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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

Addendum

PROJECT PROPOSALS: CHINA

This document is being issued to add additional text to the following sector plans:

- (a) Sector plan for the phase-out of HCFC-141b in the foam sector;
 - (b) Sector plan for the phase-out of HCFCs in the extruded polystyrene foam sector;
 - (c) Sector plan for HCFC phase-out in the industrial and commercial refrigeration and air conditioning (ICR) sectors (Stage I for 2013 and 2015 compliance); and
 - (d) HCFC-22 phase-out management plan for room air conditioner manufacturing sector.
- **Add** the following text after paragraph 95:

95bis. Subsequent to the dispatch of the documentation for the 62nd Meeting, the Foam Sector Plan was further reviewed in light of the World Bank's responses to the issues raised on the Plan, and the additional information provided on 81 of the 222 enterprises surveyed during its preparation. On the basis of all the information available, an alternative cost-effective approach was suggested to meet the 2013 and 2015 phase-out targets in the polyurethane foam sector in China by converting all the super large and large HCFC consuming enterprises manufacturing insulation foam for reefers, refrigerators and freezers, refrigerated trucks, water heaters and pipe insulation, and all the medium size refrigerators/freezers enterprises to hydrocarbon technology (Table 6). It was noted that the reported consumption of 13,252.6 mt (1,457.8 ODP tonnes) of HCFC-141b was for 2008, which will reach more than 17,340 mt (1,907.4 ODP tonnes) by 2012, based on the growth rate of the industry as forecast by the Government of China.

Table 6. Foam enterprises to be converted before 2015

Subsector	No. of enterprises	HCFC consumption (mt)				
		2008	2009	2010	2011	2012
Reefers	5	6,299.6	6,929.6	7,622.6	8,003.7	8,243.8
Large refrigerators/freezers	15	2,183.0	2,401.3	2,641.4	2,773.5	2,856.7
Medium refrigerators/freezers	25	796.6	876.3	963.9	1,012.1	1,042.4
Large refrigerated trucks	10	1,009.0	1,109.9	1,220.9	1,281.9	1,320.4
Large water heaters	8	841.4	925.5	1,018.1	1,069.0	1,101.1
Large pipe insulation	15	2,123.0	2,335.3	2,568.8	2,697.3	2,778.2
Total	78	13,252.6	14,577.9	16,035.7	16,837.5	17,342.6

95ter. In addition to phasing out over 17,300 mt of HCFC-141b, the suggested approach had the added advantages of converting only 78 enterprises (rather than the 140 originally proposed plus the conversion of a large number of small enterprises to phase-out an additional 1,979 mt in the “other” sector), and introducing only one technology, i.e., hydrocarbon, which is very well established, widely used throughout the world, and cost-effective for the size and characteristics of the enterprises under consideration.

95qua. Based on the suggested approach, the cost for the conversion of the 78 foam enterprises and one systems house was estimated at US \$46,950,000 after deducting foreign ownership of some enterprises and over 20 per cent for export of refrigerators and freezers.

95quin. In responding to the above suggestion by the Secretariat, the World Bank provided the following comments:

- (a) The Government of and the national foam and chemical industry have jointly developed the overall strategy for phasing out HCFC-141b in the polyurethane foam sector. Policies, investment activities and technical assistance programmes have been proposed for meeting the 2013 and 2015 reduction targets and for ensuring a sustainable phase-out. The submission is as a result of a thorough and exhaustive sub-sector level analysis of HCFC-141b consumption by sub-sector, viable and efficient alternative technologies, sustainability of phase-out, policies, regulations and enforcement, and implement-ability of actions within the limited timeframe available. It also reflects long and intensive consultations with the foam industry in China including foam manufacturers, polyol suppliers and chemical suppliers;
- (b) It is important to consider that the foam industry does not see any benefits in changing over to a new blowing agent. Without strong policies and regulations, foam enterprises will not sign phase-out contracts. Conversion to a new blowing agent is time consuming, expensive and requires substantive internal resources. As only retrofitting of existing foaming equipment is covered, conversion will result in stop of production for several months depending on the changes needed. In some cases, even relocation might be required for the use of hydrocarbon. Furthermore, all substitutes, including cyclopentane will result in higher production cost due to cost of chemicals and higher energy consumption. In order to ensure a level play field, enterprises are in favour of a clear cut-off date on a sub-sector level. The quality of the products manufactured using substitutes need to be confirmed. While cyclopentane is a well proven substitute, the enterprises will still have to ensure that the quality of the foam blown with hydrocarbon meets the national standards and the requirements of the customers. All these factors have been taken into consideration when developing the polyurethane foam strategy;

