of stage II of the HCFC phase-out management plan (HPMP), at the amount of US $5,549,492, plus agency support costs of US $388,464.[19] The submission included the progress report on the implementation of the second tranche and the tranche implementation plan for 2018-2019.

Progress report on the implementation of the second tranche

199. The Foreign Economic Cooperation Office (FECO) continued to implement quota permits to solvent enterprises consuming more than 100 metric tonnes (mt) of HCFCs per year.

Enterprise-level activities

200. As of April 2018, all 24 enterprises identified as part of the previous tranches have signed contracts with FECO. Thirteen of these enterprises completed equipment procurement process and signed contracts with the equipment suppliers; of these, six enterprises (Jiangsu Zhengkang, Yueyang Minkang, Changzhou Shuangma, Jiangsu Jichun, Jiangsu Linyang and Shanghai Kindly Group Co.) have provided qualified documents to FECO, while the other seven enterprises are preparing the required documents. The remaining 11 enterprises are preparing for equipment procurement process. The total phase-out associated with these enterprises is 1,176.19 mt (129.38 ODP tonnes) of HCFC-141b, representing 28 per cent of the HCFC reduction target of 455.2 ODP tonnes for stage II of the solvent sector. The total value of the conversion of these 24 enterprises to low-global warming potential alternatives[20] amounts to US $20,040,546.

201. An additional 27 enterprises (mostly small and medium-sized enterprise (SMEs) with annual consumption above five mt of HCFC-141b) have submitted proposals for conversion that would result in an additional phase-out of 436.00 mt (47.96 ODP tonnes) of HCFC-141b. FECO has arranged the screening process and baseline verifications for these enterprises in line with the funding arrangement for the sector plan. An overview of the progress in the implementation of the solvent sector plan is presented in Table 1.

Table 1. Progress in the implementation of the solvent sector plan in China

Status	Number of enterprises	Number of lines	HCFC consumption		Estimated date of conversion
Enterprises conversions			**mt**	**ODP tonnes**	
Contracts signed	24	514	1,176.19	129.38	December 2019
Contracts to be signed	27	*	436.00	47.96	**
Total	**51**	**514**	**1,612.19**	**177.34**	n/a

* To be identified after consumption verification.
** To be confirmed after contract signature.

[19] As per the letter of 4 September 2018 from the Ministry of Environmental Protection of China to UNDP. The amount requested for this tranche is higher than what had been originally approved (i.e., US $2,959,930, plus agency support costs); the Government of China requested for redistribution of tranches for the solvent sector plan as discussed in paragraphs 152 to 157.

[20] KC-6, hydrocarbons or diluent, trans-1, 2-dichloroethylene and hydrofluoroether, water-based cleaning agent, modified alcohol, nano silicon carbonate, F-solvents, and naphthenic aromatics.

Technical assistance (TA)

202. The following activities were implemented:

(a) Second implementation meeting for beneficiary enterprises to discuss, review and adjust implementation plans accordingly with guidance from technical experts;

(b) Finalised the *Technical Conversion Guideline for Medical Devices Enterprises*, and used this to train beneficiary disposable medical devices (DMD) enterprises, and collected feedback on the guideline; revised the guideline based on the feedback received, and circulated the revised guideline to participants in the annual meeting of China Association for Medical Devices Industry Medical Macromolecule Products in March 2018;

(c) Signed a contract with China Industry Cleaning Association as implementing support agency (ISA) in January 2018; and

(d) Reviewed materials and information of the 27 new enterprises. FECO has initiated baseline verification for these enterprises.

Level of fund disbursement

203. As of August 2018, of the US $6,599,127 approved so far, US $4,077,026 had been disbursed by UNDP to FECO, and US $3,646,184 by FECO to beneficiaries, as shown in Table 2. The balance of US $2,522,101 will be disbursed in 2018.

