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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Sixty-second Meeting
Montreal, 29 November - 3 December 2010

PROJECT PROPOSALS: NIGERIA

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

Phase out

- HCFC phase-out management plan (stage I) UNDP and UNIDO

Refrigeration

- Demonstration project to validate the trans-critical CO₂ refrigeration technology for application to ice-block makers at Austin Laz Japan

PROJECT EVALUATION SHEET – MULTI-YEAR PROJECTS

Nigeria

(I) PROJECT TITLE	AGENCY
HCFC phase-out management plan (stage I)	UNDP (lead), UNIDO

(II) LATEST ARTICLE 7 DATA	Year: 2009	370.0 (ODP tonnes)
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(III) LATEST COUNTRY PROGRAMME SECTORAL DATA (ODP tonnes)						Year: 2009			
Chemical	Aerosol	Foam	Fire fighting	Refrigeration		Solvent	Process agent	Lab Use	Total sector consumption
				Manufacturing	Servicing				
HCFC-123									
HCFC-124									
HCFC-141b		53.0		80.6					133.6
HCFC-142b									
HCFC-22				65.6	170.8				236.4

(IV) CONSUMPTION DATA (ODP tonnes)			
2009 - 2010 baseline (estimate):	407.4	Starting point for sustained aggregate reductions:	407.4
CONSUMPTION ELIGIBLE FOR FUNDING (ODP tonnes)			
Already approved:	0.0	Remaining:	-0.1

(V) BUSINESS PLAN		2010	2011	2012	2013	2014	Total
UNDP	ODS phase-out (ODP tonnes)	4.2	4.2	4.5	4.5	0.1	17.6
	Funding (US \$)	372,472	372,472	398,421	398,421	10,380	1,552,166
UNIDO	ODS phase-out (ODP tonnes)	0.0	6.0	0.2	0.2	0.2	6.7
	Funding (US \$)	0	1,569,111	58,076	58,076	58,076	1,743,340

(VI) PROJECT DATA			2010	2011	2012	2013	2014	Total
Montreal Protocol consumption limits (estimate)			n/a	n/a	n/a	407.4	407.4	
Maximum allowable consumption (ODP tonnes)			n/a	n/a	n/a	407.4	407.4	
Project costs requested in principle(US \$)	UNDP	Project costs	855,603	836,515	768,541	700,183	725,908	3,886,750
		Support costs	64,170	62,739	57,641	52,514	54,443	291,507
	UNIDO	Project costs	550,000	550,000	1,340,900	1,133,136	945,400	4,519,436
		Support costs	41,250	41,250	100,568	84,985	70,905	338,958
Total project costs requested in principle (US \$)			1,405,603	1,386,515	2,109,441	1,833,319	1,671,308	8,406,186
Total support costs requested in principle (US \$)			105,420	103,989	158,209	137,499	125,348	630,465
Total funds requested in principle (US \$)			1,511,023	1,490,504	2,267,650	1,970,818	1,796,656	9,036,651

(VII) Request for funding for the first tranche (2010)			
Agency	Funds requested (US \$)	Support costs (US \$)	ODS phase-out (ODP tonnes)
UNDP	855,603	64,170	12.3
UNIDO	550,000	41,250	7.9

Funding request:	Approval of funding for the first tranche (2010) as indicated above
Secretariat's recommendation:	For individual consideration

PROJECT DESCRIPTION

1. On behalf of the Government of Nigeria UNDP, as the lead implementing agency, has submitted to the 62nd Meeting of the Executive Committee an HCFC phase-out management plan (HPMP) at a total funding level of US \$8,406,186 plus support costs of US \$630,465 for the Stage I of the plan until the year 2015. Nigeria consumes both HCFC-22 and HCFC-141b. Funding for the first tranche is requested at a level of US \$1,405,603 plus support costs. The original funding request for the overall plan had been at a level of US \$13,598,400 plus support costs.

2. The HPMP for Nigeria aims at enabling the Government to meet its Montreal Protocol obligations for HCFC phase-out. This submission is specifically focused on Stage I of the HPMP and foresees actions required to meet the 2013 freeze at the baseline level, and the 10 per cent baseline reduction in 2015. Historically, ODS and specifically HCFC consumption has occurred in the foam, refrigeration and air conditioning manufacturing, as well as in the refrigeration and air conditioning servicing sectors. This HPMP will address all of these sectors. Information regarding the long-term strategy of Nigeria was included with the proposal aiming at compliance with the Montreal Protocol and complete elimination of HCFC consumption by 2030. The HPMP estimates the baseline to be 407.4 ODP tonnes, based on 2009 data and a growth of 10 per cent for 2010. The baseline was also selected as a starting point.

Background information

3. Nigeria is located in Western Africa on the Gulf of Guinea and is a federal constitutional republic. With an estimated population of 155 million it is the most populous country in Africa. The economy of Nigeria is one of the fastest growing in the world, with the International Monetary Fund projecting a growth of 9 per cent in 2008 and 8.3 per cent in 2009.

4. In 1988, Nigeria ratified both the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer. Nigeria also ratified the London, Copenhagen and Montreal Amendments to the Protocol on 23 July 2001 and the Beijing Amendment on 26 February 2004.

5. Since becoming a party to the Montreal Protocol Nigeria has largely relied on the existing regulations. Under the HPMP preparation it was decided to update legislation in order to strengthen its existing legal framework with the focus on the control of the ODS (including HCFC) export, import and other related issues that will contribute to the successful HCFC phase out. The relevant act was drafted and is now under review to be further presented to the National Assembly in 2011. The act specifically foresees a series of penalties for infringement and will also address the consequences of converting HCFC-consuming enterprises in phases. There are also ODS regulations, effective January 2010 and already operational, that include a total ban on CFCs and some control measures on other ODS including HCFCs entering the country.

6. The National Ozone Office (NOO), established within the Federal Ministry of Environment is responsible for coordinating the activities for the implementation of the Montreal Protocol. The Ozone Programme Implementation and Management Unit (OPIAMU) is an administrative unit created by the Government and UNDP to support implementation of the National CFC phase-out plan (NPP). Other governmental institutions are also involved in the implementation of the Montreal Protocol, such as the National Agency for Food and Drug Administration (NAFDAC) and the National Customs Service (NCS).

7. Nigeria has received funding for implementation of 80 investment projects in 200 enterprises with the total value of US \$28,443,506 that lead to the phase-out of 5,762 ODP tonnes of ODS. This was achieved through a number of individual investment projects in foam, refrigeration and solvent sectors with the total value of US \$15,312,722 and a NPP with the total value of US \$13,130,784. There are 19 enterprises in refrigeration that were converted to HCFC-141b. During the second stage of the NPP (2008-2009) a curriculum was developed and approximately 6,000 technicians were trained. Over one hundred refrigerant identifiers were distributed to the relevant agencies and 750 customs officers trained. The HPMP also contains lessons learned from the NPP that are to be taken into account for the HCFC phase out.

HCFC consumption

8. Nigeria does not produce nor export HCFC, therefore its consumption is equal to its import. Table 1 shows HCFC consumption during the last five years, as reported under Article 7. The information related to HCFC-141b in pre-mixed polyols is only available since 2009, as before this date this information was not recorded, but a survey contained the 2008 data and was included in the following Table 1:

Table 1 - Annual HCFC consumption 2005 to 2009

Substance	2005		2006		2007		2008		2009	
	ODP	MT	ODP	MT	ODP	MT	ODP	MT	ODP	MT
HCFC-22	31.5	572.7	35.8	650.9	96.0	1,745.5	219.0	3,981.8	236.4	4,298.2
HCFC-141b	0.0		0.0		0.0		77.0	700	85.0	772.7
HCFC-141b in pre-mixed polyols							30.1*	273.6*	48.6	441.8

*Not reported under Article 7

9. In the manufacturing sectors, 196 companies are identified of which 25 are in the foam sector, using HCFC-141b, and 171 in the refrigeration and air conditioning sector using HCFC-141b and HCFC-22. The HPMP indicates that all 25 companies in the foam sector were established prior to the cut-off date, and presents 2007-2009 consumption figures for each company and products manufactured at each of them. HCFC-141b consumption for the foam sector in 2009 is estimated to be 407 mt (44.9 ODP tonnes). There are 162 companies in refrigeration manufacturing and nine companies in air conditioning manufacturing, all of which were established before the cut-off date. The total HCFC consumption for this sub-sector to be phased out is estimated to be 577.8 mt (31.8 ODP tonnes) of HCFC-22 and 310.2 mt (34.1 ODP tonnes) of HCFC-141b in 2009. To assess the HCFC consumption in the servicing sector, a survey was conducted in four main-use sectors: domestic, commercial, mobile and industrial. The survey showed that there are currently 40,000 room air conditioning service technicians/practitioners registered with the Nigeria Association of Refrigeration and Air Conditioning Practitioners (NARAP). As to the second-stage conversion, ten companies in the foam sector were previously funded by the Multilateral Fund for CFC conversion to HCFC-141b and 19 companies in the domestic and commercial refrigeration sub-sectors were also assisted to convert to HCFC-141b and HFC-134a.