- (c) In developing the HCFC-141b phase-out strategy in China, strategies and experiences by non-Article 5 countries have been studied and used. While some non-A5 countries have stopped all use of HCFC-141b for foam production by a certain date, other has addressed the phase-out through specific schedules for each sub-sector. In all cases, a cut-off date for phase-out in a given foam sub-sector was established. China has adopted a similar approach;
- (d) The Secretariat’s proposal to address only the larger HCFC using companies was indeed considered and discussed in detail with the foam industry during the development of the phase-out plan. While this project-by-project approach might be an attractive approach, the reluctance of the companies to participate will be an issue. Another concern is the sustainability of the phase-out. While one could monitor the funded companies, there are no guarantees that other HCFC-141b based enterprises in the same sub-sector might not take over their business during the conversion period, resulting in no real reduction of HCFC-141b at the end of the day;
- (e) As learned from the ODS phase-out activities, it is critical to address an ODS using sector through a sector level approach. The phase-out has to be supported by implementable and enforceable policies so that the 2013 and 2015 targets can be met and a sustainable phase-out achieved. Policies and regulations are the key instruments, in combination with the right financial incentives, to ensure that the phase-out is achieved as planned.
- (f) In regard to the impact of foreign non-Article 5 ownerships and exports to non-Article 5 countries has been addressed on a sector level. The amount identified as ineligible for funding was extrapolated from the surveys as 2,203 mt;
- (g) Based on the above considerations, the Government of China does not agree with the approach and the cost suggested by the Secretariat. However, the World Bank and the Government of China will explore how to take into account the Secretariat’s cost template within the existing strategy of the Government.

Impact on the climate

95sex. The replacement of HCFC-141b used in the manufacturing of polyurethane foam products in China by hydrocarbon CO₂ blowing agent would avoid the emission of 10,211,819 tonnes of CO₂-equivalent into the atmosphere (Table 7).

Table 7. Impact on the climate

Substance	GWP	Tonnes/year	CO ₂ -eq (tonnes/year)
Before conversion			
HCFC-141b	713	14,577.9*	10,394,043
After conversion			
Hydrocarbon	25	7,289.0	182,224
Net impact			(10,211,819)

(*) Based on the 2009 HCFC-141b consumption

- **Replace** paragraph 96 **with** the following text:

RECOMMENDATIONS

96. The Executive Committee might wish to consider the sector plan for phase-out of HCFC-141b in the foam sector in China in light of the Secretariat’s comments contained in documents UNEP/OzL.Pro/ExCom/62/26 and Add.1.

- **Replace** paragraph 127 **with** the following text:

127. Subsequent to the dispatch of the documentation for the 62nd Meeting, the XPS Foam Sector Plan was further reviewed in light of the responses received from the relevant bilateral and implementing agencies with regard to the comments raised on the Plan and the two demonstration projects.

127bis. Considering that 43 XPS production lines will be converted, the calculation of the incremental costs as proposed in the XPS Foam Sector Plan were based on estimated costs for retrofitting a “typical” production line to either CO₂/ethanol or hydrocarbon technology. However, the actual requirements for the conversion of each production line will be only known during project implementation. Given the uncertainties associated with this methodology in the particular case of the XPS industry in China, an alternative approach to calculating the incremental cost was suggested on the basis of installation of new production lines, with counterpart contributions from the enterprises to compensate for technology upgrade (intentional or non-intentional) and new equipment components which are independent of the blowing agent. It was noted that the XPS production lines are manufactured by seven enterprises in China, which had so far made more than 970 lines.

