



**United Nations
Environment
Programme**

Distr.
GENERAL

UNEP/OzL.Pro/ExCom/81/29
1 June 2018

ORIGINAL: ENGLISH

EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Eighty-first Meeting
Montreal, 18-22 June 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 as the blowing agent UNDP

Phase-out

- HCFC phase-out management plan (stage I): UNDP
Final progress report on the solvent sector
- HCFC phase-out management plan (stage II): UNDP, UNEP, UNIDO, World Bank,
Germany, Italy and Japan

Room air-conditioning manufacturing and heat pump water heaters sector plan (second tranche) UNIDO and Italy

Refrigeration servicing sector plan and enabling programme (second tranche) UNEP, Germany and Japan

Phase-out / Production

- Draft financial reporting format for annual project management unit expenditures for the HCFC phase-out management plan and HCFC production phase-out management plan UNDP and World Bank

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 as the blowing agent.	UNDP
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NATIONAL COORDINATING AGENCY	Foreign Economic Cooperation Office/ Ministry of Environmental Protection
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LATEST REPORTED CONSUMPTION DATA FOR ODS ADDRESSED IN PROJECT

A: ARTICLE 7 DATA (METRIC TONNES (MT), 2017, AS OF MAY 2018)

HFCs	n/a
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B: COUNTRY PROGRAMME SECTORAL DATA (MT, 2017, AS OF MAY 2018)

HFCs	*
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*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
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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 \$):		3,877,300
Final project costs (US \$):		
Incremental capital costs:		
Contingency (10 %):		
Incremental operating costs:		
Total project costs:		
Local ownership (%):		100
Export component (%):		8
Requested grant (US \$):		3,877,300
Cost-effectiveness:	US \$/kg	15.51
	US \$/mt CO ₂ eq.	15.06
Implementing agency support cost (US \$):		271,411
Total cost of project to Multilateral Fund (US \$):		4,148,711
Status of counterpart funding (Y/N):		Y
Project monitoring milestones included (Y/N):		Y

SECRETARIAT'S RECOMMENDATION	For individual consideration
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PROJECT DESCRIPTION

1. On behalf of the Government of China, UNDP has submitted a project proposal to convert the manufacturing of polyurethane (PU) foam panels in domestic refrigeration at Hisense Kelon Electrical Holdings Company Ltd (Hisense Kelon) from the use of cyclopentane and HFC-245fa to the use of cyclopentane and HFO-1233zd as the blowing agent, at a cost of US \$3,877,300, as originally submitted, plus agency support costs of US \$271,411.

HFC consumption and sector background

2. 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.

3. 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 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 metric tonnes (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.

4. 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 of them produce 95 per cent of the units, and five of them (Haier, Hisense Kelon, Meiling, Midea and Siemens) produce around 70 per cent.

5. 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 gradually increasing 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.

6. 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 ever stricter energy-efficiency standards.

Enterprise background

7. 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 were exported to the European Union).

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

Project description and costs

9. Currently available alternatives to HFC-245fa in domestic refrigeration include cyclopentane, HFO-1233zd and HFO-1336mzz. The enterprise has selected a blend of cyclopentane and HFO-1233zd (C5+HFO-1233zd) owing to the availability of HFO-1233zd 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.

10. Hisense Kelon aims to convert one domestic-refrigerator manufacturing line, 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 to operate with CFC-11, and converted with the assistance of Multilateral Fund¹ to cyclopentane in 1997; 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.

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

- (a) Replacement of all plastic sealing rings in cylinders, pipes and foaming equipment on account of the solvent properties of HFO-1233zd;
- (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 27-year-old foam machine (installed in 1991, and composed of four foam dispensers, each with two heads used for five workstations) to meet the stricter temperature-control requirements of HFO-1233zd, 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.

12. 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.

¹ CPR/REF/17/INV/123.

Project costs

13. The incremental capital costs (ICCs), as submitted, amount to US \$2,313,300 as shown in Table 1.

Table 1. ICCs for the conversion of domestic refrigerators (PU foam) in Hisense Kelon

Category	Equipment	Quantity	Cost per unit (US \$)	Cost (US \$)
Storage and supply	Tank, pipes and their sealing rings	1	8,000	8,000
	Pumps and supply-control systems	1	57,000	57,000
Pre-mixing machine	Static pre-mixing machine	1	140,000	140,000
	Thermal-static system	1	110,000	110,000
Foaming machine for cabinet	Thermal-static system for foaming room	4	25,000	100,000
	Thermal-static system for jigs and moulds	40	24,000	960,000
	Conversion of wet part of foaming machine	4	160,000	640,000
	Cabinet pre-heating systems	4	22,000	88,000
Sub-total ICCs				2,103,000
Contingencies (10 %)				210,300
Total ICCs				2,313,300

14. 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 2.

Table 2. 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	

15. 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.

16. The total cost of the project, as submitted, is US \$3,877,300, with a cost-effectiveness of US \$15.51/kg, as shown in Table 3.

Table 3. Total cost for the conversion of domestic refrigerators (PU foam) in Hisense Kelon

Item	Cost (US \$)
ICCs	2,313,300
IOCs	1,500,000
Technical assistance	64,000
Total cost	3,877,300
HFC-245fa consumption (mt)	250
HFC-245fa consumption (mt CO ₂ -eq.)	257,500
Cost-effectiveness (US \$/kg)	15.51
Cost-effectiveness (US \$/mt CO ₂ -eq.)	15.06

17. The project will be implemented in 24 months.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

Eligibility

18. This project has been submitted 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.

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

Maturity of the technology, replicability and sustainability of the conversion

20. 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.

21. Noting the uncertainty with regard to the commercialization of the product on the local market, the Secretariat asked whether, in implementing this project, 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. The enterprise can, however, commit only to ceasing the use of ODS or high-GWP HFC in the converted line.

Incremental cost calculations

22. UNDP informed the Secretariat that there is a supply of HFO-1233zd in China, and that Hisense Kelon is already producing one million refrigerators with C5+HFO-1233zd. 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.

23. With regard to the equipment included in the project proposal, UNDP highlighted that HFO-1233zd 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. It might be possible to replace HFC-245fa with HFOs in the newest equipment without substantial ICCs; however, the current equipment of the enterprise would require substantial changes or complete replacement.

24. After reviewing existing information on HFOs and consulting a foam expert, however, the Secretariat considered the equipment items in the project proposal are not incremental for the following reasons:

- (a) According to the HFO-1233zd 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 Technology and Economic Assessment Panel (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,² 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”;
- (d) HFO-1233zd 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; 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.

² UNEP/OzL.Pro/ExCom/76/58, Annex I.

25. Notwithstanding that the replacement of the existing foam dispenser is not incremental, the Secretariat also noted that the foam equipment is 27 years old. In line with existing policies for machines nearing the end of their useful life,³ the incremental cost for replacement of the foam equipment will be negligible, as it has already surpassed its useful life.

Replacement of sealing rings

26. With regard to the need to change the plastic sealing rings in the equipment on account of the difference in solvency properties between HFO-1233zd and HCFC-141b or HFC-245fa, UNDP explained that, according to technical information provided by experts from the producer of the blowing agent (China) and RIM Refrigeration (China office), HFO-1233zd can react with the materials used in the rings because it contains a chlorine atom and double-bond. UNDP also provided a table outlining the results of compatibility tests between HFOs and different plastic sealing rings conducted by the RIM Refrigeration China office.

Conversion of the polyether-supply control system

27. Concerning the need for changes in the equipment on account of the different mixing ratios of blowing agents and polyols, UNDP explained that the exact ratio to be applied for the conversion will be determined by the enterprise after research and development and a cost evaluation.

28. The Secretariat considers, however, that the use of different mixing ratios is part of the baseline. In particular, Hisense Kelon has been successfully producing a large variety of models with different foam blowing formulations including CFC, HCFC, cyclopentane, C5+HFC-245fa, and 1233zd using the same equipment. Therefore, the request is not incremental.

Conversion of the static pre-mixing unit and new thermal-static systems for rooms and for jigs and moulds

29. 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, 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 \$100,000 for the foaming room, are required.

30. The Secretariat noted, however, that this equipment should already be part of the baseline as HFC-245fa evaporates more easily than HFO-1233zd due to its boiling point. Therefore, the request is not incremental. The cost of modification of the pre-mixing unit of US \$140,000, is almost double the cost of a new pre-mixer unit (US \$75,000) requested in projects to introduce cyclopentane when moving from a non-flammable technology to a flammable one.

31. In relation to the need for thermal-static systems for jigs and moulds for US \$960,000, UNDP explained that currently the jigs and moulds are heated with warm-air blowers and electrical heaters. However, as HFO-1233zd is more sensitive to heat, new thermal-static systems for jigs and moulds controlled by water (at a cost of US \$960,000) would be needed. The Secretariat noted that, in the current manufacturing process, the moulds already have heating systems and temperature controls; therefore, the request is not incremental

³ The incremental cost of conversion should be based on the cost of a new machine, from the same supplier, minus the cost of a machine using a replacement ODS technology, or a proportion thereof, in line with decision 25/48(ii).

IOCs

32. 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.

33. The Secretariat reviewed the IOCs based on the formulation provided for the conversion project and noted that the formulation for the doors is similar to the baseline formulation, but the one for the cabinets has a higher density that results in an increase in the IOCs, making them higher than for the doors. UNDP explained that foam density was increased by adding new chemicals and increasing the amounts of polyols and MDI. Noting that the formulation for the doors had minor modifications in relation to the baseline formulation, the Secretariat suggested to use the doors formulation for the cabinets, reducing the IOCs to US \$703,558.

34. The Secretariat also considers that the results of demonstration projects on HFO use in discontinuous panels could provide useful input for developing low-cost HFO-based formulations.

Technical assistance component

35. Given the enterprise's extensive experience and technical capability in manufacturing refrigerators using HFO, the Secretariat considers that additional technical assistance costs should be adjusted. The items "project monitoring and evaluation" (at US \$20,000) and "progress reporting and dissemination" (at US \$20,000) are not included in investment projects and, therefore, are not incremental. However, noting that this is a relatively new technology being introduced the Secretariat suggested to include US \$30,000 for tests and trials, in line with other proposals approved.

36. Table 4 provides a summary of the incremental costs, both as proposed in the project and as recommended by the Secretariat.

Table 4: Incremental costs for conversion of of domestic refrigerators (PU foam) in Hisense Kelon

Description	As submitted (US \$)	Secretariat proposal (US \$)
Incremental capital costs, including technical assistance	2,377,300	54,000
Incremental operating costs	1,500,000	703,558
Total	3,877,300	757,558
HFC-134a phased out (mt)	250	250
Cost-effectiveness (US \$/kg)	15.51	3.03

37. UNDP and the Secretariat were not able to reach an agreement on the overall cost of the project, which UNDP maintained as submitted at US \$3,877,300, while the Secretariat's proposal, based on its technical review, is US \$757,558.

38. 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. The Secretariat, however, considers that the cost estimates might change as more information becomes available on the technology and according to the specific characteristics of the enterprises.

Climate benefits

39. The project is expected to result in an emissions reduction of 256,750 tonnes of CO₂ 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

40. 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 submitted, the proposal is US \$2,930,814 more than what has been included into the business plan; while the Secretariat's proposal is US \$407,310.

Conclusion

41. On the basis of the project proposal submitted to the 81st meeting, the introduction of HFOs, which is considered a near drop-in alternative to HFCs, requires higher investment in equipment and systems than the conversion from non-flammable to a flammable foam blowing agent technology (e.g., previous conversions from HCFC-141b to cyclopentane). The fact that the baseline equipment already operates with flammable technology and HFC (C5+HFO-245fa) does not seem to represent savings in the required investments. Despite the positive improvements in thermal-insulation performance of the technology as compared to pure cyclopentane or C5+HFO-245fa, at US \$15.5/kg as proposed, its replicability in China and in several other Article 5 countries might be limited given the level of capital investment required and the level of operational costs. Based on the information available so far, the Secretariat, however, considers that the incremental cost to convert from C5+HFC-245fa to C5+HFO-1233zd could be lower than that proposed in the project, which would make it more replicable. UNDP and the Secretariat have not been able to reach an agreement on the overall cost of the project, as reflected in Table 4.