10. In the HPMP it is pointed out that an estimation on growth, in particular in the foam sector, is difficult to provide due to the import of pre-blended polyol; the HPMP therefore estimates growth based on information obtained during a bottom-up survey. The results of these surveys show that growth of HCFC consumption over the last few years would have been over 20 per cent, most likely also related to ongoing replacement of CFCs in service applications. The HPMP recognises that the current growth should taper off at an assumed level of twice the GDP growth which, according to the HPMP is customary for consumer and small commercial refrigeration and air conditioning equipment in developing nations. In Nigeria, the annual gross domestic product growth rate is about 6 per cent in recent years, leading to an assumed long-term growth of around 10 per cent for the coming years on a business-as-usual scenario.

Table 2 - HCFC consumption 2005-2012 and allowable consumption post-2013

Year	HCFC (ODP tonnes)		
	HCFC-22	HCFC-141b	Total HCFC
2005	31.5	0	0
2006	35.8	0	
2007	96	0	
2008	219.04	77.0*	326.1
2009	236.4	133.6**	370.0
2010***	283.7	161	444.7
2011***	312.1	177.1	489.2
2012***	343.3	194.8	538.1
2013***	260.1	147.6	407.7
2014***	260.1	147.6	407.7
2015***	234.1	132.8	366.9
Baseline***	260.0	147.3	407.4

*plus 30.1 ODP tonnes of HCFC-141b in preblended polyols

** includes already 48.6 ODP tonnes of HCFC-141b in preblended polyols

*** estimates

Strategy and plan for the HCFC phase-out

11. The HPMP presents the main principles of Nigeria's overall strategy up to the year 2040, but is specifically focused on the actions required to achieve the immediate phase-out targets of a 2013 freeze at the baseline level, and for 2015 the subsequent 10 per cent reduction in the baseline. There are four main strategic lines that the HPMP follows: phase-out of HCFC-141b in the polyurethane foam sector; conversion of companies in the commercial refrigeration and air conditioning manufacturing sector, where HCFC-22 is used and some of which use HCFC-141b; refrigeration and air conditioning servicing sector and project monitoring. These strategic lines are also outlined in Table 3. During the first phase of the implementation (up to 2015) all of the companies in the foam sector will be addressed as a first priority except spray-foam companies which will be part of the second stage. The consumption of HCFC-141b related to foam blowing in the companies in the commercial refrigeration sector, and the consumption of HCFC-22 in the air conditioning manufacturing sector will be addressed during Stage I. In the following stage, the consumption of HCFC-22 in the commercial refrigeration manufacturing sector will be addressed. A demonstration project to assess a new technology for that sector has been submitted by Japan to the 62nd Meeting, and the results of that demonstration project will be useful to plan the related activities for the second phase. Activities in the servicing sector and project management and related activities are to be implemented in all of the stages.

12. In the foam sector, of the 25 companies identified, 13 are manufacturers of spray foam, seven in thermoware, two in sandwich panels, two in ice makers and cold rooms and one in moulded automotive components. The first stage foresees five sub-projects in the foam sector. The HPMP contains a detailed description of available alternative technology in the sector and suggests the use of methyl formate as the most cost-effective HCFC replacement for most of the companies in the sector. As the technology is not available in Nigeria, the first sub-project is aimed at upgrading two system houses at Vitafoam and Komaj for supply of methyl formate-based systems. The second sub-project covers thermoware and sandwich panel companies converted to methyl formate technology. The third and final sub-project will address the spray foam sector and is foreseen for the third stage.

13. In the commercial refrigeration and air conditioning manufacturing sectors, the overall HPMP foresees three components:

- (a) HCFC-141b phase-out in foam blowing uses in the commercial refrigeration equipment manufacturing sub-sector. In this sector 171 companies were identified, of which the HPMP will address 140 during Stage I. The alternative for technologies for Stage I for foam blowing are water blown foam and methyl formate;
- (b) HCFC-22 phase-out in the air-conditioning equipment manufacturing sub-sector, with HFC-410A as the main replacement technology; and
- (c) HCFC-22 phase-out in the commercial refrigeration equipment manufacturing sub-sector, to be replaced by HFC-410A, HFC-407C, HFC-134a and HFC-404A. This component is only foreseen for the second stage.

14. The main component for the activities in the servicing sector is an activity to establish a production facility for locally produced refrigerant-grade hydrocarbons at Pamaque, for a total of US \$869,000. Other activities for the service sector include: regulatory measures; training of customs officers; technicians training in good practices and other sector specific training; the incentives programme, regeneration and bottling project¹ to strengthen about 26 existing recovery and recycling regeneration and/or storage centres; and an awareness programme. The replacement technology options for the servicing sector is presented and discussed. As to the regulatory measures, the act expected for approval in the National Assembly, as mentioned in para. 5, is the key legislative instrument for HCFC control. Other regulatory measures such as control over HCFC-containing equipment and a control system for trade, use and handling of HCFCs are also foreseen.

15. The Project Management Unit (PMU) of the NPP will be replaced by a PMU for the HPMP. The PMU will be supervised by the National Ozone Officer, and also assist the National Ozone Unit in the monitoring of the implementation of activities under the Plan.

16. The strategic lines referred to in para. 11 are also outlined in Table 3, presenting the budget for Stage I.

¹ The bulk entry of refrigerant gases will be the only allowed method of entry into the country. Hence a demonstration project is foreseen to permit importers to transfer these bulk amounts into smaller reusable cylinders and canisters.

Table 3 – Budget for strategic lines for Stage I

Line of action	Components of activity	Agency	Project cost (US \$)	Phase-out associated (MT)
Foam sector programme (excluding enterprises using HCFC 22 which belong to Stage II)	Supply of foam systems; upgrade of 2 local systems facilities for supply of fully formulated systems with methyl formate and/or methylal for RPF applications; 2 group projects (enterprises) to phase-out HCFCs in thermoware applications and miscellaneous applications; support for a manufacturer of integral skin foam	UNDP	1,950,750	412.8 MT of HCFC-141b
Refrigeration and air conditioning manufacturing programme (RACM)	Sub-sector plan for foam blowing in the commercial refrigeration equipment manufacturing sub-sector (complete sector)	UNIDO	1,759,080	310.2 MT of HCFC-141b
	Sector phase-out plan to phase out R-22 in the air-conditioning sector, 10 enterprises (complete sector)	UNIDO	2,760,356	577.8 MT of HCFC-22
	Sub-total		4,519,436	
Refrigeration and air conditioning servicing programme (RACS)	Activity for HC production (Pamaque)	UNDP	869,000	295.3 MT of HCFC-22
	Regulations: control system for products & equipment containing HCFCs and ODSs	UNDP	20,000	
	Regulations: implementation of a control system for the trade, use and handling of HCFCs	UNDP	20,000	
	Servicing: training in good practices in refrigeration and retrofits.	UNDP	100,000	
	Servicing: sector specific training, including demonstration for the refrigeration sector.	UNDP	145,000	
	Servicing: regeneration & canisterization project	UNDP	105,000	
	Sensitization: sensitization campaigns	UNDP	70,000	
	Sub-total		1,329,000	
Project coordination, management and sensitization programme	Personnel	UNDP	300,000	134.9 MT of HCFC-22
	National consultants	UNDP	100,000	
	International consultants	UNDP	100,000	
	Office and other equipment, maintenance	UNDP	20,000	
	Travel	UNDP	40,000	
	Communications & miscellaneous	UNDP	47,000	
	Sub-total		607,000	
Total			8,406,186	1,731 MT of HCFC

2011 annual implementation programme

17. The 2011 implementation programme foresees a number of activities to be implemented with a total budget of US \$1,405,603. In the foam sector two system houses, Vitafoam and Komaj, will be upgraded to start-up supply of fully formulated systems with methyl formate. A sub-programme for HCFC-141 phase-out in the commercial refrigeration equipment manufacturing and another sub-programme for HCFC-22 phase-out in the air-conditioning equipment manufacturing will be

launched. A number of activities will be implemented in the refrigeration and air conditioning servicing sector: individual project for HC production (Pamaque) will be launched; regulatory measures will be taken to strengthen the National Customs Service, develop standards for the generation, storage, transport, treatment and recycling of ODSs and to establish control over the HCFC-containing equipment; training in good practices and demonstration training will take place; the incentives programme as well as the regeneration and bottling project will start and monitoring activities are also foreseen.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

18. The Secretariat raised a number of questions with UNDP as the lead agency for the HPMP. These questions were related to the manufacturing enterprises and components of the originally submitted HPMP, with an associated request of US \$13,598,400, the baseline and starting point and the recent consumption, the status of the licensing system, as well as the cost and issues related to the draft agreement.