Table 2. Financial report of solvent sector plan stage II of the HPMP for China (US $)

Agency	First tranche		Second tranche		Total	
	Approved	**Disbursed**	**Approved**	**Disbursed**	**Approved**	**Disbursed**
UNDP	2,821,937	2,796,990	3,777,190	1,280,036	6,599,127	4,077,026
Disbursement rate (%)		**99.1**		**33.9**		**61.8**
FECO to beneficiaries		2,551,776		1,094,408		3,646,184
Disbursement rate (%)		**90.4**		**29.0**		**55.3**

Implementation plan for the third tranche

204. The following activities will be implemented between December 2018 and December 2019:

(a) *Policy actions:* FECO will continue to enforce quota management in the solvent sector, local environmental protection bureaus (EPBs) will improve their registration systems for HCFC consumers and sales; and Beijing University of Chemical Technology will conduct research on the ban of using HCFCs in the DMD sub-sector in China (funds from previous tranche);

(b) *Enterprise level activities:* 24 enterprises will continue with conversion in order to achieve HCFC phase-out by December 2019; a workshop for these enterprises will be organized to exchange lessons learned and experiences in their project implementation to facilitate the work for succeeding participating enterprises; and HCFCs baseline consumption verification will be completed for the next batch (27) of qualified beneficiary enterprises; contracts with new beneficiary enterprises are expected to be signed by the end of 2018 and in 2019 (US $5,131,587);

(c) *TA:* A workshop for representatives from solvent enterprises, technical experts, industrial associations, local EPBs and other relevant stakeholders to introduce the available alternatives, conversion costs, project implementation modality, effectiveness of the policy measures will be organized; performance verification for the first 24 enterprises to validate completion of conversions and fund disbursement will be carried out; public awareness activities will continue (US $185,471); and

(d) *Project management:* FECO will continue with contract management for the 24 beneficiary enterprises and for new enterprises that will sign contracts with FECO in order to meet the phase-out targets of stage II of the solvent sector plan. New beneficiary enterprises will be trained on how to implement projects funded by the Multilateral Fund (US $232,434).

SECRETARIAT`S COMMENTS AND RECOMMENDATION

COMMENTS

Status of implementation

205. In responding to the query on what new initiatives were completed for the policy and regulatory aspect of the plan, UNDP explained that the preparation for imposing a ban on the use of HCFCs in the DMD sub-sector by 1 January 2026, started in July 2018. This activity will analyse the potential impacts of the ban to the country in general and the solvent sector in particular; gather views from industry to minimize any negative impact on the enterprises, as well as propose the text for the ban.

206. At the 80th meeting, the Secretariat already noted that the funding tranches for the sector might cause difficulties with regard to expediting signature of agreements with enterprises. UNDP indicated that contracts have already been signed for all of the 24 enterprises initially identified, and that they have started or are completing the second milestone (i.e., procurement of equipment, production line construction) which would require payment of 30 per cent of their incremental capital costs. In addition, the new 27 SMEs are expected to complete verifications of consumption and enter into contracts with FECO during the first quarter of 2019, which will require additional financial resources to ensure the timely implementation of their conversion.

207. Based on this, the Government of China and UNDP requested an adjustment to the tranche distribution for the years 2018-2026, to meet the cash flow needed for signing up new enterprises, and timely payment `according to their implementation progress and the established milestones. The proposed tranche adjustment also reflects adjustments to incremental operating cost payments which will be made only in 2020 and 2021 once the first set of enterprises had completed their conversions.

208. The redistribution of tranches is presented in paragraphs 152 to 157, under the section Revision of the Agreement for China's stage II of the HPMP.

Interest

209. In line with decision 69/24(b)(ii), UNDP reported that FECO earned cumulative interest of US $615 for the solvent sector plan in 2017 under stage I of the HPMP. In addition, the level of interest declared of US $2,656 for 2015 which had previously been offset has been revised to US $4,887. Therefore, the total cumulative interest from stage I to offset from future transfers to UNDP is US $2,845.

210. In addition, UNDP reported that FECO earned cumulative interest of US $1,992 for the solvent sector in 2017 under stage II of the HPMP. Therefore, the total cumulative interest from stages I and II to be offset from future transfers to UNDP is US $4,836.