42. Notwithstanding the above, given the urgent requirement by the Executive Committee to gain experience in the ICCs and IOCs that might be associated with phasing down HFCs in Article 5 countries, in light of decision 78/3 (g), the Secretariat is submitting this project for the consideration of the Executive Committee.

RECOMMENDATION

43. The Executive Committee may wish to consider:

- (a) The project proposal for the 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 as the blowing agent, in the context of its discussion on HFC stand-alone project submitted to the 81st meeting in line with decision 78/3(g), as described in the document on the Overview of issues identified during project review (UNEP/OzL.Pro/ExCom/81/14); and
- (b) Whether or not to approve the project proposal in light of the information presented in the document.

HCFC phase-out management plan (stage I): Final progress report on the solvent sector (UNDP)

44. UNDP has submitted the final progress report on the implementation of the solvent sector plan for stage I of the HPMP in China to the 81st meeting.

45. The final progress report highlighted the remaining technical assistance activities implemented during the last quarter of 2017, the evaluation of project management and implementation of stage I and the preparation of a project completion report, as summarized below:

- (a) With the assistance of the China Association for Medical Devices Industry Medical Macromolecule Products (CAMDIMMP), a workshop was conducted for technical experts and technical/production managers from enterprises involved in stage I; and guidelines for conversion of HCFC-based equipment based on their experience and lessons learned were finalised in December 2017. These guidelines will be used for stage II;
- (b) Training workshop was organized in December 2017 for 14 medical devices enterprises identified as part of stage II to share lessons learned and provide case studies from stage I conversions;
- (c) The evaluation report on project management and implementation was completed. It will be used to streamline management and implementation of the solvent sector plan under stage II;
- (d) The project completion report was finalized in February 2018 for submission to the Secretariat; and
- (e) Public awareness activities continued to support the solvent sector conversions in stage II.

Lessons learned

46. Key lessons learned from the implementation of the solvent sector plan included the establishment of an effective policy system for the management and monitoring of HCFC phase-out; involvement of competent local Environmental Protection Bureaus (EPBs) in the management and monitoring of HCFCs phase-out which strengthened China's capacity to monitor the use of HCFC-141b in the consumption sector; cooperation with relevant industrial associations, academic institutes and enterprises; and that the project management and the implementation system established under stage I have been effective and compatible with business practices of larger enterprises, but may require further streamlining to deliver assistance to smaller enterprises under stage II.

Level of fund disbursement

47. As of April 2018, the US \$5,000,000 approved had been fully disbursed by FECO to beneficiaries, and for technical assistance activities, as shown in Table 1.

Table 1. Status of disbursements for the solvent sector plan as of April 2018

Component	Funds approved (US \$)	Funds disbursed (US \$)	
		From UNDP to FECO	From FECO to beneficiaries
Enterprise activities	5,000,000	4,347,929	4,347,929
Technical assistance		327,071	327,071
PMU		325,000	325,000
Total	5,000,000	5,000,000	5,000,000

Secretariat's comments

Status of implementation

48. The Secretariat noted the joint efforts by the Government of China and UNDP in ensuring that the remaining activities for the solvent sector plan had been completed as planned. The project completion report was submitted in May 2018, and the financial completion will take place by December 2018.

Conclusion

49. The conversion of nine enterprises and one demonstration project, has been completed; enterprises have been verified, and received national acceptance and final payments in accordance with paragraph 5(b)(i) of the Agreement. A total consumption of 638.12 mt of HCFC-141b has been phased-out, a consumption higher than the phase-out of 627.3 mt proposed for stage I. Technical assistance and support activities including training, awareness raising, technology promotion and dissemination of experience and lessons learned from the conversion have been implemented to sustain the conversions in the enterprises. All funds approved had been disbursed.

Secretariat's recommendation

50. The Executive Committee may wish to:

- (a) Note the final progress report on the implementation of the solvent sector plan of stage I of the HCFC phase-out management plan (HPMP) in China submitted by UNDP; and
- (b) To further note that the project completion report has been completed and submitted to the 81st meeting; and the financial completion would take place by 31 December 2018, in line with decision 69/24.

HCFC PHASE-OUT MANAGEMENT PLAN (STAGE II, SECOND TRANCHE) (UNDP, UNIDO, the World Bank, Government of Germany, Government of Italy, and Government of Japan)

Note from the Secretariat

Background

51. At its 76th, 77th, 79th, and 80th meetings, the Executive Committee has considered stage II of the HCFC phase-out management plan (HPMP) for China, with the associated sectors plans, as described below.

Submission of stage II of the HPMP at the 76th meeting

52. At its 76th meeting, the Executive Committee considered the project proposal on stage II of the HPMP.⁴ The proposal included the overall strategy for stage II of the HPMP and the following six sector plans: extruded polystyrene (XPS) foam sector plan (UNIDO/Germany); polyurethane rigid (PU) foam sector plan (World Bank); industrial and commercial refrigeration and air conditioning (ICR) sector plan (UNDP); room air-conditioner manufacturing (RAC) sector plan and heat pump water heaters (UNIDO); solvent sector plan (UNDP); and refrigeration and air-conditioning servicing sector plan and enabling component (UNEP/Germany/Japan).

53. Subsequent to a discussion, in decision 76/43 the Executive Committee noted, with appreciation, the submission by the Government of China of the overarching strategy for stage II of the HPMP and the accompanying plans, and *inter alia* approved in principle:

- (a) 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, on the understanding that funding for the project implementation and monitoring unit was separate and additional and would be determined at a future meeting; and
- (b) The refrigeration and air-conditioning servicing sector plan 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, on the understanding that the percentage of funds allocated to the project implementation and monitoring unit did not set a precedent for future approvals.

Submission of stage II of the HPMP at the 77th meeting

54. At its 77th meeting, the Executive Committee considered the project proposal on stage II of the HPMP for China⁵ in light of the discussions held at its 76th meeting and further discussions held prior to the 77th meeting. In concluding its deliberations, in decision 77/49 the Committee *inter alia* approved in principle:

- (a) Stage II of the HPMP for China for the period 2016 to 2026, to reduce HCFC consumption by 37.6 per cent of the baseline by 2020 and to achieve the total phase-out of HCFCs in the PU foam, XPS foam and the solvent sectors by 2026, in the amount of

⁴ UNEP/OzL.Pro/ExCom/76/25.

⁵ UNEP/OzL.Pro/ExCom/77/37.

US \$500,100,000,⁶ plus agency support costs to be determined at a future meeting, for UNDP, UNEP, UNIDO, the World Bank, and by the Governments of Germany, Italy and Japan; and noting that the national HCFC consumption target, as well as the targets for the ICR sector and the RAC sector for the period 2021 to 2026 would be determined when stage III of the HPMP was submitted;

- (b) The XPS foam sector plan for the period 2016 to 2026 for the complete phase-out of all HCFCs in that sector, in the amount of US \$112,786,630, plus agency support costs to be determined at a future meeting;
- (c) The PU rigid foam sector plan for the period 2016 to 2026 for the complete phase-out of all HCFCs in that sector, in the amount of US \$141,471,210, plus agency support costs to be determined at a future meeting;
- (d) The ICR sector plan for the period 2016 to 2021 to achieve, by 2020, a 33 per cent reduction in relation to the 2013 maximum allowable consumption in the sector, in the amount of US \$89,144,797, plus agency support costs to be determined at a future meeting;
- (e) The RAC sector plan for the period 2016 to 2021 to achieve, by 2020, a 45 per cent reduction in relation to the 2013 maximum allowable consumption in the sector, in the amount of US \$89,144,797, plus agency support costs to be determined at a future meeting.

55. The Executive Committee also approved the first tranche of the six sector plans of stage II, and the corresponding tranche implementation plans in the amounts shown in Table 1.

Table 1. Funding approved in principle and for the first tranche of stage II of the HPMP for China

Sector plan	Agency	Funding approved (US \$)	
		Overall (in principle)	First tranche
XPS	UNIDO, Germany	112,786,630	7,514,867
ICR	UNDP	89,144,797	13,368,756
Solvent	UNDP	47,262,566	2,821,937
PU	World Bank	141,471,210	7,045,027
RAC	UNIDO, Italy	89,144,797	15,562,981
Servicing	UNEP, Germany, Japan	20,290,000	3,679,132
Total		500,100,000	49,992,700

Submission of the Agreement of stage II of the HPMP at the 79th meeting

56. At its 79th meeting, the Executive Committee considered the Agreement between the Government of China and the Executive Committee for the implementation of stage II of the HPMP for China⁷ in line with decision 77/49(b)(i).⁸ Subsequent to a discussion, in decision 79/35 the Executive Committee *inter alia* approved the Agreement for the implementation of stage II of the HPMP, 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 administrative cost regime in force.

⁶ This funding includes the funding associated with the solvent and the refrigeration servicing sector plans approved in principle at the 76th meeting, plus an additional US \$2,462,566 approved at the 77th meeting for the project management unit for the solvent sector.

⁷ UNEP/OzL.Pro/ExCom/79/30.

⁸ The Agreement between the Government of China and the Executive Committee would be considered at the 79th meeting and should include in Appendix 4-A the amount of co-funding provided by China for the HCFC reductions.

57. The HCFC consumption limits and targeted HCFC phase-out for the period 2016 to 2026 in the six sectors included in the Agreement for stage II of the HPMP for China are shown in Table 2.

Table 2. HCFC consumption limits and phase-out for stage II of the HPMP for China (ODP tonnes)

Maximum allowable consumption							
	2016-17	2018-2019	2020-2021	2022	2023-2024	2025	2026
National	16,978.9	15,048.1	11,772.0*	n/a	n/a	n/a	n/a
XPS sector	2,286.0	2,032.0	1,397.0	1,397.0	762.0	165.0	0.0
PU sector	4,449.6	3,774.5	2,965.7	2,965.7	1,078.4	330.0	0.0
ICR sector	2,162.5	2,042.4	1,609.9*	n/a	n/a	n/a	n/a
RAC sector	3,697.7	2,876.0	2,259.7*	n/a	n/a	n/a	n/a
Solvent sector	455.2	395.4	321.2	321.2	148.3	55.0	0.0
Servicing sector	n/a	n/a	n/a	n/a	n/a	n/a	n/a
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 sector		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	

* The national HCFC consumption target and the targets for the ICR and RAC sectors for the period 2021 to 2026 will be determined during the submission of stage III of the HPMP.

Submission of second tranche requests of stage II of the HPMP at the 80th meeting

58. At its 80th meeting, the Executive Committee considered requests for the second tranche of stage II of the HPMP for China for the XPS foam, ICR, RAC and solvent sector plans.⁹ The requests for the second tranche of the PU foam and the refrigeration servicing sector plans due at the 80th meeting, were not submitted as the agreements between the respective bilateral and implementing agencies and the Government of China had yet to be signed.

59. In concluding its deliberations, in decision 80/66 the Executive Committee *inter alia*:

- (a) Noted that the funding request for the second tranche of the XPS foam sector plan, did not fully meet the requirements specified in paragraph 5 of the Agreement, and strongly urged the bilateral and implementing agencies to ensure that future submissions met the relevant requirements, including the deadlines; and approved the second tranche on an exceptional basis and on the understanding that the Treasurer would transfer the funding to the relevant agencies only upon confirmation that, before 31 December 2017, the 20 per cent disbursement threshold of the first tranche had been met and that review by the Secretariat had taken place;
- (b) Approved the second tranche of the ICR sector plan, approval was on the understanding that:
 - (i) The Government and UNDP would assess the feasibility of conversion of chiller manufacturers to HFOs, consistent with the low global-warming-potential (GWP) technology selection reflected in Appendix 8-A of the Agreement, for possible application in other enterprises to be assisted under stage II;

⁹ UNEP/OzL.Pro/ExCom/80/37.

- (ii) The technology choice for the conversion of manufacturing lines at Dunan Environment, Dunham Bush and Zhejiang Guoxiang was being agreed to on an exceptional basis, on the understanding that:
 - (iii) Consistent with decision XXVIII/2, those manufacturing lines and any other lines converted to the same technology under the second tranche would not be eligible for further funding under the Multilateral Fund;
 - (iv) The level of funding provided to those manufacturing lines would not constitute a precedent for any such future conversions; and
 - (v) The Committee would consider, at the 81st meeting, whether and how the Agreement would need to be modified to account for those conversions, on the understanding that the overall tonnage to be converted to low-GWP alternatives would not change.
- (c) Deferred the consideration of the request for the second tranche of the RAC sector plan to a future meeting;
 - (d) Approved the second tranche of the solvent sector plan; and
 - (e) Noted that, in line with decision 79/35, the agency support costs with respect to the second tranche of the XPS, ICR and solvent sector plans could be reconsidered at the 81st meeting.