19. The original submission included more elements than presented above; in particular, it was intended to carry out a demonstration project for the application of super-critical CO₂ for spray foam in Nigeria, to be implemented by the Government of Japan. The Secretariat advised the lead agency and, through UNDP, the Government of Japan about decision 60/29, where the Executive Committee decided to approve a demonstration project to validate the use of super-critical CO₂ in the manufacture of sprayed poly-urethane rigid foam in Colombia for implementation by the Government of Japan, on the understanding that the project was approved on an exceptional basis and would be the final and only validation project for super-critical CO₂ technology in the manufacture of sprayed poly-urethane rigid foams. Subsequently, this component of the HPMP was withdrawn. The original submission also foresaw a follow up for this particular demonstration project through UNDP where, in the latter years of Stage I, a broad base effort to phase-out HCFC-141b in the sprayed foam sub-sector was intended. UNDP agreed to remove this activity from Stage I. The country will evaluate jointly with UNDP whether they want to present this activity in the potential Stage II for the period beyond 2015.

20. The original submission also included a component related to the phase out of HCFC-22 as a refrigerant in the commercial refrigeration sub-sector; the same sector is already being targeted by the HCFC-141b phase-out plan for insulation of appliances. The Secretariat agreed with UNDP and UNIDO that this component would be withdrawn and resubmission would be considered for Stage II. Finally, the Government of Japan submitted a "demonstration project to validate the trans-critical CO₂ refrigeration technology for application to ice-block makers at Austin Laz, Nigeria", referred to also in para. 11 above. This project is not an integral part of the HPMP and is discussed in a separate part of this document.

21. The Secretariat requested additional information regarding enterprises undertaking a second conversion as part of this project. It pointed out that from a total of 1,720 tonnes of CFC-11 that had been phased out with the assistance from the Multilateral Fund, only 79.3 ODP tonnes were converted to HCFC-141b. UNDP confirmed that this figure is correct and pointed out that most foam enterprises were flexible box foamers that were converted from CFC-11 to methyl chloride. The agency further pointed out that the original phase out of CFC-11 in those enterprises was only 38 ODP tonnes, and that therefore a figure of 79.3 ODP tonnes may be reasonable taking into account the increase in consumption of those enterprises. The Secretariat questioned further the necessity of inclusion of enterprises undertaking a second-stage conversion in the HPMP and requested sufficient demonstration that such projects are necessary to comply with the control targets as requested by decision 60/44(b)(i). UNDP advised that, when excluding second-stage conversion, the remaining consumption of HCFC-141b would account for only 26 per cent of the aggregated consumption. UNDP also pointed to the priority that HCFC-141b projects should receive, given that their phase out contributes in ODP tonnes twice as much as the

phase-out of HCFC-22. The Secretariat requested further information on the foam sector and a number of clarifications on costs both of equipment as well incremental operating cost.

22. UNIDO provided further substantive information regarding the ten manufacturers of air conditioners, all of which are covered in the air conditioning manufacturing sector plan. These ten companies are assembling and charging pre-manufactured kits from different manufacturers. UNIDO provided detailed information regarding the amount of equipment manufactured and sold and the HCFC-22 use related. UNIDO also provided information about the baseline equipment of the enterprises. Finally, a number of technical requests from the Secretariat were addressed by UNIDO.

23. UNDP included in the activities for the servicing sector one for the production and safe use of hydrocarbons in refrigeration servicing applications in Nigeria. This activity predominantly consists of the design, construction and start-up of a pilot distillation and bottling unit for hydrocarbon refrigerants from locally produced liquid petrol gas (LPG). The costs include the construction of the pilot hydrocarbon refrigerant facility, trials, testing and certification, field testing of the refrigerant produced, the design testing and certification of conversion kits for manufacturing and servicing, technical support as well conversion of kits for 65 companies in the manufacturing assembly sector and 100 servicing practitioners. It also foresees the organization of workshops on the safe use and handling of HCs. The demonstration activities are centered around Pamaque Nigeria Ltd. in Lagos, which is a Nigerian-owned engineering company. UNDP also informed that the beneficiary will have to add approximately US \$200,000 to the budget for the pilot phase described here, while subsequently a further US \$1 million would be invested to expand production to a commercial level. In view of the demonstration aspect of this activity and the uncertainties connected with the introduction of a locally refined hydrocarbon refrigerant into the market, the contribution from the Multilateral Fund would be needed. UNDP pointed out further that the activities in the servicing sector, to which this would be attributed, would benefit greatly from the availability of affordable hydrocarbons for servicing. The hydrocarbon availability would support an environmentally friendly technology, at the same time eliminating possible abuse of LPG for servicing of refrigeration equipment. This is an irresponsible practice which will not only damage the equipment but also, due to the unrestricted availability of this technology, leads to subsequent dangers through safety issues associated with LPG in combination with lack of awareness, training and adequate equipment. The Secretariat found that this particular issue might require the consideration of the Executive Committee.

24. The Secretariat requested further explanations regarding the eight-fold increase in HCFC consumption between 2006 (35.8 ODP tonnes) and 2008 (296.2 ODP tonnes). The Secretariat noted that reporting of imported pre-blended polyols containing HCFC-141b is unlikely to be responsible for the increase in 2008 since this use has only been subsumed into Article 7 data from 2009 onwards. UNDP advised that the data for 2006 was established before the import record system had been fully computerized in 2008, which this might have resulted in a more comprehensive data capture. The Secretariat further noted that in order to meet the 2013 and 2015 phase-out targets, the Government of Nigeria is proposing to phase out 1,731 mt (135.0 ODP tonnes). This amount is equivalent to 33 per cent of the HCFC baseline estimated in the HPMP (407.4 ODP tonnes) or 39.5 per cent of the HCFC baseline used in the 2010 to 2014 consolidated business plan noted by the Executive Committee at its 61st Meeting (342.1 ODP tonnes). This figure had been calculated using the consumption level reported in the 2009 country programme reporting and using a 20 per cent growth rate between 2009 and 2010 and 10 per cent for each year 2011 and 2012. UNDP advised about the significant growth rates in the different sectors, for example up to 35 per cent in commercial refrigeration manufacturing, and maintained that these estimates appear broadly correct. Under another topic in the HPMP, UNDP also points out that the one-time effect of CFC phase out might have increased the HCFC consumption in Nigeria over the last years. This would suggest that the growth in future years would be lower.

25. In 2009, HCFC-141b consumption in Nigeria was 1,214.5 mt (133.6 ODP tonnes), equivalent to 36 per cent of the total consumption of HCFCs in the country. Accordingly, Nigeria might be able to meet the 2015 control target by addressing only the consumption of HCFC-141b in the foam sector. However, the Government is proposing to phase-out 79.3 ODP tonnes in foam manufacturing; foam manufacturing takes place both in the foam sector as well as in the sub-sector of commercial refrigeration equipment manufacturing. Further activities are to be undertaken in the servicing sector and project management that are calculated to achieve a phase-out of 23.7 ODP tonnes. Finally, the conversion of HCFC-22 in the air conditioning sector is undertaken with an impact of 31.8 ODP tonnes. In decision 59/11, the Committee requested HCFC-141b phase-out projects to be submitted as a priority to enable compliance with the 2013 and 2015 control measures, and to consider projects for HCFCs with ODP lower than HCFC-141b, where national circumstances and priorities required their submission. UNDP pointed out that the country wishes to pursue aggressive and comprehensive measures to avoid increased use of HCFC. This strategy requires that activities be conducted for all consumption sectors and sub-sectors. This decision is based on an in-depth analysis of three different phase-out approaches, mainly manufacturing only, servicing only, and a combination of the two. Stakeholders demanded that efforts be undertaken to assist all sub-sectors to provide a level playing field, and at the same time maintain momentum to ensure that previous efforts are not lost. This information provided by UNDP is also at the core of the argument related to the Secretariat's questions regarding the demonstration that Nigeria requires assistance in the refrigeration servicing sector to comply with the 2013 and 2015 control targets.