Conclusion

211. The Secretariat noted that the solvent sector plan is progressing well with all 24 enterprises selected having signed their contracts with FECO, and started the procurement of equipment. The conversion of these 24 enterprises will result in the phase-out of 129.38 ODP tonnes of HCFC-141b, representing 28 per cent of the HCFC reduction target for stage II of the solvent sector plan. In addition, a second set of 27 enterprises have been identified with an associated phase-out of 436.00 mt (47.96 ODP tonnes) of HCFC-141b. After verification of consumption, contracts for these enterprises will be signed in early 2019. The Government of China is also requesting for a reallocation of the tranches from 2018-2026 which will facilitate the overall implementation of the solvent sector plan to completely phase out the use of HCFC-141b by 2026. The disbursement rate is 70.6 per cent. In view of the implementation progress, the Secretariat recommends approval of the third tranche of the solvent sector plan.

RECOMMENDATION

212. The Executive Committee may wish to consider:

(a) Noting the progress report on the implementation of the second tranche of the solvent sector plan of stage II of the HCFC phase-out management plan (HPMP) for China; and

(b) Approving the third tranche of the solvent sector plan of stage II of the HPMP for China, and the corresponding 2018-2019 tranche implementation plan, in the amount of US $5,549,492, plus agency support costs of US $388,464 for UNDP.

Annex I

TEXT TO BE INCLUDED IN THE UPDATED AGREEMENT BETWEEN THE GOVERNMENT OF CHINA AND THE EXECUTIVE COMMITTEE OF THE MULTILATERAL FUND FOR THE REDUCTION IN CONSUMPTION OF HYDROCHLOROFLUOROCARBONS IN ACCORDANCE WITH STAGE II OF THE HCFC PHASE-OUT MANAGEMENT PLAN

(Relevant changes are in bold font for ease of reference)

17. This updated Agreement supersedes the Agreement reached between the Government of China and the Executive Committee at the 79th meeting of the Executive Committee.

APPENDIX 2-A: THE TARGETS, AND FUNDING

Row	Particulars	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
Consumption targets													
1.1	Montreal Protocol reduction schedule of Annex C, Group I substances (ODP tonnes)	17,342.1	17,342.1	17,342.1	17,342.1	12,524.9	12,524.9	12,524.9	12,524.9	12,524.9	6,262.4	6,262.4	n/a
1.2	Maximum allowable total consumption of Annex C, Group I substances (ODP tonnes)	16,978.9	16,978.9	15,048.1	15,048.1	11,772.0	*	*	*	*	*	*	n/a
1.3.1	Maximum allowable consumption of Annex C, Group I substances in the ICR sector (ODP tonnes)	2,162.5	2,162.5	2,042.4	2,042.4	1,609.9	1,609.9	**	**	**	**	**	n/a
1.3.2	Maximum allowable consumption of Annex C, Group I substances in the XPS foam sector (ODP tonnes)	2,286.0	2,286.0	2,032.0	2,032.0	1,397.0	1,397.0	1,397.0	762.0	762.0	165.0	-	n/a
1.3.3	Maximum allowable consumption of Annex C, Group I substances in the PU foam sector (ODP tonnes)	4,449.6	4,449.6	3,774.5	3,774.5	2,965.7	2,965.7	2,965.7	1,078.4	1,078.4	330.0	-	n/a
1.3.4	Maximum allowable consumption of Annex C, Group I substances in the RAC sector (ODP tonnes)	3,697.7	3,697.7	2,876.0	2,876.0	2,259.7	2,259.7	***	***	***	***	***	n/a
1.3.5	Maximum allowable consumption of Annex C, Group I substances in the solvent sector	455.2	455.2	395.4	395.4	321.2	321.2	321.2	148.3	148.3	55.0	-	n/a
Funding industrial and commercial refrigeration and air conditioning (ICR) sector plan													
2.1.1	Sector Lead IA (UNDP) agreed funding (US $)	13,368,756	20,000,000	12,000,000	16,000,000	16,000,000	11,776,041	-	-	-	-	-	89,144,797
2.1.2	Support costs for UNDP (US $)	935,813	**1,400,000**	**840,000**	**1,120,000**	**1,120,000**	**824,323**	-	-	-	-	-	**6,240,136**
Funding extruded polystyrene (XPS) foam sector plan													
2.2.1	Sector Lead IA (UNIDO) agreed funding (US $)	7,514,867	8,732,614	8,000,000	9,243,486	9,600,000	14,788,765	11,400,000	11,300,000	9,550,000	9,600,000	11,971,763	111,701,495