Issues related to the XPS sector plan addressed subsequent to the 80th meeting

60. The funding release from the Treasurer of the second tranche was subject to a confirmation that, before 31 December 2017, the 20 per cent disbursement threshold of the first tranche had been met and that review by the Secretariat had taken place (decision 80/66(d)).

61. On 18 December 2017, UNIDO submitted to the Secretariat confirmation from the Government of China that US \$1,572,614 had been disbursed (consisting of US \$1,435,245 to enterprises, US \$19,902 for technical assistance and US \$117,466.20 for the project management unit (PMU)), which amounted to 21 per cent of the funds approved in the first tranche of the XPS foam sector plan. Following its review of the information, the Secretariat requested the Treasurer to transfer to UNIDO funding for the second tranche and to offset the costs associated with the bilateral component against the bilateral contributions to the Fund by the Government of Germany. The funds were transferred to UNIDO on 27 December 2017.

Issues related to the ICR sector plan addressed subsequent to the 80th meeting

62. The funding of the second tranche was approved on the understanding that the Government and UNDP would assess the feasibility of conversion of chiller manufacturers to HFOs (decision 80/66(g)).

63. In following up decision 80/66(g) with UNDP, the Secretariat noted that the approach proposed by UNDP would not change the overall climate impact of the sector plan, but it would facilitate the phase-out of HCFCs in certain applications, for which commercially available and economically viable zero- or low-GWP alternatives are presently limited. The change from pure HFO to HFO blends would affect only the incremental operating costs; on the basis of the current market prices of HFO-1234yf and R-513A,¹⁰ both conversions would exceed the cost threshold of US \$6.3/kg for the air-conditioning sector, so there would be no change in the eligible funding level.

¹⁰ A blend of HFO-1234yf and HFC-134a.

64. However, the Government of China through UNDP expressed their concerns on the restriction of the technology selection. Pure HFOs are alternatives for HFC-134a and HCFC-123 in the centrifugal machine not for HCFC-22 in screw chiller. To the knowledge of the Government of China, there has been no evidence that pure HFO has been applied in any screw chillers so far. Moreover, the GWP of R-513A can only be offset in sectors that use HC, CO₂ and ammonia. However, the chiller and unitary air-conditioning are the two largest sub-sectors in ICR sector accounting for approximately 80 per cent of the consumption. Therefore, the implementation of the decision 80/66 will encounter great challenges to China as it would be difficult to find additional enterprises in other sectors.

65. UNDP and the Government of China suggested to conduct a comprehensive evaluation on the viable alternatives in chiller sector in the third tranche to identify the appropriate solution on this issue. The Secretariat seeks the Executive Committee's guidance on the way forward.

66. Based on the above, the Executive Committee may wish note that the Agreement on stage II of the HPMP would not need to be modified to account for those conversions to technologies with a GWP different from that originally listed in Table 8 of the ICR sector plan contained in document UNEP/OzL.Pro/ExCom/76/25, as they could be considered on case-by-case basis, taking into consideration both the climate impact of such conversions and the deviation in cost from that of the approved technologies.

Submission of tranche requests of stage II of the HPMP at the 81st meeting

67. On behalf of the Government of China, bilateral and implementing agencies have submitted to the 81st meeting requests for funding for the second tranches of the following sector plans, together with annual implementation reports covering the activities undertaken so far, and annual implementation plans for the activities to be implemented in 2018 and 2019:

- (a) PU foam sector plan, in the amount of US \$10,600,000, plus agency support costs for the World Bank;
- (b) RAC sector plan, in the amount of US \$16,000,000, plus agency support costs for UNIDO and the Government of Italy; and
- (c) Refrigeration servicing sector plan and enabling activities, in the amount of US \$2,650,000, plus agency support costs for UNEP and the Government of Japan.

Completeness of the submission

68. The Secretariat checked the documents associated with the second tranche requests submitted to the 81st meeting and concluded that the requests for the RAC and refrigeration servicing sector plans met the requirements specified in paragraph 5 of the Agreement of stage II of the HPMP, warrant their submission.

69. 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 the Foreign Economic Cooperation Office (FECO) or from FECO to the final beneficiaries.

70. 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; potential beneficiaries have been trained in preparing subproject proposals for consideration by FECO; the baseline consumption and existing equipment of potential beneficiaries have been reviewed; and seven enterprises consuming 930 mt of

HCFC-141b have submitted subproject proposals to FECO for approval. However, as the Grant Agreement has not been signed, FECO would make payments to these enterprises using over US \$1.5 million from its own general budget, and not from other Multilateral Fund-supported projects.

71. The Secretariat noted this approach, which appeared to be contrary to the normal practice for making payments to any beneficiary enterprise only when funding was available from the Multilateral Fund. After careful review of the documents submitted and the additional information provided by the World Bank, the request for funding for the second tranche of the PU foam sector plan is not being presented for consideration at the 81st meeting, as it does not meet the minimum requirements for fund release, as decided by the Executive Committee.

HCFC consumption and verification report¹¹

72. The Government of China has reported HCFC consumption for 2016 under Article 7 of the Montreal Protocol as shown in Table 3. Overall HCFC consumption in 2016 was 5.5 per cent higher (in ODP tonnes) than in 2015 but still lower than in 2014 and previous years. The reason for the variation in HCFC consumption is mainly the economic slowdown in 2015, followed by economic recovery in 2016.

Table 3. HCFC consumption in China (2012 to 2016) (Article 7)

Year	2012	2013	2014	2015	2016	Starting point
Metric tonnes						
HCFC-22	237,397	179,350	190,318	153,971	168,696	209,006
HCFC-123	778	998	1,006	900	943	507
HCFC-124	(6)	32	96	(46)	67	140
HCFC-141b	63,864	47,631	51,848	38,584	39,144	53,502
HCFC-142b	15,274	9,790	9,918	11,616	9,471	22,624
HCFC-225ca/cb	36	29	33	15	38	17
Total	317,343	237,830	253,219	205,040	218,360	285,796
ODP tonnes						
HCFC-22	13,057	9,864	10,468	8,468	9,278	11,495
HCFC-123	16	20	20	18	19	10
HCFC-124	(0)	1	2	(1)	1	3
HCFC-141b	7,025	5,239	5,703	4,244	4,306	5,885
HCFC-142b	993	636	645	755	616	1,471
HCFC-225ca/cb	1	1	1	1	1	1
Total	21,091	15,761	16,839	13,485	14,221	18,865

73. The Government of China has reported country programme (CP) data for 2016 as shown in Table 4. 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).

Table 4. Consumption of HCFC (in ODP tonnes) per sector in China in 2016*

Substance	XPS foam	PU foam	ICR	RAC	Solvent	Servicing
HCFC-22	1,458		2,063	3,025		2,607
HCFC-141b		3,830			413	
HCFC-142b	585		7			24
HCFC-123			13			6
HCFC-124						1
HCFC-225ca/cb					1	
Total	2,043	3,830	2,082	3,025	413	2,638
Maximum allowable consumption	2,286	4,450	2,163	3,698	455	n/a

*The distribution between ICR and RAC sectors are submitted by the implementing agencies; aerosol sector not included as it is not part of the HPMP.

¹¹ HCFC consumption data was presented in paragraphs 6 to 10 of document UNEP/OzL.Pro/ExCom/80/37. The data reported for 2016 was preliminary.

74. 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. For sectors with large numbers of small and medium-sized enterprises (SMEs), 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.

75. 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.

76. An independent verification of HCFC production and consumption in 2016 (World Bank) was submitted to the 80th meeting.¹² The verification confirmed that the consumption of HCFCs in 2016 was within the limits established by the Agreement for the consumption sector.

Overview of progress

77. The main achievements in implementation of stage II of the HPMP are as follows:

- (a) A licensing and quota system to ensure overall compliance in each of the manufacturing sectors has been established and has been implemented continuously. It includes the application of quota permits to enterprises consuming more than 100 mt of HCFCs per year. As a result, all manufacturing sector consumption limits have been complied with since implementation of the system began;
- (b) *XPS foam sector*: The contract between FECO and UNIDO for the implementation of the plan was signed in September 2017 and its amendment, to include the second tranche, is soon to be signed. Eleven XPS foam enterprises (accounting for 4,522 mt of HCFC-22 and HCFC-142b) were identified for their conversion and two of them (accounting for 1,146 mt of HCFC-22 and HCFC-142b) have signed subcontracts with FECO, receiving first disbursements in December 2017. The baseline information of four additional enterprises (accounting for 1,408 mt of HCFC-22 and HCFC-142b) has been verified and their sub-contracts with FECO are soon to be signed;
- (c) *ICR sector*: The amendment to the contract between FECO and UNDP, to include the second tranche of the ICR sector plan, has been signed. FECO and beneficiary enterprises have signed 10 contracts, covering 11 production lines, with a total value of US \$17,440,855 and an associated phase-out of 1,287.29 mt of HCFCs;
- (d) *RAC sector*: The contract between FECO and UNIDO for the implementation of the RAC sector plan (stage II) was signed in October 2017. A notice on the request for proposals for conversion was issued in May 2017, and 16 proposals were received to convert 11 RAC manufacturing lines, one heat pump water heater (HPWH) line, and four compressor manufacturing lines. Reviews of 12 proposals have been completed and contracts have been signed with nine of them with a total value of US \$11,045,790 and an associated phase-out of 2,221 mt of HCFC-22;
- (e) *Solvent sector*: The amendment to the contract between FECO and UNDP, to include the second tranche of the solvent sector plan, has been signed. A total of 24 enterprises have

¹² UNEP/OzL.Pro/ExCom/80/37.

been selected and verified for eligibility. As at March 2018, all the 24 beneficiaries had signed subcontracts with FECO with a total value of US \$19,927,338 and an associated phase-out of 1,176.19 mt (129.38 ODP tonnes) of HCFC-141b; and

- (f) *Refrigeration servicing sector*: Terms of reference for the development of codes and revision of standards in the servicing sector have been prepared; a contract with the national execution agency has been signed for the delivery of technician training programme under stage II; project proposals for demonstration projects have been reviewed; a bidding process to select training centres has started; a contract to conduct a study on management of HCFC recovery in the refrigeration servicing sector has been signed; data has been collected for HCFC phase-out activities in the supermarket sub-sector; terms of reference for the qualification certification for servicing enterprises have been prepared; 50 officers from the Bureau of Environmental Supervision and Inspection and 50 national commercial officers from local departments of commerce have been trained; and awareness activities to promote public awareness on ozone layer protection have been prepared.

Disbursement of funds

78. As at March 2018, of the US \$82,769,890 so far approved (consisting of the first tranches of all sector plans and the second tranches of the XPS foam, ICR and solvent sector plans), US \$26,609,531 had been disbursed from the implementing agencies to FECO, and US \$14,442,176 had been disbursed from FECO to beneficiaries, as summarized in Table 5.

Table 5. Level of disbursement per sector (as at March 2018)

Sector plan	Funds (US \$)		
	Approved	Disbursed to FECO	Disbursed to beneficiaries
XPS foam (UNIDO, Germany)*	16,514,867	2,254,460	1,666,843
PU foam (World Bank)	7,045,027	0	0
ICR (UNDP)*	33,368,756	13,368,756	4,963,925
RAC (UNIDO, Italy)	15,562,981	6,649,378	3,982,341
Solvent (UNDP) *	6,599,127	2,796,937	2,289,067
Servicing (UNEP, Germany, Japan)	3,679,132	1,540,000	1,540,000
Total	82,769,890	26,609,531	14,442,176

*Including the second tranche approved at the 80th meeting.

79. With regard to the sector plans for which funding is being requested at the 81st meeting, at the time of submission of the requests, the rate of disbursement of funding from FECO to beneficiaries was above 20 per cent in the RAC sector and the refrigeration servicing sector.