26. The Secretariat also expressed concern regarding the specific ways, documented in previous verification reports, in which Nigeria has implemented its licensing system and whether this would be effective to ensure compliance with the 2013 and 2015 control measures. In this regard, the Secretariat also noted that the description of the legislative measure is predominantly historical, and that it does not reflect recent efforts to address the known concerns regarding the particular situation of the licensing system. UNDP and the Secretariat agreed to make the submission of the third tranche in 2012 of the HPMP depended on the existence of a functioning licensing/quota system encompassing HCFCs. The functionality of that licensing/quota system is expressed in its ability to control the imports of, in particular, HCFCs into the country to a level predefined by the quota. The verification report for the third tranche will include the related information.

27. Nigeria is presently importing HCFC-141b contained in pre-blended polyols. The related imports have, since 2009, been accounted for as consumption in the Article 7 data reported. Consequently, according to decision 61/47, this consumption is eligible for assistance. In 2009, the amount of HCFC-141b contained in pre-blended polyols was 441.8 mt (48.6 ODP tonnes).

Adjusted 2010-2014 business plans

28. UNDP and UNIDO are requesting US \$8,406,186 plus support costs for meeting the 10 per cent reduction in HCFCs by 2015. The total value requested for the period 2010-2014 is US \$4,631,596 above the total amount in the adjusted business plan. The difference in the figures is related to the high amount of phase-out of HCFC foreseen in the first stage of the HPMP, that Nigeria believes is necessary to comply with the 2015 reduction step. Regarding the submission of this particular HPMP, four business plan entries had been registered. According to the business plan, the following funding would be available for the years 2010 until 2014, as shown in Table 4. This table sets out both the aggregated figures from the business plan for those years as well as the funding requirement of the HPMP for Nigeria as submitted.

Table 4 – Business plan figures and proposed funding levels
for the HPMP for 2010 to 2014

	2010	2011	2012	2013	2014	Total (US \$)	ODS phase- out (ODP tonnes)
Funding request (US \$)	1,405,603	1,386,515	2,109,441	1,833,319	1,671,308	8,406,186	-
Business plan (US \$)*	346,490	2,443,120	448,650	448,650	87,680	3,774,590	-
Aggregated funding request (US \$)	1,405,603	2,792,118	4,901,559	6,734,878	8,406,186	-	134.97
Aggregated business plan (US \$)	346,490	2,789,610	3,238,260	3,686,910	3,774,590	-	24.3

* Without support cost

29. The Secretariat and UNDP agreed on a funding schedule for the years 2010 and 2011, which is aggregated no greater than the aggregated allocation in the business plan for these two years. The remaining funding has been distributed to the years 2012 and 2014 with the last tranche covering 20 per cent of the overall funding level in 2014. The submission of this last tranche to the last meeting in 2014 would take place after the Article 7 data would be due in respect of the first control measure is due in September 2014, covering the year 2013. The funding request is noted to be more than two times higher than the business plan allocation for Nigeria. However, at the same time, the project has extraordinarily good cost-effectiveness at below US \$5 per kilogramme. This is partially due to the excellent cost-effectiveness achieved in the foam sector, and partly also to the cost effective phase-out project in the air conditioning sector. The business plan foresaw a phase out until 2014 of 24.3 ODP tonnes. The project as proposed will achieve a phase out of almost 5.5 times above the business plan value with 134.9 ODP tonnes. At this point in time, the Executive Committee has not provided clear guidance as to the level of phase out to be funded under the first stage of an HPMP. Nigeria, based on its growth projection, is of the opinion that a phase-out of this magnitude is necessary for the country to comply with the 2015 10 per cent reduction step.

30. A number of activities have already been foreseen for the second stage of the HPMP, such as phase out in the spray foam sector presently using HCFC-141b as a foam blowing agent, and the phase-out of HCFC-22 as a refrigerant in the commercial refrigeration sub-sector. However, a very significant effort will have to be taken in the refrigeration servicing sector, which will have a significantly larger share of HCFC consumption in the country by 2015.

31. Based on the discussion reported above, and on the template provided by the Executive Committee, UNDP has submitted on behalf of Nigeria a draft agreement which is contained in Annex I to this document. It also contains the starting point for sustained aggregated reduction, which Nigeria set at the estimated baseline, 407.4 ODP tonnes, based on the reported 2009 consumption and the country's estimate for 2010. Nigeria agrees that this starting point as well as the phase-out schedule in the agreement can be adjusted depending on the final figure for the HCFC baseline for Nigeria, to be determined by the Ozone Secretariat in accordance with Article 7 consumption data for 2009 and 2010 reported by the Government of Nigeria.

RECOMMENDATION

32. The HPMP for Nigeria is submitted for individual consideration. The Executive Committee may wish to consider:

- (a) Noting with appreciation the submission of Stage I of the HCFC phase-out management plan (HPMP) for Nigeria to achieve the phase-out of 134.97 ODP tonnes of HCFC at a cost of US \$8,406,186;
- (b) Noting that the Government of Nigeria agreed to establish as its starting point for sustained aggregate reduction in HCFC consumption the estimated baseline of 407.4 ODP tonnes calculated using actual consumption reported in 2009 and estimated 2010 consumption, and that these values would be modified depending on the level of the baseline consumption determined by the Ozone Secretariat;
- (c) Whether to approve the HPMP Stage I with the related phase-out of 134.97 ODP tonnes, with the main objective to ensure that Nigeria can comply with the 2013 and 2015 control measures of the Montreal Protocol;
- (d) Whether to include in the HPMP a component for the “production and safe use of hydrocarbons in refrigeration servicing applications in Nigeria”;
- (e) Whether to approve, in principle, the HPMP for Nigeria for the period 2010-2015, at the amount of US \$8,406,186 plus agency support costs of US \$291,507 for UNDP and US \$338,958 for UNIDO, or at another level depending on the views of the Executive Committee related to the necessary level of phase-out in Nigeria;
- (f) Approving the Agreement between the Government of Nigeria and the Executive Committee for the reduction in consumption of HCFCs, as contained in Annex I to the present document;
- (g) Requesting the Secretariat, once the baseline data is known, to update Appendix 2-A to the Agreement to include the figures for maximum allowable consumption, and to notify the Executive Committee of the resulting levels of maximum allowable consumption;
- (h) Approving the first implementation plan for 2010-2011, and the first tranche of Stage I of the HPMP for Nigeria at the amount of US \$855,603 plus agency support costs of US \$64,170 for UNDP and US \$550,000 plus agency support costs of US \$41,250 for UNIDO; and
- (i) Request as a precondition for the submission of the third tranche of the HPMP the existence of a functioning licensing/quota system encompassing HCFCs. The functionality of that licensing/quota system is expressed in its ability to control the imports of, in particular, HCFCs into the country to a level predefined by a quota, to be established in advance of the year of import. A verification report to be submitted with the third tranche is to include verification of the HCFC-consumption of Nigeria for the respective year, but also the necessary information allowing assessing the functionality of the licensing/quota system, as well as a specific opinion on that point.