Row	Particulars	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
2.2.2	Support costs for UNIDO (US $)	526,041	**611,283**	**560,000**	**647,044**	**672,000**	**1,035,214**	**798,000**	**791,000**	**668,500**	**672,000**	**838,023**	**7,819,105**
2.2.3	Sector cooperating agency (Germany) agreed funding (US $)	-	267,386	-	356,514	-	211,235	-	-	250,000	-	-	1,085,135
2.2.4	Support costs for Germany (US $)	-	31,877	-	42,502	-	25,182	-	-	29,804	-	-	129,365
	Funding polyurethane (PU) foam sector												
2.3.1	Sector Lead IA (World Bank) agreed funding (US $)	7,045,027	**0**	**0**	**20,300,000**	**20,300,000**	**20,000,000**	**15,700,000**	**15,600,000**	**14,500,000**	**14,000,000**	**14,026,183**	141,471,210
2.3.2	Support costs for World Bank (US $)	493,152	**0**	**0**	**1,421,000**	**1,421,000**	**1,400,000**	**1,099,000**	**1,092,000**	**1,015,000**	**980,000**	**981,833**	**9,902,985**
	Funding room air conditioning (RAC) sector plan												
2.4.1	Sector Lead IA (UNIDO) agreed funding (US $)	14,671,089	16,000,000	**0**	**18,000,000**	**14,000,000**	**14,000,000**	**11,581,816**					88,252,905
2.4.2	Support costs for UNIDO (US $)	1,026,976	**1,120,000**	**0**	**1,260,000**	**980,000**	**980,000**	**810,727**	-	-	-	-	**6,177,703**
2.4.3	Sector cooperating agency (Italy) agreed funding (US $)	891,892	-	-	-	-	-	-	-	-	-	-	891,892
2.4.4	Support costs for Italy (US $)	108,108	-	-	-	-	-	-	-	-	-	-	108,108
	Funding service sector plan, including enabling programme												
2.5.1	Sector Lead IA **(UNEP)** agreed funding (US $)	3,299,132	2,570,000	3,270,000	3,370,000	3,570,000	2,810,868	-	-	-	-	-	18,890,000
2.5.2	Support costs for **UNEP** (US $)	364,651	284,061	361,431	372,484	394,590	310,683	-	-	-	-	-	2,087,900
2.5.3	Sector cooperating agency (Germany) agreed funding (US $)	300,000		300,000	200,000		200,000	-	-	-	-	-	1,000,000
2.5.4	Support costs for Germany (US $)	36,000	-	36,000	24,000	-	24,000	-	-	-	-	-	120,000
2.5.5	Sector cooperating agency (Japan) agreed funding (US $)	80,000	80,000	80,000	80,000	80,000		-	-	-	-	-	400,000
2.5.6	Support costs for Japan (US $)	10,400	10,400	10,400	10,400	10,400		-	-	-	-	-	52,000
	Funding solvent sector plan												
2.6.1	Overall Lead IA (UNDP) agreed funding (US $)	2,821,937	3,777,190	**5,549,492**	**6,070,000**	**5,570,000**	**6,060,000**	**5,440,000**	**5,210,000**	**1,560,000**	**1,200,000**	**4,003,947**	47,262,566
2.6.2	Support costs for UNDP (US $)	197,536	**264,403**	**388,464**	**424,900**	**389,900**	**424,200**	**380,800**	**364,700**	**109,200**	**84,000**	**280,276**	**3,308,380**
	Overall funding												
3.1	Total agreed funding (US $)	49,992,700	**51,427,190**	**29,199,492**	**73,620,000**	**69,120,000**	**69,846,909**	**44,121,816**	**32,110,000**	**25,860,000**	**24,800,000**	**30,001,893**	500,100,000
3.2	Total support cost (US $)	3,698,676	**3,722,023**	**2,196,296**	**5,322,330**	**4,987,890**	**5,023,602**	**3,088,527**	**2,247,700**	**1,822,504**	**1,736,000**	**2,100,133**	**35,945,681**
3.3	Total agreed costs (US $)	53,691,376	**55,149,213**	**31,395,788**	**78,942,330**	**74,107,890**	**74,870,511**	**47,210,343**	**34,357,700**	**27,682,504**	**26,536,000**	**32,102,026**	**536,045,681**
	Phase-out and remaining eligible consumption												
4.1.1	Total phase-out of HCFC-22 agreed to be achieved under this Agreement (ODP tonnes)												3,878.80
4.1.2	Phase-out of HCFC-22 to be achieved in previously approved projects (ODP tonnes)												1,479.72
4.1.3	Remaining eligible consumption for HCFC-22 (ODP tonnes)												6,136.79
4.2.1	Total phase-out of HCFC-123 agreed to be achieved under this Agreement (ODP tonnes)												2.70
4.2.2	Phase-out of HCFC-123 to be achieved in previously approved projects (ODP tonnes)												0.00
4.2.3	Remaining eligible consumption for HCFC-123 (ODP tonnes)												7.43
4.3.1	Total phase-out of HCFC-124 agreed to be achieved under this Agreement (ODP tonnes)												0.00