Interest accrued

80. Information on the interest accrued on the funding approved for the sector plans of the HPMP for China has been provided at every last meeting of the year following the commissioning of a financial audit. UNDP has explained that, at the time of the submission deadline (March 2018), FECO had just finished its final accounting for the year 2017 and had not yet been able to conduct the financial audit on the disbursement and interest accrued for the HPMPs. Accordingly, it has confirmed that information on the interest accrued in 2017 will be submitted at the 82nd meeting.

Agency support costs

81. In approving the Agreement for stage II of the HPMP for China, the Executive Committee decided to set the agency support costs for UNDP, UNIDO, and the World Bank at 6.5 per cent, on the understanding that those costs could be reconsidered at the 81st meeting, and maintained the agency support

costs for the bilateral agencies and UNEP at the level stipulated by the administrative cost regime in force (decision 79/35).

82. At the 79th meeting, during the discussion of this matter, UNIDO, speaking on behalf of the three implementing agencies, said that the decision to place the agency support costs at 6.5 per cent had not involved any cost analysis and that the analysis by the Secretariat in document UNEP/OzL.Pro/ExCom/79/43 had recommended retaining the level used for the final tranches of stage I of the HPMP for China. The implementing agencies did not agree, therefore, with the change in overhead costs, but noted with appreciation the flexibility of the Executive Committee in agreeing to renewed discussion of the level of support costs at its 81st meeting.¹³

83. At its 80th meeting, the Executive Committee approved the second tranches for the XPS foam, ICR and solvent sectors with agency support costs of 6.5 per cent and recalled that, in line with decision 79/35, the agency support costs with respect to the second tranche of each sector plan could be reconsidered at the 81st meeting.

84. UNIDO has resubmitted to the 81st meeting, the request for the second tranche of the RAC sector plan with agency support costs of 7.0 per cent. However, in line with decision 79/35 the Secretariat adjusted the agency support costs for UNIDO at 6.5 per cent.

85. In light with decision 79/35(b), the Executive Committee may wish to reconsider the level of the agency support costs for UNDP, UNIDO and the World Bank for stage II of the HPMP for China. It is the Executive Committee' prerogative whether it adjusts the agency support costs associated with the second (and future) tranches of all the sector plans of stage II of the HPMP for China, including the XPS foam, ICR and solvent sector plans approved in 2017; the RAC sector plan submitted to the 81st meeting; and the PU foam sector plan to be submitted to the 82nd meeting. Unless otherwise specified, any decision by the Executive Committee to change the agency support costs would apply only to tranches approved at subsequent meetings. The Secretariat would like to note the need to treat agencies equitably.

Annual report on the PMU

86. At the 80th meeting, the Executive Committee requested the Secretariat to work with the Government of China through UNDP, as the lead implementing agency of the HPMP, and through the World Bank, as the lead implementing agency of the HPPMP, to develop, by the 81st meeting, a financial reporting format for annual PMU expenditures in relation to the production and consumption sectors (decision 80/80). The draft financial reporting format for annual project management unit expenditures for the HPMP and HPPMP is contained in paragraphs 136 to 159 of the present document.

Revision of the Agreement for stage II of the HPMP for China

87. The Secretariat notes that the Agreement between the Government of China and the Executive Committee for stage II of the HPMP would need to be revised to, *inter alia*, include the level of the agency support costs that the Executive Committee might decide at the 81st meeting. The Secretariat also notes that the second tranche of the PU foam sector plan planned for submission in 2018, would only be submitted to the 82nd meeting; accordingly, the funding for the third tranche planned in 2018 would need to be deferred to 2019, resulting in changes to the distribution of the overall funding of stage II of the HPMP.

88. Accordingly, the Secretariat would like to suggest that the Executive Committee considers the revision to the Agreement for stage II of the HPMP at its 82nd meeting, together with the submission of relevant tranches of sector plans.

¹³ Paragraph 114 of document UNEP/OzL.Pro/ExCom/79/51.

Tranche progress reports and funding requests

89. Stand-alone progress reports on the implementation of the RAC and refrigeration servicing sector plans and requests for funding for the second tranches follow this Note by the Secretariat. Each report contains: progress in the implementation of the first tranche; the level of fund disbursement; the implementation plans for the second tranches; comments by the Fund Secretariat; and the recommendations.

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS
China

(I) PROJECT TITLE	AGENCY	MEETING APPROVED	CONTROL MEASURE
HCFC phase-out plan (stage II) room air-conditioning manufacturing and heat pump water heaters	Government of Italy and UNIDO (lead)	77 th	37.6% by 2020

(II) LATEST ARTICLE 7 DATA (Annex C Group I)	Year: 2016	14,220.59 (ODP tonnes)
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(III) LATEST COUNTRY PROGRAMME SECTORAL DATA (ODP tonnes)								Year: 2016	
Chemical	Aerosol	Foam	Fire fighting	Refrigeration		Solvent	Process agent	Lab use	Total sector consumption
				Manufacturing	Servicing				
HCFC-22	126.4	1,457.5		5,087.5	2,606.9				9,278.3
HCFC-123				13.1	5.8				18.9
HCFC-124					1.5				1.5
HCFC-141b	63.0	3,830.3				412.5			4,305.9
HCFC-142b		585.0		6.5	24.1				615.6
HCFC-225ca						0.9			0.9

(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
UNIDO	ODS phase-out (ODP tonnes)	313.71	243.99	243.99	201.85	1,003.54
	Funding (US \$)	36,210,000	14,910,000	14,910,000	12,334,634	78,364,634
Italy	ODS phase-out (ODP tonnes)	0	0	0	0	0
	Funding (US \$)	0	0	0	0	0

(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)			3,697.7	3,697.7	2,876.0	2,876.0	2,259.7	2,259.7	*	*	*	*	*	n/a	
Agreed funding (US \$)	UNIDO	Project costs	14,671,089	16,000,000	18,000,000	14,000,000	14,000,000	11,581,816	-	-	-	-	-	88,252,905	
		Support costs	1,026,976	1,040,000**	1,170,000**	910,000**	910,000**	752,818**	-	-	-	-	-	-	5,809,794
	Italy	Project costs	891,892	-	-	-	-	-	-	-	-	-	-	-	891,892
		Support costs	108,108	-	-	-	-	-	-	-	-	-	-	-	108,108
Funds approved by ExCom (US \$)		Project costs	15,562,981											15,562,981	
		Support costs	1,135,084												1,135,084
Total funds requested for approval at this meeting (US \$)		Project costs			16,000,000									16,000,000	
		Support costs			1,040,000										1,040,000

*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.

** Calculated at 6.5 per cent of the project costs.

Secretariat's recommendation:	For individual consideration
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PROJECT DESCRIPTION

Background

90. On behalf of the Government of China, UNIDO as the designated implementing agency, submitted a request for funding for the second tranche of the room air-conditioning manufacturing (RAC) and heat pump water heaters (HPWH) sector plan (RAC sector plan) of the HCFC phase-out management plan (HPMP) for China to the 80th meeting. Subsequent to a discussion, the Executive Committee decided to defer the consideration of the request for the second tranche of the RAC sector plan to a future meeting (decision 80/66(j)).

91. On behalf of the Government of China, UNIDO has re-submitted the request for funding for the second tranche of the RAC sector plan at the amount of US \$16,000,000, plus agency support costs of US \$1,040,000.¹⁴ The submission includes a progress report on the implementation of the first tranche of the RAC sector plan and the tranche implementation plan for 2018-2020.

92. In order to facilitate the review of the re-submission by the Executive Committee, the present document is based on document UNEP/OzL.Pro/ExCom/80/37. Progress that has been made since the 80th meeting is identified in **bold and highlighted in yellow**.

Progress report on the implementation of the first tranche

Enterprise-level activities

93. The contract between FECO and UNIDO for the implementation of the RAC sector plan (stage II) was signed in October 2017. A notice on the request for proposals for conversion under stage II was issued in May 2017, and 16 proposals were received to convert 11 RAC manufacturing lines, one HPWH line, and four compressor manufacturing lines. Reviews of proposals to convert **12** lines have been completed while the remaining proposals to convert **four** lines are still under review. **As part of the proposal review, those four** lines will undergo verification of their baseline information (i.e., non-article 5 ownership, baseline equipment, HCFC consumption and financial data) to determine the HCFC-22 phase-out and the incremental capital costs (ICC). The list of 16 enterprises is presented in Table 1.

Table 1. List of RAC, HPWH and compressor enterprises in the first three tranches

RAC				
Name	HCFC-22 (mt)	Technology	ICC(US \$)	Tranche
TCL Zhongshan	875.87	R-290	1,352,355	1
TCL Wuhan	829.587	R-290	1,352,355	1
Hisense Guangdong	120*	R-290	1,340,805*	1 or 2
Hisense Jiangmen	110.2	R-290	1,147,920	1
Jiangsu Sinco	89.7*	R-290	1,340,805*	1 or 2
Foshan Daishiba	295.9*	R-290	1,340,805*	1 or 2
Zhongshan Changhong	83.361	R-290	1,352,355	1
Chuzhou Yangzi	322.107	R-290	1,340,805	1

¹⁴ As per the letter of **22 March 2018** from the Foreign Economic Cooperation Office of the Ministry of Environmental Protection of China to UNIDO.

Compressor				
Name	Compressor/year	Technology	ICC(US \$)	Tranche
Guangdong GMCC	1,384,268**	R-290	861,490**	1
Shenyang Sanyo	1,465,635***	R-290	969,136***	1
Xi'an Qing'an	1,682,250	R-290	1,744,895	1
Shanghai Highly	891,288	R-290	924,479	1
RAC and HPWH				
Name	HCFC-22 (mt)*	Technology	Estimated ICC(US \$)*	Tranche
Hisense Shandong	47.3	R-290	1,340,805	2 or 3
Hisense Zhejiang	175	R-290	1,340,805	2 or 3
Foshan Baiyide	231.2	R-290	1,340,805	2 or 3
Chuzhou Yangzi	24	R-290 HPWH	338,750	2 or 3

* To be verified by audit

** 40 per cent non-Article 5 ownership, which is reflected in the ICC

*** 36 per cent non-Article 5 ownership, which is reflected in the ICC

94. **Of the proposals for 12 lines that have passed the review process, contracts for nine lines were signed with an associated phase-out of 2,221 mt of HCFC-22 and a resulting disbursement of US \$3,313,740.**

95. The China Household Electric Appliances Association (CHEAA) will continue: to assist UNIDO and FECO by providing policy recommendations for introduction of environmentally friendly technologies; supporting the enterprises; assisting FECO to select beneficiaries; supporting technology transfer and implementation of investment projects; and establishing and operating an industrial database on HCFC consumption, alternatives technologies and phase-out activities.

Technical assistance activities

96. Technical assistance (TA) activities implemented in 2017 include the inception meeting in March covering the Kigali Amendment, the implementation concept for the stage II, requirements for the preparation of project proposals, policies and regulations, and lessons learned from stage I; updating the project implementation manual from stage I; a workshop on research and development (R&D) needs with participation from FECO, the Government of Germany, UNIDO, universities, technical institutions and enterprises' representatives; **participation by CHEAA in the workshop on safety standards convened in accordance with decision XXVIII/4 in July 2017 in Bangkok; and hosting an international workshop on HCFC-22 alternatives in the RAC sector in Hefei in November 2017. The appliance and electronics world exposition was held in March 2018 in Shanghai, which included a seminar with participation from FECO and RAC and compressor manufacturers to discuss barriers to the market uptake of R-290, and future work on R-290 promotion.**

97. **The safety standard GB4706.32 covering air conditioning equipment (household and similar electrical appliances safety and the special requirements of heat pumps, air conditioners and dehumidifiers), has been a compulsory standard as of 1 May 2013. Since then, this standard has been under review by a technical committee. On 29 March 2018, this committee approved a revision to the standard GB4706.32 that adopts equivalently the International Electrotechnical Commission (IEC) standard 60335-2-40, which specifies particular requirements for the use of flammable refrigerants (and the maximum allowable charge of refrigerant). The IEC standard 60335-2-40 is currently under review; and CHEAA hosted a meeting that produced comments that were submitted the IEC, which is now seeking advice from national standard commissions. The increased charge size that would be permitted under the revised IEC standard would allow higher capacity, higher energy-efficient**

equipment to be manufactured. Once the review of the IEC 60335-2-40 standard is approved, the GB4706.32 standard would again need to be revised.