127ter. The cost of a typical XPS production line with an output of 320 to 480 kg/hr, for board thickness between 20 mm to 50 mm and foam density between 32 to 42 kg/m³, suitable for CO₂/ethanol or hydrocarbon blowing agents, was proposed at US \$250,000 based on one quotation provided to the Secretariat. Additional funding for retrofitting the production facilities was proposed at US \$40,000 per extrusion line using CO₂ technology and US \$80,000 per line using hydrocarbon technology. To compensate for technology upgrade and new equipment components which are independent of the blowing agents used, a 20 per cent reduction on the price of the extrusion line was suggested as a counterpart contribution in line with prevailing rules. This would result in a total estimated capital cost of US \$23,530,000 for the installation of 79 extrusion lines. An additional US \$3,530,000 (i.e., 15 per cent of the total capital cost) was suggested for training, monitoring and supervision.

127qua. During the project review process the Secretariat raised the issue of whether the two stand-alone projects for the demonstration of CO₂ technology at Nainjing Feininger and hydrocarbon technology at Shanghai Xinzhao are needed, in light of the submission of the US \$145 million XPS Foam Sector Plan in China. Following the explanation provided by the agencies, it is suggested that the two projects could be implemented in advance of the actual conversion of the XPS enterprises covered under the XPS Foam Sector Plan in order to optimize the production parameters, such as: amount of recycled polystyrene resin in the raw material; and reduction of flammability of XPS foam caused by butane.

127quin. In responding to the above suggestion by the Secretariat, the Government of Germany requested the following comments to be reflected:

- (a) The recommended cost effectiveness of the proposal is about US \$2.34/kg. This has no relation with the real cost for conversions as presented in the XPS Foam Sector Plan. The Government of China had made considerable concessions in its request for funding. After presenting the real costs of the required conversion, the Government only requested funding based on the negotiated conditions reflected in the approved cost guidelines for HPMPs. This will already result in a situation where enterprises will be required to contribute a large part of the investment cost from their own resources, or from other funding. As the approach suggested amounts only to a small fraction of the real cost of conversions, it will be impossible to motivate the enterprises to convert at this cost, especially considering the short period of time available;

- (b) China's submission is based on agreed funding guidelines. The Government of Germany is concerned about the proposed cost-effectiveness as suggested as well as the reference in document UNEP/OzL.Pro/ExCom/62/10 which states that the XPS foam sector plans will only be considered in the first stage if the cost-effectiveness value is below US \$4.50/kg. In Germany's view this contradicts the approved funding guidelines and it also seems to be inconsistent with Article 10.1 of the Montreal Protocol which stipulates that all agreed incremental costs of conversions will be covered. It also appears contrary to the spirit of the 2007 adjustment to the Montreal Protocol in which the Parties agreed for "stable and sufficient" funding to assist Article 5 countries to achieve compliance. Lastly, it does not echo the often repeated statement during the discussions of the funding guidelines about incremental capital and operating costs, that Article 5 countries would "get all new equipment";
- (c) Under the conditions of the suggested approach, most of the targeted enterprises will have reason to refuse to phase out HCFC which will immediately put China's compliance in jeopardy;
- (d) Inquiries undertaken by Germany with local equipment manufacturers showed that commercial quotations for CO₂-lines for XPS- production in the local market vary considerably; however, Germany was not aware of any installed and operating extrusion line at a cost of US \$250,000, even of substandard quality. It is unreasonable to suggest such technologies which would most likely conflict with local laws and regulations, and quality standards;
- (e) While there are companies producing extrusion equipment in China, most of these are assemblers only. These factories build extruders for HCFC-142b and/or HCFC-22 technology. However, there are significant with CO₂ based equipment as the pressure inside the barrel is about 15 times higher than that for HCFC-based equipment. China has still very limited experience in using and producing equipment for CO₂ or hydrocarbon alternatives. Equipment producers themselves need to change their production from manufacturing HCFC equipment to CO₂ or hydrocarbon equipment. This will of course be a very welcome development for China, but will not suffice or come in time to achieve compliance with the 2013 and 2015 HCFC control targets. Considering also the raw material situation, production lines purchased in China according to the suggestion by the Secretariat, may not be able to meet required foam standards to be accepted in the market;
- (f) The suggested approach did not consider other components of the HPMP, such as incremental operating costs, technical assistance and other essential elements.