Row	Particulars	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
4.3.2	Phase-out of HCFC-124 to be achieved in previously approved projects (ODP tonnes)												0.00
4.3.3	Remaining eligible consumption for HCFC-124 (ODP tonnes)												3.07
4.4.1	Total phase-out of HCFC-141b agreed to be achieved under this Agreement (ODP tonnes)												4,187.18****
4.4.2	Phase-out of HCFC-141b to be achieved in previously approved projects (ODP tonnes)												1,698.00
4.4.3	Remaining eligible consumption for HCFC-141b (ODP tonnes)												0.00
4.5.1	Total phase-out of HCFC-142b agreed to be achieved under this Agreement (ODP tonnes)												646.02
4.5.2	Phase-out of HCFC-142b to be achieved in previously approved projects (ODP tonnes)												267.47
4.5.3	Remaining eligible consumption for HCFC-142b (ODP tonnes)												557.04
4.6.1	Total phase-out of HCFC-225 agreed to be achieved under this Agreement (ODP tonnes)												1.13
4.6.2	Phase-out of HCFC-225 to be achieved in previously approved projects (ODP tonnes)												0.00
4.6.3	Remaining eligible consumption for HCFC-225 (ODP tonnes)												0.09

* Maximum allowable total consumption of Annex C, Group I substances for the period 2021 to 2026 would be determined at a later date, but would in no case be greater than 11,772 ODP tonnes prior to 2025, and no greater than 6,131 ODP tonnes thereafter.

** Maximum allowable total consumption of Annex C, Group I substances in the ICR sector for the period 2021 to 2026 would be determined later, but would in no case be greater than 1,609.9 ODP tonnes prior to 2025, and no greater than 781 ODP tonnes thereafter.

*** Maximum allowable total consumption of Annex C, Group I substances in the RAC sector for the period 2021 to 2026 would be determined later, but would in no case be greater than 2,259.7 ODP tonnes prior to 2025, and no greater than 1,335 ODP tonnes thereafter.

**** In accordance with decision 68/42(b), includes 137.83 ODP tonnes of HCFC-141b contained in exported pre-blended polyols.

Note: Date of completion of stage I as per stage I Agreement: 31 December 2019.