98. Terms of reference for two R&D projects are being developed, one focused on the lubricant for the R-290 compressor, and the other focused on the R-744 HPWH.

99. Midea, one of the RAC enterprises that was funded during the implementation of stage I of the RAC sector plan, initiated the process of obtaining the German Blue Angel ecolabel¹⁵ for their R-290 split-unit using its own funding, which was granted in March 2018. This is the first split-unit air-conditioner to have obtained the Blue Angel ecolabel.

100. The funding allocation plan was updated based on the agreed level of funding for stage II of the RAC sector, as reflected in Table 2.

Table 2. Funding allocation plan for stage II of the RAC sector plan

Item	Total
Production line conversion	
RAC to R-290 (20 lines)	33,575,100
HPWH to R-290 (3 lines)	1,016,250
HPWH to R-744 (2 lines)	528,250
Compressors to R-290 (3-4 lines)	4,500,000
IOC	33,648,412
Technical assistance	
TA – bilateral contribution (Italy)	891,892
Verification	606,200
R&D and standards	3,365,000
Technical communication	340,000
Publicity	250,000
CHEAA*	1,782,896
Tools and PMU	
Servicing tools	3,996,000
Management cost* (FECO)	4,644,797
Total	89,144,797

* In document UNEP/OzL.Pro/ExCom/80/37, funding for CHEAA and FECO were allocated to management costs.

Level of fund disbursement

101. The implementation subcontracts between FECO and the enterprises are performance-based with disbursements to be released upon completion of the following milestones: 30 per cent of ICCs will be paid upon signature of contract with FECO, 10 per cent upon signature of contract with suppliers, 40 per cent upon delivery of equipment and completion of trials, and 20 per cent after project acceptance. Disbursement of the incremental operating costs (IOCs) will be based upon the manufacturing of equipment with the agreed technology. The intention is to allocate 20 per cent of the IOCs with the manufacturers and 80 per cent will be used by FECO for an incentive scheme that is still to be developed.

102. As of 30 March 2018, of the total US \$15,562,981 approved, US \$4,371,327 (28 per cent) has been transferred to FECO and US \$3,689,476 (24 per cent) has been disbursed to final beneficiaries.

¹⁵ Ecolabel of the Government of Germany since 1978. It sets high standards for environmentally friendly product design.

Table 3. Status of disbursements for the RAC sector plan as of 30 March 2018

Component	Funds approved (US \$)	Funds disbursed (US \$)	
		To FECO	To beneficiaries
Enterprise activities	11,977,500	3,593,250	3,313,740
TA	2,463,328	441,431	132,468*
PMU	1,122,153	336,646	243,268
Total	15,562,981	4,371,327	3,689,476

* Comprises verification (US \$39,090) and funding for CHEAA (US \$93,378).

Implementation plan for the second tranche

103. FECO will continue enforcing the quota permits to RAC enterprises consuming more than 100 mt of HCFCs per year, and select between **seven and ten** lines for conversion **in addition to those assisted under the first tranche**. The following TA will be implemented: enterprise baselines verifications; continued R&D activities for the introduction of R-290 and new technologies for the RAC sector; a study tour on the performance of alternative technologies in the air-conditioning industry, analysis of the barriers of international standards, and discussion of possible revisions to international safety standards; and at least two technical communication meetings, and at least one public awareness activity.

104. Table 4 presents the budget of the activities to be implemented during the implementation of the second tranche.

Table 4. Budget for the second tranche of the RAC sector plan

Activity	Budget (US \$)
Conversion of RAC lines to R-290	13,522,500
Conversion of HPWH to R-290	677,500
Conversion of HPWH to R-744	264,125
TA activities*	702,212
PMU	833,663
Total	16,000,000

* TA activities include verification, R&D and standards, technical communication, publicity, and funding for CHEAA.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

HCFC consumption

105. Since the approval of stage I of the HPMP, the Government of China has established a licensing and quota system which has ensured compliance with the consumption limits under the Montreal Protocol and under its Agreements with the Executive Committee. Through this system, quota permits are issued to enterprises consuming more than 100 mt of HCFCs per year.

106. The Secretariat noted that the quota permits for the RAC sector for 2016, 2017 and 2018 had been established at levels below the maximum allowable consumption under the Agreement with the Executive Committee. However, the HCFC-22 consumption in 2016 was above the quota permit while for 2017 it could also be above the quota permit as shown in Table 5.

Table 5. HCFC consumption and quota permits in the RAC sector plan for 2016-2018

Description	2016		2017		2018	
	mt	ODP tonnes	mt	ODP tonnes	mt	ODP tonnes
Allowable consumption (a)	67,230.91	3,697.70	67,230.91	3,697.70	52,290.91	2,876.00
Quota permits (b)	53,789.00	2,958.40	58,154.00	3,198.47	47,501.00	2,612.56
Actual consumption (c)	55,000.00	3,025.00	59,000.00*	3,245.00*		
Difference (c)-(b)	(1,211.00)	(66.61)	(846.00)	(46.53)		

* Estimated consumption between 57,000 mt (3,135 ODP tonnes) and 59,000 mt (3,245 ODP tonnes).

107. Given that quota permits are not issued to enterprises with HCFC-22 consumption below 100 mt, it appeared that several smaller-size enterprises are manufacturing RAC equipment. The Secretariat further noted that in future years where allowable levels of consumption would be lower, there could be a potential risk of non compliance if large HCFC-consuming enterprises fully utilize the quotas issued and smaller-size enterprises are also converted. In this regard, the Secretariat suggested to UNIDO that the Government could consider measures to mitigate the risk of such an occurrence, such as allocating a lower quota or reducing the level of consumption of enterprises that do not need to obtain a quota.

108. UNIDO indicated that based on information from CHEAA and other sources, there could be dozens of smaller-size enterprises; an increasing number of these enterprises where the production had been idle for a long time, have recovered and are currently manufacturing HCFC-22-based equipment. UNIDO further explained that the Government of China has to allocate quotas for the full target according to the national ODS regulation.

Level of disbursement

109. The Secretariat noted with appreciation the work of the Government of China, UNIDO and the Government of Italy to continue the progress in implementing China's RAC sector plan. In particular, the Secretariat noted the signature of the project contract for the stage II and the project implementation plan; the disbursement of 28 per cent of the tranche from UNIDO to FECO; the finalization of the project implementation manual; the submission of proposal from 16 manufacturing lines; the approval of 12 of the proposals and the ongoing review of the remaining four proposals; the implementation of TA and PMU activities; and the signature of contracts for the conversion at nine lines with an associated disbursement of US \$3,689,476 to the beneficiary enterprises (i.e., 24 per cent of the tranche).

110. The progress report for the implementation of the first tranche of the RAC sector submitted on 23 March 2018 had indicated that a first disbursement of US \$243,268 for the PMU would be made only in May 2018. However, in the context of the discussions to develop a financial reporting format for annual PMU expenditures in relation to the consumption sector, as requested in decision 80/80, the Government of China through UNDP as the lead implementing agency of stage II of the HPMP, indicated that the disbursement of US \$243,268 took place after the submission of the progress report but before 30 March 2018.

Technical issues

Sustainability of the conversion to R-290 at Midea

111. At the 61st meeting, the Executive Committee approved funding for a demonstration project for conversion of one production line from HCFC-22 to R-290 at Midea Room Air-conditioning Manufacturing Company (Midea); additional funding was approved for the conversion of additional two lines to R-290 Midea under stage I of the HPMP. Conversion of the three lines to R-290

technology has been successfully completed and Midea obtained the Blue Angel ecolabel. The World Bank has submitted to the 81st meeting, a request to change the technology from R-290 to HFC-32 a subsidiary of Midea in Viet Nam.¹⁶ Given this fact, the Secretariat inquired on the long-term sustainability of the manufacturing lines already converted at Midea (China). UNIDO clarified that Midea, as a global player, is implementing a multi-refrigerant strategy, including R-410A, HFC-32 and R-290 for different products and markets, and that it remains committed to R-290 as a long-term sustainable choice in China.

Conversions at enterprises without assistance from the Multilateral Fund

112. Recalling that over half of the phase-out under stage II (i.e., 10,505 mt) would be achieved through conversions at enterprises without assistance from the Multilateral Fund, the Secretariat asked whether any information was available on those conversions. UNIDO indicated that it was expected that those conversions would predominantly be to R-410A; however, some conversions to HFC-32 technology had taken place principally for export to the European Union and to Thailand, but no detailed information was available.

Potential revision of the Agreement

113. Regarding the expected duration of conversions under the first tranches, UNIDO indicated that the equipment purchase order was expected to be issued in the first and second quarters of 2018. Installation, commissioning, and commercial manufacturing, was expected in 2019, with project acceptance anticipated by the end of 2019. Payment of IOCs was expected in the 2019 to 2021 timeframe under a subsequent funding tranche request. Contracts for enterprises to be converted under the second tranche were expected to be signed in August 2018, with the completion of the second tranche expected in 2021.

114. The third tranche of the RAC sector plan is expected to be submitted to the 82nd meeting. Given that the signatures of the contracts for enterprises associated with the second tranche were expected in August 2018, a few weeks prior to the submission deadline for project proposals to the 82nd meeting, it could be difficult to meet the 20 per cent disbursement necessary for the submission of the third tranche to that meeting. The Secretariat inquired whether UNIDO would be able to fulfill all the requirements necessary for the submission to the 82nd meeting, or whether the Agreement between the Government of China and the Executive Committee should be amended to help ensure reliable business planning and that the tranche distribution realistically reflects the status of implementation. UNIDO indicated that the Government of China preferred not to amend the Agreement at this time.

Issues related to IOCs

115. The Secretariat requested clarification for the lower level of funding allocated for IOCs that had been agreed between the Secretariat and UNIDO at the 77th meeting. UNIDO clarified that the level of funding agreed at the 79th meeting for stage II was below the level proposed by the Government. Therefore, changes in the funding allocation were needed. To ensure that the conversions are done in a safe manner, part of the IOC had to be reallocated to ICCs of conversion.

116. Noting the unusual provision of IOCs whereby 20 per cent of the IOCs would be allocated to the manufacturers and the remaining 80 per cent to FECO for an incentive scheme, UNIDO clarified that the level of IOC will continue to be based on the verified HCFC consumption at the converted enterprise, with

¹⁶ The request for the change of technology for Viet Nam is presented in document UNEP/OzL.Pro/ExCom/81/10.

disbursement based on an independent report on the number of HC-290-based units that are sold, their energy efficiency and type and after the lines completed their project acceptance. Further details of the IOC scheme will only be available following an assessment of market barriers to be undertaken by FECO and CHEAA.

117. Noting that no funding was allocated for IOCs under the first and second tranche, and that updates on the incentive scheme for stage II might be warranted relative to that used for stage I (e.g., funding for certification of R-290-based models might not be needed in stage II or will be substantially lower as many of the same enterprises that participated in stage I are expected to participate in stage II), the Secretariat looks forward to regular updates on the IOC scheme that will be provided by UNIDO in subsequent progress reports and tranche requests. Based on those updates, the Secretariat would be in a position to make a recommendation to the Executive Committee regarding the new IOC scheme.