Impact on the climate

127sex. The replacement of HCFC-22/HCFC-142b used in the manufacturing of XPS foam products in China by hydrocarbon and CO₂ blowing agents would avoid the emission of 20,769,688 tonnes of CO₂-equivalent into the atmosphere (Table 3).

Table 3. Impact on the climate

Substance	GWP	Tonnes/year	CO ₂ -eq (tonnes/year)
Before conversion			
HCFC-22	2,270	6,018.6	13,662,222
HCFC-142b	1,780	4,012.4	7,142,072
Total		10,031.0	20,804,294
After conversion			
Hydrocarbon	25	1,304.0	32,600
CO ₂	1	2,006.2	2,006
Total		3,310.2	34,606
Net impact			(20,769,688)

- **Replace** paragraph 128 **with** the following text:

RECOMMENDATIONS

128. The Executive Committee might wish to consider the sector plan for phase-out of HCFCs in the extruded polystyrene foam sector in China, and the demonstration projects for conversion from HCFC-22 to butane blowing technology in the manufacture of extruded polystyrene foam at Shanghai Xinzhao Plastic Enterprises Co. Ltd., and from HCFC-22/HCFC-142b technology to CO₂ with methyl formate co-blowing technology in the manufacture of extruded polystyrene foam at Feininger (Nanjing) in light of the Secretariat's comments contained in documents UNEP/OzL.Pro/ExCom/62/26 and Add.1. The Secretariat will continue discussing with the Government of Germany on outstanding technical and cost related issues.

- **Add** the following text after paragraph 198:

198bis. Since document UNEP/OzL.Pro/ExCom/62/26 was issued, no further developments have taken place in regard to the sector plan for the industrial and commercial refrigeration and air conditioning manufacturing sector that would enable the Secretariat to develop a recommendation on funding levels. Although there has been a vast exchange of correspondence between UNDP and the Secretariat and each question of the Secretariat was replied to, the replies were not in all cases either substantive enough or provided the needed information that would enable the Secretariat to assess the eligibility and incrementality of the requested funding.

- **Add** the following text after paragraph 262:

262bis. This addendum is issued to reflect developments since document UNEP/OzL.Pro/ExCom/62/26 was posted in regard to the sector plan for the room air-conditioner (RAC) manufacturing sector, forming part of the HCFC-22 phase-out management plan (HPMP) still to be submitted. The remaining unresolved issues are as follows:

- UNIDO questioned the Secretariat's comments contained in document UNEP/OzL.Pro/ExCom/62/26 indicating that a number of UNIDO's arguments put forward in the course of discussion of the RAC sector plan have not been reflected in the document. This is correct in the sense that indeed not all information received is provided in that document, the document being a summary of the original project document and the subsequent exchanges, with detail being provided on those open issues which need to be resolved in order to progress towards a funding decision. Although UNIDO replied to all questions raised by the Secretariat, it did not in all cases reflect sufficiently the information requested. In preparing document UNEP/OzL.Pro/ExCom/62/26, the intention of the Secretariat was to make it as concise as possible concentrating on

outstanding issues. However, the Secretariat is pleased to provide interested members of the Executive Committee with the full documentation upon request;