Annex II

REVISED TRANCHE DISTRIBUTION AMONG SECTORS OF STAGE II OF THE HPMP FOR CHINA

Table 1. Tranche distribution as per decision 79/35 (including support cost)

Sector*	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
PU foam	7,538,179	11,289,000	10,117,500	13,525,500	13,525,500	21,300,000	16,720,500	16,614,000	11,182,500	13,951,500	14,937,885	150,702,064
RAC	16,698,065	17,040,000	19,170,000	14,910,000	14,910,000	12,334,634	-	-	-	-	-	95,062,699
Solvent	3,019,473	4,022,707	3,152,325	3,438,917	3,835,153	8,401,701	7,591,947	3,902,543	5,837,895	2,883,892	4,262,188	50,348,742
XPS	8,040,908	9,599,496	8,520,000	10,243,329	10,224,000	15,986,452	12,141,000	12,034,500	10,450,554	10,224,000	12,749,928	120,214,166
ICR	14,304,569	21,300,000	12,780,000	17,040,000	17,040,000	12,541,484	-	-	-	-	-	95,006,053
Servicing	4,090,183	2,944,461	4,057,831	4,056,884	4,054,990	3,345,551	-	-	-	-	-	22,549,900
Total	**53,691,376**	**66,195,664**	**57,797,657**	**63,214,630**	**63,589,643**	**73,909,822**	**36,453,447**	**32,551,043**	**27,470,949**	**27,059,392**	**31,950,000**	**533,883,625**

Table 2. Revised tranche distribution as proposed by the Government of China (including support cost)

Sector*	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
PU	7,538,179	-	-	21,721,000	21,721,000	21,400,000	16,799,000	16,692,000	15,515,000	14,980,000	15,008,016	151,374,195
RAC	16,698,065	17,120,000	-	19,260,000	14,980,000	14,980,000	12,392,543	-	-	-	-	95,430,608
Solvent	3,019,473	4,041,593	5,937,956	6,494,900	5,959,900	6,484,200	5,820,800	5,574,700	1,669,200	1,284,000	4,284,223	50,570,946
XPS	8,040,908	9,643,160	8,560,000	10,289,546	10,272,000	16,060,396	12,198,000	12,091,000	10,498,304	10,272,000	12,809,786	120,735,100
ICR	14,304,569	21,400,000	12,840,000	17,120,000	17,120,000	12,600,364	-	-	-	-	-	95,384,933
Servicing	4,090,183	2,944,461	4,057,831	4,056,884	4,054,990	3,345,551	-	-	-	-	-	22,549,900
Total	**53,691,376**	**55,149,213**	**31,395,788**	**78,942,330**	**74,107,890**	**74,870,511**	**47,210,343**	**34,357,700**	**27,682,504**	**26,536,000**	**32,102,026**	**536,045,681**

Table 3. Differences between Table 1 and Table 2

Sector*	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
PU	-	-11,289,000	-10,117,500	8,195,500	8,195,500	100,000	78,500	78,000	4,332,500	1,028,500	70,131	672,131
RAC	-	80,000	-19,170,000	4,350,000	70,000	2,645,366	12,392,543	-	-	-	-	367,909
Solvent	-	18,886	2,785,631	3,055,983	2,124,747	-1,917,501	-1,771,147	1,672,157	-4,168,695	-1,599,892	22,036	222,203
XPS	-	43,663	40,000	46,217	48,000	73,944	57,000	56,500	47,750	48,000	59,859	520,933
ICR	-	100,000	60,000	80,000	80,000	58,880	-	-	-	-	-	378,880
Servicing	-	-	-	-	-	-	-	-	-	-	-	-
Total	**-**	**-11,046,451**	**-26,401,869**	**15,727,700**	**10,518,247**	**960,689**	**10,756,896**	**1,806,657**	**211,555**	**-523,392**	**152,026**	**2,162,056**

*PU= polyurethane foam; XPS= extruded polystyrene foam; RAC=room air-conditioning manufacturing and heat pump water heaters; ICR=industrial and commercial refrigeration and air conditioning