Manufacturing lines selected for conversion

118. Regarding the lines selected for participation thus far, the following issues were discussed:

- (a) With only two exceptions, the identified RAC lines had a lower level of consumption than expected from the stage II proposal; **in particular, the verified HCFC-22 consumption at the five lines that had signed contracts is approximately 10 per cent lower than the 402.5 mt phase-out per line that had been expected. This raises** a possible concern of whether the agreed phase-out would be achieved by converting 20 RAC lines as stipulated in Appendix 8-A of the Agreement. UNIDO clarified that the characteristics of lines that participated under stage I varied. Lines that decide to participate later may be larger than those currently wishing to participate. The Government of China was committed to the phase-out agreed under stage II; and
- (b) The four compressor manufacturing lines had a lower production capacity than expected from the stage II proposal (i.e., 1.7 million units/year), leading to approximately **6** per cent lower converted capacity and raising a possible concern that there would be insufficient compressors for the 20 RAC lines that will convert to R-290. In addition, the Secretariat expected that one compressor manufacturing line would be converted to R-744. UNIDO clarified that **no further compressor conversion was planned under stage II of the HPMP and that the Government of China may consider a single compressor conversion to R-744 for HPWH under a later stage.**

Low levels of manufacturing R-290 equipment

119. **During the discussions of the RAC sector plan at the 80th meeting, UNIDO informed the Executive Committee that approximately 12,000 R-290 units (2,000 units for the local market and 10,000 units for export); 100,000 R-290 dehumidifiers; and 650,000 rotary compressors (250,000 units for the local market and 400,000 for export), had been produced on the same lines that had been converted under stage I. Since the 80th meeting, UNIDO explained that sales have only increased by a small amount; some enterprises deployed a few hundred units near their factories; one enterprise received an order for 400 units for Ghana; and another enterprise is expected to receive an order for 10,000 units annually for Indonesia.**

120. **In light of the continued low level of manufacturing at the converted lines to R-290 (i.e., approximately 0.3 per cent of the R-290 capacity converted to date), the Secretariat noted that further conversions to R-290 could have the unintended consequence of increased manufacturing of high-GWP-based equipment as enterprises that wish to offset their idle capacity are likely to do so**

by increasing their manufacturing R-410A-based equipment given the market demand for inverter-based equipment and that the enterprise's quota likely limits the manufacture of additional HCFC-22-based equipment. Under these circumstances, the Secretariat suggested to UNIDO that further steps to facilitate the market uptake of R-290-based RAC might be considered. For example, the Secretariat inquired whether the Government might be able to request those enterprises that converted to R-290 with assistance from the Multilateral Fund to voluntarily commit not to increase manufacturing of R-410A equipment to offset low manufacturing on their converted line. The Secretariat also explored whether other approaches might be considered. UNIDO indicated that such a course of action would not be appropriate at this time as the process of converting to R-290 is ongoing, enterprises are still committed, and any disruption of the programme and funding flow would likely further increase the demand of high- and medium-GWP-based equipment.

Conclusion

121. There is significant progress in the implementation of the first tranche of stage II, including the signature of contracts for the conversion of nine manufacturing lines with an associated phase-out of 2,221 mt of HCFC-22. The level of disbursement of the first tranche from FEEO to the beneficiary enterprises, including technical assistance, and for the PMU is 24 per cent. TA activities continue to be implemented, which are expected to facilitate the market introduction of R-290 RAC equipment. The 2016 (actual) and 2017 (estimated) consumption in the sector is in compliance with the Agreement between the Government of China and Executive Committee. Notwithstanding the continued progress in implementation of conversions and TA, sales of R-290-based equipment remain low. At a future meeting, the Executive Committee may wish to consider whether changes to the quota allocation system could help ensure continued compliance with the sector consumption targets; whether the Agreement should be amended to ensure that the tranche distribution realistically reflects the status of implementation; and whether to request UNIDO to explore feasible measures to encourage the manufacturing and sale of R-290-based RAC equipment in the local market.

RECOMMENDATION

122. The Executive Committee may wish:

- (a) To note the progress report on the implementation of the first tranche of the room air-conditioning manufacturing (RAC) and heat pump water heaters (HPWH) sector plan (RAC sector plan) of the stage II of the HCFC phase-out management plan (HPMP) for China; and
- (b) **To approve** the second tranche of the RAC sector plan of stage II of the HPMP for China, and the corresponding **2018-2020** tranche implementation plan, at the amount of US \$16,000,000, plus agency support costs of US \$1,040,000 for UNIDO.

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	76 th	n/a

(II) LATEST ARTICLE 7 DATA (Annex C Group I)	Year: 2016	14,220.59 (ODP tonnes)
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(III) LATEST COUNTRY PROGRAMME SECTORAL DATA (ODP tonnes)								Year: 2016	
Chemical	Aerosol	Foam	Fire fighting	Refrigeration		Solvent	Process agent	Lab use	Total sector consumption
				Manufacturing	Servicing				
HCFC-22	126.4	1,457.5		5,087.5	2,606.9				9,278.3
HCFC-123				13.1	5.8				18.9
HCFC-124					1.5				1.5
HCFC-141b	63.0	3,830.3				412.5			4,305.9
HCFC-142b		585.0		6.5	24.1				615.6
HCFC-225ca						0.9			0.9

(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
UNEP	ODS phase-out (ODP tonnes)	101.8	58.7	62.2	49.0	271.1
	Funding (US \$)	6,485,492	3,742,484	3,964,590	3,121,552	17,314,118
Germany	ODS phase-out (ODP tonnes)	5.2	3.5	0	3.5	12.2
	Funding (US \$)	336,000	224,000	0	224,000	784,000
Japan	ODS phase-out (ODP tonnes)	1.4	1.4	1.4	0	4.2
	Funding (US \$)	180,800	90,400	90,400	0	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											3,679,132	
		Support costs	411,051												411,051
Total funds requested for approval at this meeting (US \$)		Project costs			2,650,000**									2,650,000	
		Support costs			294,461**										294,461

* 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.

**The second tranche should have been submitted in 2017.

Secretariat's recommendation:	For individual consideration
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PROJECT DESCRIPTION

123. On behalf of the Government of China, UNEP as the lead implementing agency, has submitted a request for funding for the second 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 \$2,944,461, consisting of US \$2,570,000, plus agency support costs of US \$284,061 for UNEP, 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 first tranche and the tranche implementation plan for 2018 to 2020.

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

124. The main activities completed since the approval of the first tranche are summarised below:

- (a) Agreement was signed between UNEP and FECO in July 2017, and funds were subsequently transferred in August 2017;
- (b) Implementation plan of stage II of the HPMP was finalised and approved by FECO/MEP, particularly activities in the servicing sector;
- (c) Development of standards and codes for the refrigeration sector was initiated; terms of reference (TOR) were developed for codes for the servicing and maintenance of air-conditioning units (heat pumps) and water chillers (heat pumps) with focus on refrigerant emissions; and TOR are under preparation for the revision of the standards for the installation of room air-conditioners and development of the codes of good practices for installation and servicing of air-conditioners;
- (d) The national executive agency for the delivery of the technician training programme under stage II of the HPMP, China Association of Staff and Workers Education and Vocational Training (CAWEVT), was identified and a contract was signed; the work plan is expected to be finalised by April 2018;
- (e) The work to revise the national certification criteria for service technicians was initiated, as well as the qualification certification system for servicing companies;
- (f) Three cities (Guangzhou, Shanghai and Shenzhen) were identified for the pilot demonstration project for local Environmental Protection Bureaus (EPBs) on the establishment of policy frameworks to support the phase-out of HCFCs and the safe use of non-HCFC refrigerants through management, supervision, incentives, standards, and training; and work plans were developed for implementation once contracts with these cities are signed;
- (g) The operation of the training centres established under stage I of the HPMP was reviewed, the training centre selection criteria were developed, the training curriculum was consolidated, and the training scheme for the training programme was finalized;

¹⁷ As per the letter of 21 March 2018, from the Foreign Economic Cooperation Office, Ministry of Environmental Protection of China, to UNEP.

- (h) Contracts were signed in December 2017 with the China Solid Waste and Chemical Management Centre, China National Resources Recycling Association (CNRRA) and Shenzhen University to conduct the study on management of HCFC recovery in the refrigeration servicing sector, which is ongoing;
- (i) Stakeholders were consulted for the design of the activities in the supermarket sector; a survey was completed in cooperation with China Chain Store and Franchise Association (CCFA) to support the selection of the potential supermarkets for demonstration projects under stage II;
- (j) A training workshop on enforcement of the ODS Management Regulation was conducted for 50 customs officers from different provinces; 50 officers from local EPBs were trained on ODS management and supervision at the local level;
- (k) An international workshop on alternatives to HCFC-22 in room air-conditioner sector with 200 participants and a workshop on refrigerant management and emission reduction in the chain stores for 50 managers and engineers from the supermarket sector were organized; and
- (l) A draft plan for the outreach and communication for the celebration of International Ozone Day including workshops on ODS management and other awareness activities to support implementation of stage II of the HPMP was prepared; the website “Ozone Action in China” continued to be updated and an English version was developed.

Project implementation and monitoring unit (PMU)

125. A Working Group for the implementation of the refrigeration servicing sector plan has been established under FECO/MEP for the direct coordination, implementation and monitoring of the activities, as well as capacity-building of national and local authorities, and the awareness and outreach strategy.

Level of fund disbursement

126. As of March 2018, of the US \$3,679,132 approved so far, US \$1,540,000 (42 per cent) had been disbursed to FECO, as shown in Table 1. The balance of US \$2,139,132 will be disbursed in 2018.

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

Agency	First tranche	
	Approved	Disbursed to FECO
UNEP	3,299,132	1,460,000
Germany	300,000	-
Japan	80,000	80,000
Total	3,679,132	1,540,000
Disbursement rate (%)	42	

Implementation plan for the second tranche

127. The following activities will be implemented between July 2018 and December 2020:

- (a) Organizing workshops for local customs officers and ODS dealers on strengthening the import/export management of HCFCs and conducting training on ODS import/export control for four customs districts (US \$185,000);

- (b) Contracting additional ten training centres to implement the technicians training programmes including training coordination and monitoring by CAWEVT (US \$1,010,000);
- (c) Selecting 10 to 20 manufacturers' servicing enterprises to train 6,000 technicians on HCFC good servicing practices, and installation and handling of flammable refrigerant-based air-conditioning equipment (US \$660,000);
- (d) Organizing overseas training/study tour on alternative refrigerants and their applications in the cold chain and supermarket subsector for eight to ten high-level managers and engineers (US \$40,000);
- (e) Initiating activities for the new pilot cities as part of the demonstration project for capacity building for local EPBs, developing work plans for implementation and conducting one meeting on capacity building and two training workshops for 200 officers on matters related to the Montreal Protocol and the ODS phase-out programme (US \$425,000);
- (f) Continuing outreach activities in the servicing sector for other stakeholders and the public (e.g., 2019 Ozone2Climate Technologies Roadshow and Roundtable), promoting awareness on the preservation of ozone layer, and maintaining and updating the "OzonAction in China" website (US \$130,000); and
- (g) Operation of the Working Group (PMU) (US \$200,000).

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

Progress report on implementation of the first tranche

128. With regard to the progress in implementation and disbursement, the Secretariat noted that the completed activities were preparatory in nature (e.g., signing agreements and contracts), with limited implementation of training activities. UNEP advised that as it was the case for the implementation of stage I, it was necessary for the preparatory contractual arrangements to be put in place in order for the specific activities to proceed. FECO and UNEP also needed to have consultations with all stakeholders to identify the right partners, as there were new activities in stage II that required further discussions. With the agreement on the work plan in place and agreed, implementation of the activities will go on as planned.

129. In explaining the roles of China Refrigeration and Air-Conditioning Industry Association (CRAA) and China Household Electric Appliances Association (CHEAA) as partners in the servicing sector *vis-à-vis* their roles in the ICR and RAC manufacturing sectors, UNEP indicated that both institutes are fully involved in the servicing sector, as well as in the ICR and RAC manufacturing sectors. Their participation is necessary to ensure that in developing standards for the servicing and manufacturing sectors, for example, there is clear delineation of what these standards should be, while at the same time ensuring that they complement each other. For instance, standards in the servicing sector would focus on installation, servicing and maintenance aspects, which are different from standards in the manufacturing sectors. UNEP is cognizant that financial transactions with these institutes have to be clearly defined in order to avoid double counting with other sectors, and these are included in the contracts signed with each institution, thereby clarifying source of funding for certain activities.

Level of disbursement

130. The Secretariat noted that the agreement between UNEP as the lead agency and FECO was signed in July 2017, and the first disbursement to FECO of US \$1,540,000 (i.e., 42 per cent of the first tranche) was completed in August 2017, and requested a clarification for not submitting the second tranche to the 80th meeting where it was due. UNEP explained that the request could not be submitted on time as disbursement was completed only after the deadlines for submission, thus it is being submitted for consideration only to this meeting. UNEP has further confirmed that the request for third tranche for the servicing sector will be submitted to the 82nd meeting as planned, if the requirements for tranche submission are met.

131. UNEP further clarified that the component of the Government of Germany for this programme will be implemented directly by their implementation arm, albeit with overall consultations with UNEP as lead agency for this sector, and FECO. As of writing this document, the agreement between FECO and Germany has not yet been finalised, and no funds have been disbursed for this component. While no contracts have yet been signed, the partners for the initiative led by the Government of Germany, which includes technology demonstration in the supermarket sector, have been identified, and contracts will be signed as soon as the agreement with FECO is signed.