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

PROJECT TITLE		BILATERAL/IMPLEMENTING AGENCY
(a)	Demonstration project to validate the trans-critical CO ₂ refrigeration technology for application to ice-block makers at Austin Laz	Japan

NATIONAL CO-ORDINATING AGENCY	Federal Ministry of Environment
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LATEST REPORTED CONSUMPTION DATA FOR ODS ADDRESSED IN PROJECT

A: ARTICLE-7 DATA (ODP TONNES, 2009, AS OF NOVEMBER 2010)

Annex C, Group I	370.0 ODP tonnes
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B: COUNTRY PROGRAMME SECTORAL DATA (ODP TONNES, 2009, AS OF NOVEMBER 2010)

Substance	Consumption by sector (ODP tonnes)						Total
	Aerosol	Foam	Ref. manu.	Ref. serv.	Solvent	Other	
HCFC-22			65.7	170.8			236.5
HCFC-141b		53.0	80.7				133.7
HCFC-142b							
Other							

HCFC 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)	826,844	n/a

PROJECT TITLE:	(a)
ODS use at enterprise (ODP tonnes):	1.65
ODS to be phased out (ODP tonnes):	n/a
Project duration (months):	24
Project costs (US \$):	
Incremental Capital Cost:	665,200
Contingency (10 %):	66,520
Incremental Operating Cost:	
Total Project Cost:	731,720
Local ownership (%):	100
Export component (%):	0
Requested grant (US \$):	731,720
Cost-effectiveness (US \$/kg):	n/a
Implementing agency support cost (US \$):	90,489
Total cost of project to Multilateral Fund (US \$):	822,209
Status of counterpart funding (Y/N):	N
Project monitoring milestones included (Y/N):	Y

SECRETARIAT'S RECOMMENDATION:	For individual consideration
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PROJECT DESCRIPTION

Background

33. The Government of Japan submitted to the 62nd Meeting on behalf of the Government of Nigeria, the “Demonstration project to validate the trans-critical CO₂ refrigeration technology for application to ice-block makers at Austin Laz”, at a total cost of US \$731,720 plus agency support costs of US \$90,489 for the Government of Japan. The submission also includes an expert review of the project. Preparation funding for this project had been approved at the 61st Meeting. The demonstration project aims to validate the use of trans-critical CO₂ technology to be specifically used for the manufacture of ice-block makers.

34. An HPMP was submitted in parallel to this demonstration project in order to support the country in its phase-out efforts up to and including compliance with the 2015 reduction target for HCFCs. The HPMP identified more than 100 ice-maker manufacturing plants all over the country. The HPMP foresees the conversion of the commercial refrigeration manufacturers, a group which includes the manufacturers of ice-makers, in their use of HCFC-22 as a refrigerant to alternatives during the second stage of the HPMP, i.e. post-2015. A successful demonstration project validating a suitable replacement technology for these ice-makers in the country could be an important contribution to the selection of environmentally benign alternatives for the conversion in the commercial refrigeration sector in time for Stage II of the HPMP.

Ice-maker sub-sector profile

35. The manufacturing of ice-makers represents an important part of the manufacturing activity in the commercial refrigeration sub-sector in Nigeria. Ice-making machines are needed to produce ice blocks to preserve foods or to cool beverages, as electricity supply is not stable in the country and fridges are not common in every household. The industry survey and the HPMP identified 137 manufacturers of ice-makers all over the country. Some produce sophisticated units equipped with rigid polyurethane insulation and brine circulation to achieve fast ice-making. Others produce ice-makers with condensing units and direct cooling of the ice chamber. The consumption of these enterprises was 259 metric tonnes (mt) of HCFC-22 in 2006, 350 mt in 2007 and 440 mt in 2008. The project proposal contained detailed information about the location of the different ice-makers in the different regions of Nigeria. Based on the consumption data cited above and the fact that some of the companies manufacture other refrigeration equipment or provide servicing, the estimated HCFC-22 consumption for the manufacture of ice-makers in Nigeria is in the order 300 mt (16.5 ODP tonnes) annually.

Objective of the project and technology selection

36. The project proposal informs that the objectives of this project are:

- (a) To validate the trans-critical CO₂ technology for the manufacture of ice-makers in Nigeria. The applicability of the trans-critical CO₂ technology established in Japan for heating purposes will be assessed in terms of installation of ice-makers. An economical analysis may also be undertaken. A representative of the national manufacturers is serving as a local technical host for the demonstration activities;
- (b) To disseminate the outcomes of the present demonstration project to interested industry in Nigeria and neighbouring countries.

37. In its project proposal, the Government of Japan points to the previous assessments of the suitability of CO₂ as an alternative to HCFC-22. The project proposal cites, *inter alia*, the TEAP task force report regarding decision XX/8, stating “although it is not the high-priority candidate in the ranking, CO₂ is definitely offered as a possible option for large commercial refrigeration. Direct systems using

CO₂ have been introduced in several countries, mainly in Europe. CO₂ offers very good properties for heat-recovery, which is often desirable in supermarkets for a substantial period of the year, even in climates with higher outdoor ambient temperatures. This then contributes to an overall favourable energy-efficiency for these types of systems.” The Government of Japan provides additional information regarding the advantages of this technology, *inter alia*, the availability of CO₂ in Article-5 countries, the low global warming potential (GWP) of 1, high efficiency, low electricity consumption, low toxicity and the benefit of converting to a final technology where no further conversions would be needed.

38. At the same time, the project document points to a number of challenges, including that the trans-critical CO₂ systems are new to the industry in Article-5 countries and, consequently, efforts would be needed for training and awareness; and proper modification of the equipment is to be considered due to the specific tropical conditions found in several developing countries, including Nigeria. Also, the equipment design needs to take into account the relatively unstable electricity supply in many Article-5 countries; further optimization of efficiency is needed; necessary training and equipment to install, maintain and service high-pressure CO₂ refrigerant systems; and the cost of the system, for which information will be available at the later stage after completion of the demonstration project.

Company profile

39. The project is to be implemented at the company Austin Laz and Co. Limited (Austin Laz), a Nigerian-owned indigenous refrigeration engineering, contracting and trading firm. The refrigeration division of Austin Laz has a portfolio of ice-makers, cold rooms, condensing units and mini fridges; the company has about 15 years of experience in this field. Austin Laz was assisted by the Multilateral Fund for the phase-out of CFC-12 as a refrigerant used for the manufacture of its commercial equipment such as cold storage rooms and ice-makers, where CFCs were replaced with HFC-134a in 2002. HCFC-22 was used as a refrigerant from 1998; its use has been increased due to the demand for higher capacity ice-makers since 2003. The project proposal informs that 3,000 units are produced per year, which consume for their manufacturing 21 mt of HCFC-22, while another 9 tonnes of HCFC-22 are being used for the service. These numbers refer to the year 2008, they increased by 85 per cent between 2008 and 2009, and are expected to increase by another 44 per cent from 2009 to 2010.

Activities foreseen in the project proposal

40. At present the project does not foresee the conversion of production facilities, instead, it is intended to send ice-makers to the technology provider, Sanyo Electric Co. Limited (Sanyo), located in Japan for investigation, manufacture prototypes and test those prototypes, train Austin Laz personnel at Sanyo, carry out field tests of the prototypes in Nigeria and evaluate their performance and, finally, review the application of super-critical CO₂ technology in Article-5 countries in general and Nigeria in particular including their manufacture, servicing and economic analysis. A dissemination workshop is meant for the industry in Nigeria and neighbouring countries to inform about the results of the project. The timetable for implementation is two years, with the last quarter of those two years being reserved for the review of the results and the workshop for dissemination of the information.

41. The project proposal lists a number of cost items such as field inspection by a representative of the technology provider, activities related to technical advice, components and material of prototypes, ice-maker models from Austin Laz to be sent to the technology provider, travel for engineers from Austin Laz to Japan, transportation costs for the prototypes from Japan to Nigeria, equipment set-up at Austin Laz, field tests and the dissemination workshop. Contingencies of 10 per cent are also included in the budget. As part of the budget, Austin Laz is provided with tools and equipment for US \$11,000 and with training for two engineers on CO₂ technology for a duration of two weeks. The total project costs are US \$731,720 plus support costs.

Implementation arrangements

42. The project will be implemented by the Government of Japan with the assistance of UNIDO as an executing agency. Financial management as well as relevant activities such as equipment procurement, and the contract with the technical supplier for prototype preparation and testing will be arranged under the UNIDO financial rules and regulations. On behalf of the Government of Japan, the Ministry of Economy, Trade and Industry (METI) will supervise and monitor the project implementation. The duration of the project is until the end of 2012.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

43. Japan had originally submitted a project proposal under the same title to the 61st Meeting of the Executive Committee. At that time, the Secretariat raised *inter alia* the issue that no project preparation funding had been approved by the Executive Committee, combined with the concern that the intention for such a project should first be communicated to the Executive Committee, and its preparation approved. The Secretariat was also of the opinion that the project preparation funding would allow for the Government of Japan to visit the country and assess whether the activities foreseen would be implementable and would serve the desired purpose of both the Multilateral Fund as well as this project proposal. Consequently, the Secretariat had raised a number of specific issues with the Government of Japan, among them those of environmental concerns, the status of the technology and its commercial viability, the eligibility of the activities proposed, the implementation modality selected as well as the level of costs required for this project. On the background of the original project submission, the Secretariat's comments in regard to that submission, and more information collected as part of the project preparation, the Government of Japan prepared the second submission of this project for the 62nd Meeting of the Executive Committee.