- (b) UNIDO provided after the finalisation of the document some additional data that facilitated the understanding of some remaining issues. Based on the information provided, the Secretariat was able to calculate the share of HCFC-22 based RAC units exported to non-Article 5 countries in 2009. Altogether, 2,667,049 HCFC-22 RAC units have been exported to non-Article 5 countries with 93 per cent exports to the United States of America. HCFC-22 consumption of 1,572 mt was associated with exports to non-Article 5 countries, which would be ineligible for funding and could be deducted from the total 2009 HCFC-22 consumption in the sector, and so impact the 2009-2010 sector-plan baseline accordingly. No data is yet available regarding potential 2010 exports to non-Article 5 countries and associated HCFC-22 consumption. In this regard, the Secretariat would like to point out that increasing amounts of air conditioners appear to be exported from China to, in particular, eastern European and central Asian non-Article 5 countries;
- (c) UNIDO pointed out that the Government of China conducted a survey to obtain 2009 production and consumption data. Despite requests, the complete set of data has not been made available to the Secretariat. The methodology for determination of the 2009 and 2010 HCFC-22 baseline consumption in the RAC sector remains unclear and, therefore, cannot serve as a reliable basis for determining the eligible incremental cost;
- (d) The ownership of non-Article 5 countries in RAC manufacturing capacity has a significant impact on the level of eligible incremental costs. Currently, the contribution of enterprises with non-Article 5 ownership represents 9.3 per cent of the total target of HCFC-22 phase out in Stage I. The methodology used to determine this share does not correspond to the respective decisions of the Executive Committee, which request enterprise specific information. The sensitivity analysis shows that the contribution of such enterprises might vary from zero per cent (in case only locally owned enterprises are selected for conversion during Stage I) to 64 per cent when only enterprises with non-Article 5 ownership are involved in Stage I conversions. In the latter case, the commitment of the MLF would represent about 36 per cent of all Stage I incremental costs instead of 90.7 per cent as requested. The Secretariat would like to state that such an approach might not be implementable, and that currently it is not possible for the Secretariat to assess and clarify the issues related to the selection of enterprises versus their ownership;
- (e) At this point in time, the Secretariat is not aware of which enterprises are being selected for Stage I conversions and, therefore, can neither advise the Executive Committee on the eligible MLF share of required costs for conversions, nor of the actual incremental cost needed for each particular enterprise;
- (f) The basis for selected average annual production capacity of 250,000 units for the model case production line is also not clear. No supporting information was provided to corroborate why this size of line had been chosen, or how to determine an alternative number which might better reflect the situation of conversions during Stage I. The selection of a model production line with higher output would have resulted in a lower level of eligible incremental costs, since to reach the calculated reduction in consumption desired, starting from the assumed sector baseline, fewer production lines would need to be converted;

- (g) A number of incremental capital and operating cost items have not been agreed as indicated in the Secretariat's comments within document UNEP/OzL.Pro/ExCom/62/26. For example, the costs of plant engineering, product redesign, trials, testing and training have been assumed to arise for the conversion of each of the production lines to be converted but this does not account for any savings arising where one selected enterprise has several production lines to be converted and might even be manufacturing the same product or similar products on them;
- (h) UNIDO informed the Secretariat that it could not recognise any synergy between the project proposed and the UNDP-GEF project "Promoting Energy Efficient Room Air-Conditioners" (PEERAC). The Secretariat had demonstrated that the PEERAC project incorporates many features that are closely related with activities proposed in the RAC sector plan, such as the technical assistance components requested in the RAC sector plan and, therefore, has an impact on the requested incremental costs for technical assistance; and
- (i) The Secretariat believes that it is presently not possible to assess the eligible incremental cost for the RAC sector on a technical level with reasonable accuracy, given the gaps in data as explained above. However, the Secretariat also feels that the current level of information might provide sufficient input into a discussion in the Executive Committee focussing on non-technical issues regarding the funding level for the RAC sector.