132. UNEP is implementing the activities on behalf of the Government of Japan, therefore any fund disbursements include the funds allocated to Japan as well.

Work plan for 2018-2019

133. UNEP explained that the implementation of activities for this delayed tranche will start after its approval in June, and will continue up to 2020. UNEP also provided a revised work plan with clear and quantifiable milestones for each activity for easier monitoring of implementation progress.

Conclusion

134. The Secretariat notes that implementation of the first tranche of the servicing sector plan and the enabling programme is ongoing. 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 of 42 per cent meets the required pre-conditions for the release of the second tranche.

RECOMMENDATION

135. The Executive Committee may wish:

- (a) To note the progress report on the implementation of the first 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) To approve the second 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, at the amount of US \$2,944,461, consisting of US \$2,570,000, plus agency support costs of US \$284,061 for UNEP, and US \$80,000, plus agency support costs of US \$10,400 for the Government of Japan.

DRAFT FINANCIAL REPORTING FORMAT FOR ANNUAL PROJECT MANAGEMENT UNIT EXPENDITURES FOR CHINA HPMP AND CHINA HPPMP

Background

136. The Ministry of Environmental Protection (MEP) is responsible for implementation of Montreal Protocol in China. The Foreign Economic Cooperation Office (FECO), under the leadership of MEP, acts as national ozone unit (NOU) and is responsible for implementing all activities related to ODS phase-out, including institutional strengthening (IS) programme, HPMP and HPPMP.

137. The IS takes the lead focusing on coordination within MEP, Ministries and governmental departments; liaising with implementing agencies, preparing meetings of Executive Committee and the Parties. The PMU, under the lead of the IS, undertakes all the activities at the operational level.

The project management unit (PMU) for HCFC phase-out activities

138. Given the complexity and magnitude of the sectors associated with HCFC phase-out activities in China, the enterprises participating in phase-out activities in each sector are selected during implementation through a bidding process. Once a funding tranche of each sector plan is approved, a bidding process is initiated through which specific enterprises are identified and associated funding levels are allocated. A key task undertaken by the PMU is to design the implementation strategy, including determination of funding priority and funding levels for individual enterprises, design of any TA, market promotion of converted technologies, and making any adjustments to the strategy during implementation, if needed.

PMU in the context of stages I and II of the HPMP and stage I of the HPPMP

139. At its 64th meeting, the Executive Committee approved stage I of the HPMP for China.¹⁸ Each sector plan contained in the HPMP was approved for a negotiated value without specifying the funding level of PMU. Based on the stage I progress reports received and additional information provided by UNDP,¹⁹ of the total funding approved in principle, US \$15,406,950 was allocated for the PMU, representing 5.71 per cent of the total funding, of which US \$12,913,707 had been disbursed. The allocation of PMU funding by sector plan and the level of disbursement as of August 2017 are shown in Table 1.

Table 1. Funds allocated to the PMU in stage I of the HPMP for China

Sector	Funds approved in principle (US \$)	Funds allocated to PMU (US \$)	Percentage of PMU	Disbursement by FECO (US\$)	Percentage of disbursement (%)
PU	73,000,000	3,650,000	5	3,102,500	85
XPS	50,000,000	2,807,000	5.6	1,969,965	70
ICR	61,000,000	3,965,000	6.5	3,965,000	100
RAC	75,000,000	4,236,550*	5.6	3,374,145	80
Solvent	5,000,000	325,000	6.5	325,000	100
Servicing	5,640,000	400,000	7.1	161,497	40
National coordination	360,000	23,400	6.5	15,600	67
Total	270,000,000	15,406,950	5.71	12,913,707	84%

* At the 68th meeting, a higher value was reported that included funds used to support the China Household Electrical Appliances Association.

¹⁸ Decision 64/49.

¹⁹ Information provided by the Government of China through UNDP, as the lead implementing agency of the HPMP, on 30 March 2018.

140. At its 69th meeting, the Executive Committee approved in principle stage I of the HPPMP for China,²⁰ at a total amount of US \$95 million (without specifying the funding level of PMU) to meet the freeze and 10 per cent reduction in HCFC production. During the implementation of stage I of the HPPMP, US \$4.75 million was allocated to the PMU, equivalent to 5 per cent of the approved funding in principle, as proposed by the Government in tranche implementation plans and approved by the Executive Committee.²¹ Based on the progress report provided to the 80th meeting, allocation for the PMU has been fully disbursed.

141. At the 76th meeting, stage II of the HPMP for China was submitted for consideration by the Executive Committee. The project contained a description of the institutional arrangements and activities undertaken by the PMU, including categories of cost and their share in the PMU budget, as summarized below (Annex II to the present document describes all the activities undertaken by the PMU):

- (a) Salaries and benefits of permanent staff;
- (b) Salaries and benefits of contractual staff (consultants) hired to help with high workload or special events;
- (c) Travel costs related to HPMP and HPPMP implementation, for meetings and workshops; field visits to enterprises for monitoring and verification, data collection for TA; coordination of implementation agency visits;
- (d) Meetings for coordination with implementing agencies and other stakeholders for project implementation review, bid evaluation, technical consultation, and auditing;
- (e) Consulting service, and translation for project review, financial and technical verification, technical review, bidding evaluation, and any other technical support;
- (f) Building, office equipment and supplies (e.g., power, water, heating, maintenance; computer systems);
- (g) Communication (e.g., telephone, fax mailing, internet); and
- (h) Supporting the operation of industrial associations for data collection and coordination of enterprise-level activities.

142. At its 77th meeting, the Executive Committee approved stage II of the HPMP for China.²² Each sector plan contained in the HPMP was approved for a negotiated value without specifying the funding level of PMU, except for an informal understanding that this would be no more than US \$25 million, excluding the servicing sector that had been approved at the 76th meeting. Based on this total level of funding for the PMU, the Government of China has worked with the bilateral and implementing agencies and developed the budget allocation for each sector plan as shown in Table 2.

Table 2. The PMU budget per sector under stage II of the HPMP for China

Sector	Funds approved in principle (US\$)	Funds allocated to PMU (US\$)	Percentage of PMU	Disbursement by FECO (US\$)
PU	141,471,210	7,371,210	5.21	0
XPS	112,786,630	5,876,630	5.21	117,466
ICR	89,144,797	4,644,797	5.21	557,252
RAC	89,144,797	4,644,797	5.21	243,268*

²⁰ Decision 69/28.

²¹ Decision 72/45(b), 74/56(b) and 75/74(b).

²² Decision 77/49.

Sector	Funds approved in principle (US\$)	Funds allocated to PMU (US\$)	Percentage of PMU	Disbursement by FECO (US\$)
Solvent	47,262,566	2,462,566	5.21	109,600
Servicing	20,290,000	1,520,000	7.49	135,000
Total	500,100,000	26,520,000	5.3	1,162,586

* As of April 2018

Request for reporting activities under the PMU

143. While the progress reports submitted with each tranche request associated with the HPMP provided detail on the funds allocated to investment activities and technical assistance (TA), as well as a description of activities undertaken under the PMUs in each sector, a breakdown of the PMU expenditures have not been provided. Moreover, while the budget allocation for the PMU for the RAC sector was provided to the Executive Committee at the 68th meeting, and the allocation for the PU and XPS foam sectors at the 77th meeting, the budget allocation for the PMU of the ICR, solvent, servicing and national coordination had not been separately provided to the Executive Committee.

144. Similarly, tranche request associated with the HPPMP provided detail on the funds allocated to investment activities and TA; however, a breakdown of the PMU expenditures was not provided. At its 74th meeting, the Executive Committee requested the Government of China, through the World Bank, to provide in future progress reports on tranches a detailed description of the activities conducted by the PMU related to the production sector in the relevant time period and the types and estimates of the costs. In the subsequent progress reports, the Government of China, through the World Bank, highlighted the challenges in reporting a detailed cost breakdown for the PMU for the production sector as the funds for PMU from both the production sector and consumption sectors were pooled together and detailed expenditures for each sector were not recorded separately.

145. At the 80th meeting, the Sub-group on the Production Sector discussed the HCFC production phase out management plan (HPPMP) submitted to the 80th meeting. Several issues were discussed by the Sub-group including issues related to the request for the PMU and the reporting of expenditures associated with it. Further to the report of the Sub-group, the Executive Committee *inter alia* requested the Secretariat to work with the Government of China through UNDP, as the lead implementing agency of the HCFC phase-out management plan (HPMP), and through the World Bank, as the lead implementing agency of the HPPMP, to develop, by the 81st meeting, a financial reporting format for annual PMU expenditures in relation to the production and consumption sectors (decision 80/80).

146. The Secretariat has prepared the following section of the present document pursuant to decision 80/80.

Proposed format for a financial report for PMU expenditures under the HPMP and HPPMP

147. Based on the input provided by the Government of China at the 76th meeting, the Secretariat developed a draft financial reporting format²³ and had substantive discussions with all relevant bilateral and implementing agencies during the Inter-agency coordination meeting.²⁴

148. Subsequently, the Government of China through UNDP proposed an alternate format, as shown in Table 3.

²³ Annex I, MLF/IACM.2018/1/11 <http://multilateralfund.org/implementingagencies/IACM2018-1/default.aspx>

²⁴ Montreal, 6 – 8 March 2018

Table 3. Financial reporting format for the PMU proposed by the Government of China

Cost category	Estimation of annual expenditure (US \$)
Project staff (fixed contract)	
Supporting staff	
Domestic travel	
International travel	
Meetings*	
Consulting service**	
Office operation service and maintenance, utilities	
Computer, internet, post, phone, printing	
Total:	

* Includes numerous small working meetings, coordination meetings, project implementation training. In some of the meetings, the cost will combine some portion of the transportations and daily subsistence allowance of participants. No international meetings would be included in this category.

** Temporary personnel and translation in addition to technical consultants.

149. UNDP clarified that disbursement to the PMU depends on the funding disbursement from agencies to FECO, as well as the project implementation progress. The national implementation modality followed for the implementation of the HPMP and HPPMP allows FECO to manage the overall PMU allocation from all sectors to enhance efficiency and performance. The financial accounting system of FECO follows the law and rule of China, which could not divide PMU cost by sectors and tranches. For example, cost of central services such as financial division, procurement and legal (contract) division, general (operation) affairs division, information technology and others, are managed as a whole and could not be accounted by sectors and tranches.

150. FECO uses the following method to determine the disbursement per sector: After the approval of each tranche of a sector plan, the relevant agency disburses funds to FECO based on milestones identified for each sector, in multiple payments as agreed. These are deposited to a special account established by FECO, from which the allocated PMU cost is disbursed to FECO's own account when substantial progress in each respective sector has been met. As such, the PMU disbursement in each sector is not necessarily equal to the funds disbursed from the agencies to FECO, and may not relate to actual project implementation progress.

151. UNDP further clarified that, in addition to the annual report in Table 3, the Government of China would provide annual expenditures across sectors and stages, and disbursement for the PMU for each sector separately, as part of the tranche implementation reports.

Discussion

152. The Secretariat notes the challenge in developing a methodology to allocate certain shared costs to specific sectors, such as communication (e.g., phone, internet, mailings); building operation, office facilities, computers, equipment and maintenance; and apportioned supporting staff (e.g., financial division, division of contract management, general affairs division). Noting that considerable effort would be required in developing a methodology to allocate such costs transparently, and is unlikely to provide the Executive Committee with relevant new information, the Secretariat therefore concurs with the Government of China not to include it in the reporting template.

153. In contrast, a methodology of apportioning other costs to sectors could be developed. For example, project staff are generally hired to work on one or a limited number of sectors. Similarly, international or domestic travels and meetings are usually planned for specific sectors. Where meetings address several sectors, the participation of the sector-based staff could still be identified. Similarly, a technical consultant undertakes a financial and technical verification for a specific sector. Such costs could then be apportioned by sector. While such reporting may entail additional effort on the part of both the Government the agencies, providing a more detailed report on the disbursements for the PMU would be necessary to ensure fiduciary

responsibility and accountability. This reporting is also consistent with the reporting requirements contained in the respective agreements for the HPMP and HPPMP.