Environmental issues

44. CO₂ is a substance which can be used as a refrigerant. However, for the application foreseen in Nigeria, there are significant technology differences as compared to the substances typically used as refrigerants today, such as hydrocarbons, HFC, ammonia, etc. CO₂ has a GWP of 1, since it serves as the yardstick for the definition of GWP. As compared to the majority of other refrigerants, the environmental impact of the substance is very small. CO₂ is also abundant in the environment and consequently environmentally benign and, in addition, essentially non-toxic. Consequently, the environmental impact of any direct emission of the refrigerant is very low. However, when using CO₂ as a refrigerant, challenges have to be overcome to achieve acceptable energy efficiency at higher ambient temperatures. Typically, the efficiency of CO₂ systems decreases with increasing outdoor temperature; while this is generally true for almost all refrigeration systems, this trend is particularly pronounced when using CO₂ as a refrigerant. Consequently, in regions where high ambient temperatures persist, additional efforts have to be undertaken to design a product with comparable energy efficiency to, for example, HCFC-22. The Secretariat and the Government of Japan had several exchanges regarding this particular point. The Government of Japan believes that with the technology to be utilized for this specific case, in particular a newly developed compressor from Sanyo, the energy efficiency of the ice-maker should be equivalent to or better than that of HCFC-22. Should that be the case, the climate impact of this technology will be considerably lower than the climate impact of the current HCFC-22 based systems. However, the Secretariat also advised that other technologies, in particular hydrocarbons, could be used for that purpose and might achieve even better results in terms of energy efficiency. This might lead then to an overall lower climate impact of the equipment.

Technology, status and commercial viability

45. The use of super-critical CO₂ technology has never been undertaken in a project supported by the Multilateral Fund; however, CO₂ as a sub-critical refrigerant has been used in a “Demonstration project for conversion from HCFC-22 technology to ammonia/ CO₂ technology in the manufacture of two-stage refrigeration systems for cold storage and freezing applications at Yantai Moon Group Co. Limited” (China). While the use of sub-critical CO₂ is similar in its technology to the use of conventional refrigerants, super-critical CO₂ has some technical specialties:

- (a) The underlying principle of the refrigeration cycle is different from the conventional refrigeration cycle (vapour compression cycle), as there is no condenser in the refrigeration circuit;
- (b) The working pressure of the CO₂ is in the order of 120 to 150 bar and therefore significantly higher than the working pressure of conventional refrigeration systems (25 to 40 bar);
- (c) Charging and control of CO₂-systems is different from similar procedures for vapour compression systems;
- (d) The differences described above lead to a difference in tools and education needed when servicing CO₂ super-critical refrigeration equipment; and
- (e) The technology of super-critical CO₂ for low temperature freezing applications in small, decentralized refrigeration systems has not yet been applied on a large scale. The technology that is intended to be used is based on heat pump water heaters, a sub-sector with considerably different characteristics as compared to commercial refrigeration equipment for low temperatures.

46. According to the information provided in the project proposal, an ice-maker with a capacity of 2.25 kW has, at this point in time, material costs in the order of US \$1,900 to US \$2,100. The Secretariat noted that the cost for the components for three prototypes, consisting of CO₂ cooling units, controls, evaporators, copper tubes and CO₂, was US \$16,700 per ice-maker. The fabrication of prototypes will cost another US \$50,000 per prototype. On this basis, the Secretariat expressed concern with the Government of Japan whether it would be possible to achieve a cost-effective product design, which would allow the company to compete in the market. The Secretariat further expressed its view that, if this were a conversion project, the company Austin Laz would have to cease all production of HCFC-22 ice-makers and would have to produce henceforth ice-makers with super-critical CO₂ technology; the Secretariat expressed further concern regarding the possible impact to the economic future of the company. The Government of Japan informed the Secretariat that it shares its concern related to the cost of production, and pointed out in its reply that the estimated costs of prototype production is only for assembling a few units manually and would therefore not be representative of the final cost of the product. The Government of Japan further pointed out that it understood that this project has a purpose of validating the possible alternative technology with low global warming impact against the currently dominating non-ODS technology based on HFC refrigerants with relatively high GWP values.

47. The Secretariat pointed to the significant production of ice-makers at Austin Laz and the lack of ability to service these ice-makers in Nigeria. In this regard, the Secretariat also pointed out that neither the project document nor the overall HPMP submitted to the 62nd Meeting is addressing the servicing needs of this technology, i.e. the need for education and equipment. The Government of Japan informed that the technology provider is seriously considering the possibility for charging the CO₂ refrigerant at the location where the ice-maker is installed, because the technology provider considers that without this possibility, the relevant technology may not be rightly applied in developing countries. Consequently, the

prototype design and the technicians training aim at achieving possibility of charging during the development of equipment in the field.

Eligibility

48. The Secretariat requested from the Government of Japan information as to how the current production capacity for HCFC-22 containing equipment is clearly separated from the production capacity that has been converted from CFC-12 to HFC-134a. It further requested information on what level of consumption of HCFC-22 might be associated with the previously converted part of the production. The information provided by the Government of Japan indicates that Austin Laz has used a limited amount of HCFC-22, in the order of 400 kg, in 1999 when the phase-out project for CFC-12 had been approved. In 2002, when the project had been completed, the HCFC-22 use was 800 kg compared to the HFC-134a use of 3.8 mt. The Government of Japan further informed that the reason for increasing use of HCFC-22 substantially relates to the higher refrigeration capacity of HCFC-22 as compared to HFC-134a, in combination with a changed market demand. According to the information provided by the Government of Japan, the company covered all capital expenses related to the introduction and extension of HCFC-22 manufacturing capacity at its own cost and not from MLF funding.

49. The Secretariat pointed out that, for this project, the funding threshold should be US \$570,375 if all of the consumption at Austin Laz of 30 mt of HCFC-22 is to be phased out and if all of that consumption would be eligible. The Government of Japan stressed that the purpose of the demonstration project was to validate the applicability of the super-critical CO₂ refrigeration technology for the commercial refrigeration sector in Nigeria as well as for the countries in the region. In this context, Austin Laz is simply a hosting enterprise for the demonstration project. The Government of Japan further pointed out that, in other cases, the cost-effectiveness threshold had also not been taken into account when funding demonstration projects. The context of the answer of the Government of Japan to the questions of the Secretariat regarding the eligibility of the project makes clear that the project has to be understood as the validation of the technology itself and its use in the field, and not the validation of the conversion of the company to that technology. Consequently, this project represents a different approach to what would be usually submitted to the Multilateral Fund.

Implementation modality

50. The project proposal states that the contracting of the technical supplier will be arranged under the UNIDO financial rules and regulations. However, the repeated mentioning of a particular technology supplier in the project proposal caused the Secretariat to inform the Government of Japan of the impression that technology provider, i.e. the company Sanyo, had been already agreed on, and asked whether this impression was correct and what portion of the budget is foreseen to be used. The Government of Japan confirmed that Sanyo is the technology provider for the present project. Further, the cost related to the technical advice of US \$515,000 (out of the US \$731,720 being requested) will be used for the provision of the technical services by the technology provider. These activities include a project management field inspection, review and participation in the dissemination workshop, training of Austin Laz personnel on production, installation and servicing including field refrigerant charging, design of prototypes, namely cooling unit modification, evaporator design and overall system design, fabrication of prototypes in the premise of the technology provider in Japan, testing of prototypes at the Sanyo laboratory and support of field tests by Austin Laz, as well as administration support including procurement of components and material.

RECOMMENDATION

51. As explained above, the Government of Japan has undertaken a novel approach to this project as compared to other projects submitted in the past to the Multilateral Fund. The Secretariat is therefore not in a position to provide a recommendation for its approval. The Secretariat suggests that the Executive Committee might wish to consider whether to approve the “Demonstration project to validate the trans-critical CO₂ refrigeration technology for application to ice-block makers at Austin Laz”, at the level of funding being requested of US \$731,720, or a different cost level, as appropriate.

Annex I

DRAFT AGREEMENT BETWEEN NIGERIA AND THE EXECUTIVE COMMITTEE OF THE MULTILATERAL FUND FOR THE REDUCTION IN CONSUMPTION OF HYDROCHLOROFLUROCARBONS

1. This Agreement represents the understanding of the Government of Nigeria (the “Country”) and the Executive Committee with respect to the reduction of controlled use of the ozone depleting substances (ODS) set out in Appendix 1-A (“The Substances”) to a sustained level of the maximum consumption allowed for 2015 under the Montreal Protocol reduction schedule.