154. The Secretariat further noted that one of the limitations of reporting disbursements for the PMU on a sector basis is the absence of a work and financial plan for the PMU budget allocations that would be the foundation for such expenditure reports. Such a work and financial plan would provide the basis against which the reported expenditures could be compared, facilitating a more efficient reporting process for any financial reporting format that may be agreed.

155. The Secretariat also observed that each bilateral and implementing agency appear to have different reporting requirements for the PMU costs per sector (e.g., one agency requires only a reporting of the overall cost without details, while others may have particular information that needs to be submitted). This inconsistency in reporting PMU costs to the agencies could have implications in the mandatory audited report on income and expenditures that the agencies provide to the Executive Committee through the Treasurer of the Multilateral Fund. There may therefore be a need for agencies to amend their agreements with the Government of China to ensure an appropriate level of detail in reporting on PMU disbursement and expenditures.

156. During the comprehensive discussions on the issue of the PMU, relevant agencies provided additional information on disbursements to the PMUs of sector plans, and some inadvertent inconsistencies with disbursements previously reported, as well as other relevant observations are noted below:

- (a) At the 79th meeting, it was reported a disbursement US \$4.75 million for the PMU for the stage I of the HPPMP as of 1 May 2017. It was subsequently clarified that as of August 2017, US \$4.51 million had been disbursed, and that the last disbursement of US \$240,000 was made in September 2017, bringing the total disbursement to US \$4.75 million as reported the 80th meeting. Similarly, the progress report for the implementation of the first tranche of the RAC sector submitted to the 81st meeting had indicated that US \$243,268 would be disbursed in May 2018; information provided subsequently indicated the disbursement had been made by December 2017; it was subsequently clarified that this disbursement took place after the submission the progress report but before 30 March 2018. More detailed sector-specific reporting may help avoid such inadvertent inconsistencies in the future;
- (b) In line with decision 80/66(d)(i), the Treasurer transferred the second tranche of the stage II of the XPS foam sector to UNIDO and offset the costs associated with the bilateral component by the Government of Germany given the confirmation received by the Secretariat that 20 per cent disbursement threshold of the first tranche of the XPS foam sector had been achieved. The 20 per cent disbursement would not have been achieved absent the reported disbursement to the PMU for the sector, reinforcing the importance of sector-specific reporting;
- (c) As of September 2017, all the funding allocated to the PMU for stage I of the HPPMP had been disbursed. Since that time, the PMU has continued to undertake its (valuable) work notwithstanding that no funds were available. The World Bank clarified that FECO provided its own funding to support the operation of the PMU in 2018, which would be reimbursed once stage II of the HPPMP is approved. This suggests that the level of reimbursement could be determined based on the activities undertaken in the sector; and

- (d) Funds used to support industrial associations may have not been reported consistently, sometimes as technical assistance and other times as part of project management. It has been clarified that the Government considers support to the industrial associations as technical assistance and will henceforth report it as such. This reporting allocation may be of relevance when considering administrative costs.

157. Based on the substantive discussions with bilateral and implementing agencies, the above considerations, and using the financial reporting format for the PMU proposed by the Government, the Secretariat proposed a draft reporting format for the PMU, as contained in Annex I to the present document. This format is proposed to be used for both stage I and stage II of the HPMP and HPPMP, where PMU expenditures would be reported separately for each stage, and the format would be filled by the agencies annually as part of the tranche progress reports.

158. The Executive Committee should note that this format, while prepared in consultation with the relevant implementing agencies and the Government of China, has not been agreed. The Government reiterated that FECO's current financial management system records all expenditures which come from the revenue pool of FECO, so the expenditure of PMU could not be identified and traced back to the specific project management fee, and certainly not further to the annual tranche of a sector plan. Therefore it would be almost impossible to report PMU expenditures by sectors as required in the format proposed by the Secretariat, and therefore the Government of China suggested that the format it had suggested be used.

RECOMMENDATION

159. The Executive Committee may wish to:

- (a) Note the document on the draft financial reporting format for annual project management unit (PMU) expenditures for the HCFC phase-out management plan (HPMP) and HCFC production phase-out management plan (HPPMP) for China contained in document UNEP/OzL.Pro/ExCom/81/29; and
- (b) Request the sector lead implementing agencies to use the financial reporting format for the PMU expenditures contained in Annex I of document UNEP/OzL.Pro/ExCom/81/29 in their annual tranche progress reports;

OR

Request the sector lead implementing agencies to use the financial reporting format for the PMU expenditures contained in Table 3 of document UNEP/OzL.Pro/ExCom/81/29 (under the document on draft financial reporting format for annual PMU expenditures for the HPMP and HPPMP for China) in annual progress reports until the completion of the HPMP and HPPMP;

- (c) Request the implementing agencies to consider whether there is a need to amend their respective agreements with the Government of China with a view to ensure that the financial reporting on PMU expenditures is sufficiently detailed to satisfy their respective financial reporting requirements to the Executive Committee; and
- (d) Request the sector lead implementing agencies to provide as part of future tranche submissions a work plan that describes the PMU activities to be undertaken with allocated budget by activity in the respective sector.

Annex I

FINANCIAL REPORTING FORMAT FOR THE PROJECT MANAGEMENT UNIT EXPENDITURES TO BE INCLUDED IN TRANCHE REQUESTS OF THE CHINA HPMP AND CHINA HPPMP

Stage: _____

Tranche: _____

Content	Value allocated (US \$)	Cumulative expenditure (US \$) as of [DATE]							Secretariat comments
		Production	RAC	PU Foam	XPS Foam	ICR	Solvent	Servicing	
Sector costs									
Project staff									
Domestic travel									
International travel									
Domestic meeting									Costs for venue, equipment rental and other costs
International meetings									Please specify which meeting and number of participants
Consulting service									Consulting institutions and experts hired for project evaluation, financial and technical verification, technical review, bidding evaluation, technical support etc. Would also include contractual staff to help with high workload or special events, such as meetings, exhibitions and workshops, as well as translation-related costs
Sub-total sector costs									
Shared costs									
Supporting staff									Costs associated with apportioned supporting staff e.g., financial division, division of contract management, general affairs division, and other relevant divisions
Computer, internet, post, phone, printing, etc.									
Office operation service and maintenance, utilities									
Total									

Annex II

DESCRIPTION OF ACTIVITIES CARRIED OUT BY THE PROJECT MANAGEMENT UNIT

1. The activities undertaken by the project management unit (PMU) can be categorized in the following groups:
 - (a) Policies and regulations development and enforcement;
 - (b) Coordinating and managing investment projects;
 - (c) Coordinating and managing technical assistance (TA) activities;
 - (d) Coordinating and organizing publicity, education and capacity building;
 - (e) HPMP and HPPMP coordination and management;
 - (f) Procurement of equipment and services; and
 - (g) Financial management.

Policies and regulations development and enforcement

2. The PMU supports the implementation of the licensing and quota system for production, import and export of HCFCs; the ban on the establishment/expansion of new HCFC production and manufacturing capacities; manages HCFC production for feedstock use to prevent direction to controlled use; establishes standards for alternatives including flammable refrigerants; and other legal documents for supporting good practices and management of ODS.

3. The development of policies and regulations to support the HCFC phase-out takes several stages, from draft development, public consultation, expert review to final issuance, and often involves many industrial stakeholders and Government departments. The PMU is responsible for the development of draft regulations, technical review, debate within industries and expert review for submission to the Ministry of Environmental Protection (MEP). The institutional strengthening team then takes over from there to further conduct legal review, wider scope public consultation, coordination with other Governmental departments, and submission for final approval.

4. The costs incurred in these activities include staff salary and associated office cost, travel, coordination meetings, expert services/consultant and public consultation.

Coordinating the implementation of investment projects

5. The closure of HCFC production lines and/or production quota reduction and conversion of manufacturing capacity consuming HCFCs are realized through investment projects. The implementation modality in China uses bidding processes to select the most cost-effective investment projects for funding. It usually takes several steps before a project is selected for funding, which include distributing information on alternative technologies and funding policies to mobilise enterprises to participate; developing project implementation manuals as a guide for enterprises seeking funding support from the Multilateral Fund; developing bidding documents; screening project proposals received; field verification of the beneficiary enterprises; technical evaluation of projects by experts; and preparing and signing the contracts between the Foreign Economic Cooperation Office (FECO) and the beneficiary enterprise. For projects that

showcase alternative technologies or products, the PMU also develops project concepts and prepares project proposals.

6. After the signing of contracts, training workshops are provided to enterprises to understand the requirements of project implementation, including procurement rules, funding disbursement, verification of progress milestones and final commissioning. Detailed work plans with milestones are developed and the process is closely monitored and independently verified according to milestones before payments are made.

7. A total of 21 contracts in the production sector and over 130 contracts in the consumption sectors were signed and implemented in stage I; more projects will be implemented in stage II.

8. The costs incurred by the PMU in managing and coordinating investment projects are similar to developing policies and regulations and enforcing them, plus training workshops for enterprises, independent verification services, and financial audits.

TA activities

9. The activities undertaken by the PMU include identifying the needs for TA, preparing terms of reference, bidding and selecting TA services, preparing contracts, monitoring implementation, review draft and final reports, and dissemination of TA results.

10. The PMU costs associated with this activity are the same as those in developing policies and regulations, as well costs related to TA project design, review of reports and dissemination of results.

Public awareness raising and capacity-building activities

11. The PMU directly conducts or coordinates various public awareness raising activities to disseminate information on sector phase-out plans, control targets, policies and regulations, to promote environmentally friendly alternatives and their market adoption, raising awareness in ODS phase-out and climate change. In stage I, the PMU conducted a series of awareness raising activities, including technical seminars on a regular basis to disseminate information on alternative technologies; issuance of environmentally friendly and low-global warming potential label to refrigeration and air-conditioning equipment; organization of climate friendly technology road show and exhibition and international workshops in the industrial and commercial refrigeration and air-conditioning sector; organization of R-290 procurement event. The PMU also conducted capacity building for local environmental protection bureau on policy and compliance issues, and organized national ozone day celebrations.

12. The costs incurred by the PMU are similar to developing policies and regulations and enforcing them.

Project coordination, monitoring and reporting

13. The PMU works with relevant bilateral and implementing agencies and develops detailed project implementation plans for each sector, including project implementation approach, funding allocation, disbursement milestones, procurement management, monitoring and verification. Contracts between bilateral and implementing agencies and the PMU are signed for each tranche.

14. Tranche implementation plans are developed for approval by the Executive Committee. Projects in each tranche are monitored and progress reports are submitted to the Executive Committee through bilateral and implementing agencies. Except for reports to the Executive Committee, the PMU also prepares quarterly or half-year reports for the agencies to meet their specific reporting requirements; coordinates

agencies' field monitoring visits to discuss the implementation progress and issues in implementation; coordinates the approval of procurement plans and disbursement plans; coordinates the audit of agencies and the Government; arranges the annual financial audit and submits the report to the Executive Committee. The PMU also coordinates with industrial associations to conduct training, awareness-raising, disseminate policies, promoting technologies, technical workshops, and annual sector implementation meetings, etc.

15. The cost incurred by the PMU in coordination are similar to developing policies and regulations and enforcing them.

Financial management

16. The financial division is responsible for managing, monitoring and maintaining all the accounting records for projects. Detailed activities include: reviewing the project funding allocation plan and project approval procedure; maintaining all the accounting records for projects; receiving funding from bilateral and implementing agencies; reviewing funding disbursement applications and disbursing funds to final beneficiaries; conducting financial review when commissioning projects; and coordinating financial audits of the project expenses. The division makes approximately 300 disbursements each year.

17. The cost of the financial department is mainly staff and the associated operational costs (office and supplies).

Procurement services

18. The contract division is responsible for procurement-related matters. The detailed activities include developing and maintaining procurement procedures and standard documents for bidding; evaluating procurement capacity of beneficiary enterprises; reviewing project proposals, work plans and implementation programme to ensure sound procurement; reviewing bidding invitations; receiving bidding proposals; organizing procurement committee meetings; reviewing bidding evaluation documents; monitoring the contract implementation; reviewing and recording contracts, participating in project verification and commissioning; and providing legal support to project implementation. The finance and procurement departments are supporting departments for all the sector plans and other projects outside of Montreal Protocol. Their costs are shared by all the projects.

19. The cost incurred by the PMU in procurement services include staff and the associated operational costs (office and supplies), travel for field visits and meetings.