2. The Country agrees to meet the annual consumption limits of the Substances as set out in row 1.2 of Appendix 2-A (“The Targets and Funding”) in this Agreement as well as in the Montreal Protocol reduction schedule for all Substances mentioned in Appendix 1-A. The consumption figures contained in Appendix 2-A rows 1.1 and 1.2 are preliminary at the time when this meeting is concluded, since the baseline consumption is not known at that time. The Agreement is concluded on the understanding that these figures are to be revised one single time to reflect the actual baseline, once the baseline consumption for compliance would be established based on Article 7 data. Any reference in this Agreement to rows 1.1 and 1.2 of Appendix 2-A is referring to the revised figures if no other specific reference is made. The Country accepts that, by its acceptance of this Agreement and performance by the Executive Committee of its funding obligations described in paragraph 3, it is precluded from applying for or receiving further funding from the Multilateral Fund in respect to any consumption of the Substances which exceeds the level defined in row 1.2 of Appendix 2-A (maximum allowable total consumption of Annex C, Group I substances) as the final reduction step under this agreement for all of the Substances specified in Appendix 1-A, and in respect to any consumption of each of the Substances which exceeds the level defined in rows 4.1.3 and 4.2.3, (remaining eligible consumption).

3. Subject to compliance by the Country with its obligations set out in this Agreement, the Executive Committee agrees in principle to provide the funding set out in row 3.1 of Appendix 2-A (the “Targets and Funding”) to the Country. The Executive Committee will, in principle, provide this funding at the Executive Committee meetings specified in Appendix 3-A (the “Funding Approval Schedule”).

4. The Country will meet the consumption limits for each of the Substances as indicated in Appendix 2-A. It will also accept independent verification, to be commissioned by the relevant bilateral or implementing agency, of achievement of these consumption limits as described in sub-paragraph 5(b) of this Agreement.

5. The Executive Committee will not provide the Funding in accordance with the Funding Approval Schedule unless the Country satisfies the following conditions at least 60 days prior to the applicable Executive Committee meeting set out in the Funding Approval Schedule:

- (a) That the Country has met the Targets for all relevant years. Relevant years are all years since the year in which the hydrochlorofluorocarbons phase-out management plan (HPMP) was approved. Exempt are years for which no obligation for reporting of country programme data exists at the date of the Executive Committee Meeting at which the funding request is being presented;
- (b) That the meeting of these Targets has been independently verified, except if the Executive Committee decided that such verification would not be required;

- (c) That the Country had submitted tranche implementation reports in the form of Appendix 4-A (the “Format of Tranche Implementation Report and Plan”) covering each previous calendar year, that it had achieved a significant level of implementation of activities initiated with previously approved tranches, and that the rate of disbursement of funding available from the previously approved tranche was more than 20 per cent; and
- (d) That the Country has submitted and received approval from the Executive Committee for a tranche implementation plan in the form of Appendix 4-A (the “Format of Tranche Implementation Reports and Plans”) covering each calendar year until and including the year for which the funding schedule foresees the submission of the next tranche or, in case of the final tranche, until completion of all activities foreseen.

6. The Country will ensure that it conducts accurate monitoring of its activities under this Agreement. The institutions set out in Appendix 5-A (the “Monitoring Institutions and Roles”) will monitor and report on Implementation of the activities in the previous tranche implementation plan in accordance with their roles and responsibilities set out in Appendix 5-A. This monitoring will also be subject to independent verification as described in sub-paragraph 5(b).

7. The Executive Committee agrees that the Country may have the flexibility to reallocate the approved funds, or part of the funds, according to the evolving circumstances to achieve the smoothest phase-down and phase-out of the Substances specified in Appendix 1-A. Reallocations categorized as major changes must be documented in advance in a Tranche Implementation Plan and approved by the Executive Committee as described in sub-paragraph 5(d). Major changes would relate to reallocations affecting in total 30 per cent or more of the funding of the last approved tranche, issues potentially concerning the rules and policies of the Multilateral Fund, or changes, which would modify any clause of this Agreement. Reallocations not categorized as major changes may be incorporated in the approved Tranche Implementation Plan, under implementation at the time, and reported to the Executive Committee in the Tranche Implementation Report. Any remaining funds will be returned to the Multilateral Fund upon closure of the last tranche of the plan.

8. Specific attention will be paid to the execution of the activities in the refrigeration servicing sub-sector, in particular:

- (a) The Country would use the flexibility available under this Agreement to address specific needs that might arise during project implementation; and
- (b) The Country and the bilateral and implementing agencies involved will take full account of the requirements of decisions 41/100 and 49/6 during the implementation of the plan.

9. The Country agrees to assume overall responsibility for the management and implementation of this Agreement and of all activities undertaken by it or on its behalf to fulfil the obligations under this Agreement. UNDP has agreed to be the lead implementing agency (the “Lead IA”) and UNIDO has agreed to be the cooperating implementing agency (the “Cooperating IA”) under the lead of the Lead IA in respect of the Country’s activities under this Agreement. The Country agrees to evaluations, which might be carried out under the monitoring and evaluation work programmes of the Multilateral Fund or under the evaluation programme of any of the IA taking part in this Agreement.

10. The Lead IA will be responsible for carrying out the activities of the plan as detailed in the first submission of the HPMP with the changes approved as part of the subsequent tranche submissions, including but not limited to independent verification as per sub-paragraph 5(b). This responsibility includes the necessity to co-ordinate with the Cooperating IA to ensure appropriate timing and sequence of activities in the implementation. The Cooperating IA will support the Lead IA by implementing the

activities listed in Appendix 6-B under the overall co-ordination of the Lead IA. The Lead IA and Cooperating IA have entered into a formal agreement regarding planning, reporting and responsibilities under this Agreement to facilitate a co-ordinated implementation of the Plan, including regular co-ordination meetings. The Executive Committee agrees, in principle, to provide the Lead IA and the Cooperating IA with the fees set out in rows 2.2 and 2.4 Appendix 2-A.

11. Should the Country, for any reason, not meet the Targets for the elimination of the Substances set out in row 1.2 of Appendix 2-A or otherwise does not comply with this Agreement, then the Country agrees that it will not be entitled to the Funding in accordance with the Funding Approval Schedule. At the discretion of the Executive Committee, funding will be reinstated according to a revised Funding Approval Schedule determined by the Executive Committee after the Country has demonstrated that it has satisfied all of its obligations that were due to be met prior to receipt of the next tranche of funding under the Funding Approval Schedule. The Country acknowledges that the Executive Committee may reduce the amount of the Funding by the amounts set out in Appendix 7-A in respect of each ODP tonne of reductions in consumption not achieved in any one year. The Executive Committee will discuss each specific case in which the country did not comply with this Agreement, and take related decisions. Once these decisions are taken, this specific case will not be an impediment for future tranches as per paragraph 5.

12. The Funding of this Agreement will not be modified on the basis of any future Executive Committee decision that may affect the funding of any other consumption sector projects or any other related activities in the Country.

13. The Country will comply with any reasonable request of the Executive Committee, the Lead IA and the Cooperating IA to facilitate implementation of this Agreement. In particular, it will provide the Lead IA and the Cooperating IA with access to information necessary to verify compliance with this Agreement.

14. The completion of the HPMP and the associated Agreement will take place at the end of the year following the last year for which a maximum allowable total consumption has been specified in Appendix 2-A. Should at that time activities be still outstanding which were foreseen in the Plan and its subsequent revisions as per sub-paragraph 5(d) and paragraph 7, the completion will be delayed until the end of the year following the implementation of the remaining activities. The reporting requirements as per Appendix 4-A (a), (b), (d) and (e) continue until the time of the completion if not specified by the Executive Committee otherwise.

15. All of the agreements set out in this Agreement are undertaken solely within the context of the Montreal Protocol and as specified in this Agreement. All terms used in this Agreement have the meaning ascribed to them in the Montreal Protocol unless otherwise defined herein.

APPENDICES

APPENDIX 1-A: THE SUBSTANCES

Substance	Annex	Group	Starting point for aggregate reductions in consumption (ODP tonnes)
HCFC-22	C	I	260
HCFC-141b	C	I	147.3

APPENDIX 2-A: THE TARGETS, AND FUNDING

		2010	2011	2012	2013	2014	2015	Total	
1.1	Montreal Protocol reduction schedule of Annex C, Group I substances (ODP tonnes)				407.4	407.4	366.7	n/a	
1.2	Maximum allowable total consumption of Annex C, Group I substances (ODP tonnes)				407.4	407.4	366.7	n/a	
2.1	Lead IA UNDP agreed funding (US \$)	855,603	836,515	768,541	700,183	725,908	0	3,886,750	
2.2	Support costs for Lead IA (US \$)	64,170	62,739	57,641	52,514	54,443	0	291,507	
2.3	Cooperating IA UNIDO agreed funding (US \$)	550,000	550,000	1,340,900	1,133,136	945,400	0	4,519,436	
2.4	Support costs for Cooperating IA (US \$)	41,250	41,250	100,568	84,985	70,905	0	338,958	
3.1	Total agreed funding (US \$)	1,405,603	1,386,515	2,109,441	1,833,319	1,671,308	0	8,406,186	
3.2	Total support cost (US \$)	105,420	103,989	158,209	137,499	125,348	0	630,462	
3.3	Total agreed costs (US \$)	1,511,023	1,490,504	2,267,650	1,970,818	1,796,656	0	9,036,648	
4.1.1	Total phase-out of HFCF-22 agreed to be achieved under this agreement (ODP tonnes)								55.4
4.1.2	Phase-out of HFCF-22 to be achieved in previously approved projects (ODP tonnes)								0
4.1.3	Remaining eligible consumption for HFCF-22 (ODP tonnes)								204.6
4.2.1	Total phase-out of HFCF-141b agreed to be achieved under this agreement (ODP tonnes)								79.5
4.2.2	Phase-out of HFCF-141b to be achieved in previously approved projects (ODP tonnes)								0
4.2.3	Remaining eligible consumption for HFCF-141b (ODP tonnes)								67.8

APPENDIX 3-A: FUNDING APPROVAL SCHEDULE

1. Funding for the future tranches will be considered for approval not earlier than the last meeting of the year specified in Appendix 2-A.

APPENDIX 4-A: FORMAT OF TRANCHE IMPLEMENTATION REPORTS AND PLANS

1. The submission of the Tranche Implementation Report and Plan will consist of five parts:
 - (a) A narrative report regarding the progress in the previous tranche, reflecting on the situation of the Country in regard to phase-out of the Substances, how the different activities contribute to it and how they relate to each other. The report should further highlight successes, experiences and challenges related to the different activities included in the Plan, reflecting on changes in the circumstances in the country, and providing other relevant information. The report should also include information about and justification for any changes vis-à-vis the previously submitted tranche plan, such as delays, uses of the flexibility for reallocation of funds during implementation of a tranche, as provided for in paragraph 7 of this Agreement, or other changes. The narrative report will cover all relevant years specified in sub-paragraph 5(a) of the Agreement and can in addition also include information about activities in the current year;
 - (b) A verification report of the HPMP results and the consumption of the substances mentioned in Appendix 1-A, as per sub-paragraph 5(b) of the Agreement. If not decided otherwise by the Executive Committee, such a verification has to be provided together with each tranche request and will have to provide verification of the consumption for all

relevant years as specified in sub-paragraph 5(a) of the Agreement for which a verification report has not yet been acknowledged by the Committee;

- (c) A written description of the activities to be undertaken in the next tranche, highlighting their interdependence, and taking into account experiences made and progress achieved in the implementation of earlier tranches. The description should also include a reference to the overall Plan and progress achieved, as well as any possible changes to the overall plan foreseen. The description should cover the years specified in sub-paragraph 5(d) of the Agreement. The description should also specify and explain any revisions to the overall plan which were found to be necessary;
- (d) A set of quantitative information for the report and plan, submitted into a database. As per the relevant decisions of the Executive Committee in respect to the format required, the data should be submitted online. This quantitative information, to be submitted by calendar year with each tranche request, will be amending the narratives and description for the report (see sub-paragraph 1(a) above) and the plan (see sub-paragraph 1(c) above), and will cover the same time periods and activities; it will also capture the quantitative information regarding any necessary revisions of the overall plan as per sub-paragraph 1(c) above. While the quantitative information is required only for previous and future years, the format will include the option to submit in addition information regarding the current year if desired by the country and lead implementing agency; and
- (e) An Executive Summary of about five paragraphs, summarizing the information of above sub-paragraphs 1(a) to 1(d).

APPENDIX 5-A: MONITORING INSTITUTIONS AND ROLES

1. All the monitoring activities will be coordinated and managed through the National Ozone Office (NOO).
2. The Lead IA will liaise with the NOO all monitoring arrangements because of its mandate to monitor ODS imports, the records of which will be used as a crosschecking reference in all the monitoring programmes for the different projects within the HPMP. The Lead Agency will also liaise with the NOO to monitor illegal ODS imports and exports with advisements made to the appropriate national agencies.

Verification and reporting

3. In accordance to decision 45/54 (d), the Executive Committee requires an independent verification report to be produced annually at the time of submission of the yearly request for a new funding-tranche. The Lead IA should select the independent organization (auditing) to carry out the verification of the HPMP results and this independent verification.
4. The verification reports will be produced each year, previous to the third meeting of the Executive Committee. These reports will produce the input for the yearly implementation reports required by the Executive Committee.

APPENDIX 6-A: ROLE OF THE LEAD IMPLEMENTING AGENCY

1. The Lead IA will be responsible for a range of activities. These can be specified in the project document further, but include at least the following:

- (a) Ensuring performance and financial verification in accordance with this Agreement and with its specific internal procedures and requirements as set out in the Country's phase-out plan;
- (b) Assisting the Country in preparation of the Tranche Implementation Plans and subsequent reports as per Appendix 4-A;
- (c) Providing verification to the Executive Committee that the Targets have been met and associated annual activities have been completed as indicated in the Tranche Implementation Plan consistent with Appendix 4-A;
- (d) Ensuring that the experiences and progress is reflected in updates of the overall Plan and in future Tranche Implementation Plans consistent with sub-paragraphs 1(c) and 1(d) of Appendix 4-A;
- (e) Fulfilling the reporting requirements for the tranches and the overall Plan as specified in Appendix 4-A as well as project completion reports for submission to the Executive Committee. The reporting requirements include the reporting about activities undertaken by the Cooperating IA;
- (f) Ensuring that appropriate independent technical experts carry out the technical reviews;
- (g) Carrying out required supervision missions;
- (h) Ensuring the presence of an operating mechanism to allow effective, transparent implementation of the Tranche Implementation Plan and accurate data reporting;
- (i) Co-ordinating the activities of the Cooperating IA, and ensuring appropriate sequence of activities;
- (j) In case of reductions in funding for failure to comply in accordance with paragraph 11 of the Agreement, to determine, in consultation with the Country and the co-ordinating implementing agencies, the allocation of the reductions to the different budget items and to the funding of each implementing or bilateral agency involved;
- (k) Ensuring that disbursements made to the Country are based on the use of the indicators; and
- (l) Providing assistance with policy, management and technical support when required.

2. After consultation with the Country and taking into account any views expressed, the Lead IA will select and mandate an independent organization to carry out the verification of the HPMP results and the consumption of the substances mentioned in Appendix 1-A, as per sub-paragraph 5(b) of the Agreement and sub-paragraph 1(b) of Appendix 4-A.

APPENDIX 6-B: ROLE OF COOPERATING IMPLEMENTING AGENCY

1. The Cooperating IA will be responsible for a range of activities. These activities can be specified in the respective project document further, but include at least the following:

- (a) Providing policy development assistance when required;
- (b) Assisting the Country in the implementation and assessment of the activities funded by the Cooperating IA, and refer to the Lead IA to ensure a co-ordinated sequence in the activities; and
- (c) Providing reports to the Lead IA on these activities, for inclusion in the consolidated reports as per Appendix 4-A.

APPENDIX 7-A: REDUCTIONS IN FUNDING FOR FAILURE TO COMPLY

1. In accordance with paragraph 11 of the Agreement, the amount of funding provided may be reduced by US \$9,500 per metric tonne of consumption beyond the level defined in row 1.2 of Appendix 2-A for each year in which the target specified in row 1.2 of Appendix 2-A has not been met.

APPENDIX 8-A: SECTOR SPECIFIC ARRANGEMENTS

1. All sector activities to be undertaken form part of this HPMP agreement and will not be submitted as separate sector plans. There are therefore no specific arrangements to mention in the case of Nigeria.
